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Original Article

Awareness and performance of dentists and general practitioners regarding dry mouth

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Abstract

Background: The aim was to investigate the knowledge and performance of dentists and general practitioners in Kerman City concerning dry mouth in 2023.

Methods: This analytical and cross-sectional study examined 305 physicians. A questionnaire was developed by the researcher that included personal questions such as age, sex, weekly working hours, and work experience, as well as general questions and questions related to dry mouth. The data were analyzed using Wilcoxon-Mann-Whitney tests, t-tests, Chi-square test, and ANOVA in SPSS 21 software.

Results: Of the participants, 108 were men and 197 were women. Moreover, 94 participants were physicians, and 211 were dentists. The study showed that 53.8% of the participants had encountered a person complaining of dry mouth, and according to 72.6% of the participants, a dry mouth retraining course was required. The participants' average knowledge score was 21.45 ± 3.21 out of 32, and their average performance score was 32.24 ± 4.52 out of 55. There was a significant relationship between age and performance, with younger participants performing better ($P=0.01$). However, no significant relationship was observed between working hours per week, gender, field of study, and year of graduation with performance ($P=0.31$, $P=0.14$, $P=0.09$, $P=0.06$, respectively).

Conclusion: The dentists' and general practitioners' knowledge and performance regarding dry mouth were evaluated to be at a moderate level. Determining and continuing necessary strategies to improve physicians' level of knowledge and performance, as well as examining the economic losses caused by such apparently insignificant oral problems, will play an important role in reducing the occurrence of these problems and their consequences.

Keywords: Xerostomia, Awareness, Performance, Physician

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Introduction

Saliva is a fluid in the oral cavity that helps neutralize acids produced by bacteria, restricts bacterial growth, and washes away food particles, thus preventing tooth decay. Saliva also enhances the sense of taste and facilitates chewing and swallowing. Enzymes present in saliva aid in digestion. As a result, reduced saliva and dry mouth can have a significant impact on overall health, oral health, appetite, and enjoyment of food[1].

The term "dry mouth" encompasses two issues: 1) the sensation of oral dryness (xerostomia) and 2) dysfunction of salivary glands (reduction in the quantity and/or quality of saliva). These conditions may occur separately or in combination[2].

Interestingly, patients with complaints of dry mouth often do not exhibit any overt signs of hyposalivation, and their symptoms may be secondary to qualitative or quantitative changes in saliva composition. Stimulated salivary flow rate averages from 1.5 to 2.0 milliliters per minute, while unstimulated salivary flow rate is nearly 0.3 to 0.4 milliliters per minute. When the stimulated salivary flow rate is less than 0.5–0.7 milliliters per minute, and the unstimulated salivary flow rate is less than 0.1 milliliters per minute, hyposalivation is diagnosed[3].

Dry mouth is often caused by the side effects of certain medications, aging, or as a result of radiation therapy for cancer. In rarer cases, dry mouth can be caused by diseases directly affecting the salivary glands[1,4]. Additionally, certain health conditions, diseases, and habits can contribute to dry mouth, including anxiety disorders, depression, HIV/AIDS, Parkinson's disease, diabetes, Sjögren's syndrome, sleeping with an open mouth, snoring, botulinum toxin

injections, stroke, and Alzheimer's disease[5].

The consequences of dry mouth include atrophy of tongue papillae, tongue fissuring, bad breath, cervical tooth decay, tooth erosion, pain or burning sensation, dry lips and mouth, difficulty in eating and speaking, altered taste, and difficulties in using dentures[5].

The prevalence of dry mouth in the population ranges from 5.5% to 46%, significantly affecting quality of life and self-esteem[4].

Nevertheless, considering the psychological and physical effects of dry mouth, a specific management strategy should be implemented for this issue, including a comprehensive medical history and clinical examination to identify underlying pathologies contributing to dry mouth symptoms[1-5]. Therefore, given the limited research on the awareness and performance of dentists and especially general practitioners regarding dry mouth, this study aimed to investigate the awareness and performance of dentists and general practitioners in Kerman City regarding dry mouth.

Methods

To conduct this analytical and cross-sectional study, we initially obtained a list of dentists and general practitioners from the Medical Council. A researcher-designed questionnaire was prepared, consisting of personal information questions such as age and gender, general questions (six questions), and questions related to dry mouth (knowledge-related questions – 16 questions; performance-related questions – 11 questions).

The questionnaire was distributed among the study participants, who were then asked to complete and return it. Each participant was provided with an explanation of the study's objectives and was invited to participate voluntarily. They were assured that all their information would remain confidential and would only be presented in the form of a report. Given that such studies require the cooperation of individuals, every effort was made to thoroughly explain the purpose of the study, and the participants were assured of the harmlessness of the research and the confidentiality of their information.

A final-year dental student visited clinics and medical centers and distributed the questionnaire. The nature and purpose of this study allowed participants who agreed to take part to withdraw at any time after the interview began. The questionnaire consisted of two categories of questions: awareness and performance. Since the questionnaire was based on individuals' knowledge, it was collected approximately 15 minutes after being given to each participant.

The items in the questionnaire were designed by six dental specialists and one statistics specialist. To evaluate and thereby confirm the scientific validity and reliability of the questionnaire, it was first reviewed by seven faculty specialists. Discussions were held regarding the level and comprehensibility of the items, based on their opinions and the examination of texts, confirming the content validity of the questionnaire. Afterward, the preliminary questionnaire was given to 10 dentists and general practitioners for feedback on its wording (formal validity), and a review was conducted 10 days later. The reliability of the questionnaire, using Cronbach's alpha coefficient (0.81), was found to be desirable.

In the knowledge-related items, each correct answer received a score of 2, an incorrect answer received a score of 0 (score range between 0–32), and "I do not know" received a score of 1. For the performance-related items, a Likert scale was used, with scores ranging from 5 (Always) to 1 (Never) (score range between 11–55).

Statistical analyses were conducted using t-tests (to determine any significant difference between the means of the two groups and how they are related) and Chi-square tests (to analyze such differences in categorical variables, especially those nominal in nature). The statistical software SPSS version 21 was used for data analysis.

Results

A total of 305 physicians and dentists, 108 males and 197 females, participated in the study. The average age of the participants was 35.25 ± 12.33. Of the participants, 94 were physicians and 211 were dentists. Table 1 shows the demographic characteristics of the study participants.

The study showed that 53.8% of the individuals encountered someone with a dry mouth, and 72.6% of them felt the need to participate in a dry mouth training program. Less than half of the participants had knowledge about dry mouth tests (Table 2).

The most common factors that the participants believed could cause dry mouth in order of abundance were antidepressant medication (80%), smoking (77.9%), radiotherapy to the head and neck region (74.4%), increasing age (73.4%), and antihypertensive medications (67.9%). Among these factors, levothyroxine medication was the only one not mentioned by the participants (Table 3).

Of the participants, 92.2% stated that dry mouth is more common in older individuals. Moreover, 89.1% of the participants believed that diabetes could cause dry mouth,

Table 1. Demographic Characteristics of Study Participants

Variable		Male		Female	
		No	%	No	%
Field of Study	Medical	42	44.7	52	55.3
	Dentistry	65	30.8	146	69.2
Age (Mean ± SD)		14.21 ± 39.25		10.45 ± 31.19	
Weekly Working hours	<25	24	16.2	124	83.8
	≥25	70	48.6	74	51.4
Work Experience	<10	60	35.3	110	64.7
	≥10	47	35.1	87	64.9

and 49.1% believed that lupus could lead to dry mouth, while 86.1% thought that mental and psychological disorders could cause dry mouth (Table 4).

The average awareness score among the study participants was 21.45 ± 3.21 out of 32, indicating moderate awareness among them. There was a significant relationship between gender and field of study with awareness, with women and dentists having higher awareness than men and physicians ($P = 0.02$, $P = 0.01$). However, there was no significant relationship with weekly working hours, age, or year of graduation ($P = 0.12$, $P = 0.09$, $P = 0.21$).

Of the participants, 69.96% often or always recommended that patients with dry mouths avoid spicy foods. About 32.2% recommended the use of artificial saliva to patients, and 4.2% prescribed anti-anxiety medications for their patients (Table 5).

The average performance score among the study participants was 32.24 ± 4.52 out of 55, indicating moderate performance among them. There was a significant relationship between age and performance, with younger individuals performing better than older ones ($P = 0.01$). However, there was no significant relationship between weekly working hours, gender, field of study, or year of graduation ($P = 0.31$, $P = 0.14$, $P = 0.09$, $P = 0.06$).

Table 2. Participants' Responses to General Questions

Question	Yes		No	
	No	%	No	%
Have you ever encountered a patient with dry mouth?	160	53.8	136	45.7
Do you treat these patients?	109	37.45	181	62.1
Do you refer patients with dry mouth?	201	68.6	91	31.05
Have you participated in a training course on dry mouth?	11	3.71	284	95.9
Do you think participating in a dry mouth training course is necessary?	212	72.6	79	27.05
Are you familiar with diagnostic tests for dry mouth?	118	40	177	60

Discussion

This study investigated the awareness and performance of physicians regarding dry mouth. The results showed that the participants had average knowledge and performance. There was a significant relationship between gender, field of study, and knowledge; women were more

Table 3. Participants' Responses to the Question "In your opinion, which of the following factors can cause dry mouth?"

	No	%		No	%		No	%
Antihistamines	163	56.2	Tobacco Use	226	77.9	Anticoagulant Drugs	19	6.5
Antihypertensive Drugs	197	67.9	Botulinum Toxin for Cosmetics	39	13.4	Antiviral Drugs	33	11.3
Painkillers	44	15.17	Stroke	62	21.4	Blood Sugar Reducers	110	37.9
Muscle Relaxants	32	11.03	Alzheimer's Disease	60	20.6	Levothyroxine	0	0
Urinary Control Drugs	147	50.6	Radiotherapy	216	74.4	Multivitamins &Supplements	11	3.7
Parkinson's Drugs	104	35.8	Antidepressant Drugs	235	81	Aging	213	73.4

Table 4. Participants' Responses to Awareness Questions

Question	True		False		Don't know	
	No	%	No	%	No	%
Dry mouth is more common in women.	89	30.4	28	9.5	174	59.5
Dry mouth is more common in the elderly.	274	92.2	5	1.6	17	5.7
Dry mouth is common in Iran.	32	10.8	26	8.7	237	80
A dry mouth is always a sign of a systemic disease.	30	9.8	237	80	28	9.4
Medications can cause dry mouth.	289	97.6	0	0	6	2
Diabetes can cause dry mouth.	264	89.1	7	2.3	6	1.9
Rheumatoid arthritis can cause dry mouth.	110	37.1	34	11.4	152	51.3
Sjögren's syndrome can cause dry mouth.	233	78.7	6	2	56	18.9
Lupus can cause dry mouth.	145	49.1	27	9.1	122	41.3
Hypothyroidism can cause dry mouth.	136	46.2	48	16.3	109	37
Hyperthyroidism can cause dry mouth.	70	23.8	87	29.5	136	46.2
Using Dentures can cause dry mouth.	151	51.2	47	15.2	96	32.5
A dry mouth can cause tooth decay.	277	93.9	2	0.6	15	5.1
A dry mouth can cause Candida in the mouth.	249	84.6	18	6.1	26	8.8
Dry mouth causes a burning and painful sensation in the mouth	262	89.4	6	2.1	24	8.2
Psychological disorders can cause dry mouth.	253	86.1	10	3.4	30	10.2

Table 5. Participants' Responses to Performance Questions

Question	Always		Often		Sometimes		Rarely		Never	
	No	%	No	%	No	%	No	%	No	%
I recommend that a patient with a dry mouth drink plenty of water.	10	36.2	98	33.5	74	25.3	9	3.1	5	1.7
I recommend that a patient with a dry mouth avoid spicy foods.	93	31.7	112	38.2	51	17.4	20	6.8	16	5.4
I recommend that a patient with dry mouth not have dietary restrictions.	15	5.12	27	9.2	80	27.3	95	32.4	75	25.6
I recommend the use of artificial saliva for my patient.	30	10.3	64	21.9	113	38.7	55	18.8	29	9.9
I recommend that my patient use chlorhexidine mouthwash.	9	3.1	60	20.6	120	41.2	54	18.6	46	15.8
I recommend that my patient use sugar-free gum.	65	22.3	133	45.5	61	20.9	22	7.5	11	3.7
I prescribe pilocarpine medication for my patient.	19	6.6	26	9.03	100	34.7	81	28.1	61	21.2
I refer a patient with dry mouth to a specialist.	65	22.1	104	35.4	88	29.9	27	91.2	9	3.1
I refer a patient with dry mouth to a psychiatrist.	1	0.3	7	2.4	101	34.5	122	41.6	61	20.8
I advise my patient not to use dentures in the mouth.	4	1.4	18	6.2	85	29.3	120	41.4	62	21.4
I prescribe anti-anxiety medications for my patient.	2	0.7	10	3.5	84	29.2	86	28.8	105	36.4

knowledgeable than men, and dentists were more knowledgeable than physicians. However, no significant relationship was found between working hours per week, age, and year of graduation. A significant relationship was observed between age and performance, with younger individuals performing better than older ones, while no significant association was found with working hours per week, gender, field of study, or year of graduation.

Dry mouth is the most common manifestation of salivary gland disease, with its prevalence reported to range between 10% and 30% in various studies.[6] In addition to true dry mouth, which is caused by a decrease in saliva secretion, there is another definition: the sensation described by the patient as a dry mouth, which does not necessarily indicate a reduction in salivary flow. The sensation of dry mouth usually occurs in elderly individuals and is more common in women.[7-9]

Considering the key role of saliva in protecting the oral environment and supporting functions such as chewing, swallowing, and the sense of taste, a lack of saliva can cause numerous painful problems for patients and negatively affect their quality of life.[10-13]

Since dry mouth is a common phenomenon and patients usually go to physicians for treatment, it is necessary for these professionals to acquire the necessary knowledge regarding its causes, symptoms, complications, and treatments. Examining the knowledge and ability of dentists to manage patients complaining of dry mouth can provide useful information for educational planning by those in charge.

Davarmanesh et al[14] showed that the level of awareness of dentists in Shiraz about the causes, symptoms, and treatment methods of dry mouth is weak and insufficient, and there is no significant relationship between the employment history of dentists and their knowledge about the causes and symptoms of dry mouth, while a significant inverse relationship was found between the employment history of the participating dentists and their knowledge of how to treat dry mouth. In addition, there was no significant difference between the causes of dry mouth and the age of the dentists. The average level of knowledge of dentists about the causes of dry mouth was higher among women than men, and this difference was statistically significant.

In Abdelghany et al's research[15], young people and women had better knowledge, performance, and attitude than older people and men, and in general, the attitude of dentists toward the treatment of patients was positive. They did not consider dry mouth an insignificant complaint and were aware of its negative impact on people's quality of life and public health.

In the study by Abdul Ghani et al[16], individuals in the younger age group gave better answers to the questions, and women had more information about the treatment of patients than men. The reason for the higher level of knowledge among female dentists compared to male ones, as observed in both the present study and the study by Abdul Ghani et al., may be related to women's greater ability to retain information[16]. In this research, 37.45% of dentists treated patients with dry mouth.

Dauermensch et al[14] showed that among the participating dentists, 57.7% were only trying to solve the problem of patients with dry mouth, which was similar to the results of Folke et al[16], in which dry mouth, except in certain cases where it was the main motivation for the patient's visit, was not considered highly important by the dentist. The opinion of the health officials about dry mouth was that this problem is neglected despite its high prevalence in society.

Shanan and Aldieb[17] investigated the level of knowledge and attitude of dentists about dry mouth and its treatment in 2011. They stated that if the acquisition of the necessary knowledge in the dental education course can be accompanied by a sufficient amount of clinical interaction with patients with dry mouth, then the self-confidence of dentists increases in dealing with patients

and treating dry mouth.

As in the current study, in the study by Shanan and Aldieb[17], the demographic information of the participants was also used to analyze some results. However, the study by Folke et al[16] was mostly based on the approach and description of dentists in dealing with patients with dry mouth, regardless of their demographic characteristics. In this study, the questions were asked in the form of multiple-choice options, while in the qualitative study by Folke et al[16] the information was obtained through face-to-face interviews with participants, and the possibility of being affected by misunderstandings and incompleteness in the interview process existed. As a result, mistakes in answering the questions increased.

The difference in the level of knowledge in different studies may be related to the decline in scientific records due to a lack of interaction with patients and inadequate use of academic resources.

The familiarity of most dentists with the causes of dry mouth was adequate. However, in a few limited cases, this familiarity was reported to be higher. In addition, dentists had a relatively good familiarity with drugs that cause dry mouth, which is consistent with the findings of Darmenesh et al[14].

In this study, 15.63% of the participants considered pilocarpine as an effective systemic drug. In the study of Davarmanesh et al[14], 47% of participants considered this drug as an effective drug on the amount of saliva secretion.

In a qualitative study, Appleby et al[18] investigated the awareness and treatment of dry mouth in general practitioners in Australia. The most notable finding in their study was that dry mouth was not an important issue for general practitioners and was ignored or undervalued by a large number of participants. Ignoring dry mouth as a symptom or side effect of diseases has led most physicians not to consider it when taking a history or performing an examination, and to rarely ask about dry mouth during routine examinations, which is consistent with the research of Andersson et al[19]

According to the participants, the factors most likely to cause dry mouth are antidepressants (80%), tobacco (77.9%), radiotherapy of the head and neck area (74.4%), aging (73.4%), and antihypertensive drugs (67.9%). Among these factors, the only item that none of the participants mentioned was levothyroxine.

Appleby et al's research[18] showed that, according to physicians, several drugs can cause dry mouth. However, some of the participants in this study did not consider medication modification or replacement for patients who complained of dry mouth, and there was no information about dry mouth caused by medications.

Villa et al[20] recommended that when prescribing a drug, one should pay attention to its side effects and warn the patient if it affects saliva.

Abdelghany et al[15] showed that more than 70% of dentists asked patients with dry mouth about prescribed medications such as antidepressants, diabetes, or rheumatoid disease, which is consistent with other studies[21,22,23,24].

Studies have shown that a significant population of elderly people face the challenge of dry mouth. The evidence shows that the secretory capacity of the saliva of the elderly decreases under the influence of external factors such as the use of drugs, some chronic inflammatory diseases, and radiation caused by radiation therapy for head and neck cancers.[25,26,27]

This study showed that according to 72.6% of the participants, there is a need to participate in a dry mouth retraining course, which is consistent with the research of Appleby et al[28] Other studies have also shown the desire of physicians to know more about oral and dental health and support increasing education for general practitioners on this topic[26-28].

Of the individuals participating in the study, 68.6% referred the patient. In Appleby et al's study[28], communication between dentists and general practitioners was reported to be weak, and referrals were also limited, which is consistent with Chrismawaty et al's research[29]. Isbej et al's research showed that the poor knowledge of physicians prevents these patients from being referred to dentists.[30]

Of the participants, 53.8% had encountered a patient with dry mouth. In Abdelghany et al's research[15], almost two-thirds of dentists had seen patients with dry mouth in the previous month, and more than 70% of them reported that they treated patients with dry mouth or that the patient had been referred.

The patient's poor understanding of the importance of dry mouth causes the patient to suffer from gradual complications for a long time without being aware of dry mouth. Another point to consider in this issue is the lack of attention and care on the part of physicians to obtain proper medical history from patients and the failure to perform external and internal examinations related to dry mouth. Providing appropriate diagnostic-therapeutic services for patients requires, on the one hand, improving the level of knowledge in identifying and treating the problem of dry mouth, and on the other hand, creating a positive attitude and strengthening the motivation of physicians. It is suggested that by applying the necessary measures from health officials, such as encouraging physicians to increase their diagnostic abilities and holding retraining courses, appropriate information and knowledge in dealing with oral problems—and more importantly, improving the attitudes of this group of physicians—be provided, with a deeper focus on the mouth in addition to paying attention to the main reason for the patient's visit.

Conclusion

The knowledge and performance of dentists and general

practitioners regarding dry mouth were evaluated to be at a moderate level. In terms of performance, younger people performed better than older people. Determining and continuing the necessary strategies to improve the level of knowledge and performance of physicians, and examining the economic losses caused by such apparently insignificant oral problems, will play an important role in reducing the occurrence of problems and their consequences.

Strengths and Limitations

The limitations of the research included the non-cooperation of a number of participants and the incompleteness of a number of forms.

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Authors' Contribution

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Competing Interests

None declared.

Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethical Approval

This project was approved by the Ethics Committee of the Kerman University of Medical Science with the code IR.KMU.REC.1399.540.

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