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Knowledge, Attitudes and Practices of Dentists Regarding Pharmacovigilance and Reporting of Adverse Drug Reactions in Northwestern Turkiye: A Cross-Sectional Study

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ABSTRACT

Objectives: The drugs commonly used/prescribed by dentists/physicians or consumed by patients may cause adverse drug reactions (ADRs). Therefore, the possibility of dentists to encounter an ADR during their professional lives cannot be underestimated and the contribution of dentists to pharmacovigilance systems by notifying spontaneous ADR reports play an important role in the early detection and prevention of ADRs. This study aimed to assess the knowledge, attitudes and practices of dentists regarding pharmacovigilance and ADR reporting.

Materials and Methods: A questionnaire with 30 questions evaluating knowledge, attitudes and practices of pharmacovigilance and ADR reporting among general dentists (GDs) and specialist dentists (SDs) was distributed electronically in northwestern region of Turkey. Data were statistically analyzed ($p < 0.05$).

Results: Most of the participants were able to define the terms of pharmacovigilance (64.7%), ADR (74.9%) and side-effect (58.1%). SDs were significantly more aware of ADRs related to the drugs used/prescribed by dentists/physicians and other drugs consumed by patients than GDs. Additionally, awareness of ADRs regarding these drugs was significantly higher among participants with ≤12 years of experience ($p<0.05$). Only 2.8% of participants (4 GDs, 6 SDs) reported an ADR in their professional lives. However, 52.5% of participants had encountered an oral mucosal ADR during their professional lives, which was statistically higher in the group of SDs and participants with >12 years of experience ($p<0.05$).

Conclusions: The role of dentists in the diagnosis and reporting of ADRs should not be underestimated since they are an integral part of the healthcare system. The contribution of both GDs and SDs to the ADR reporting system needs to be improved in Turkey. Additionally, ADR reporting should be integrated into daily practices of dentists.

Keywords: Adverse Drug Reaction; Dentists; Pharmacovigilance.

Türkiye'nin Kuzeybatısındaki Diş Hekimlerinin Farmakovijilans ve Advers İlaç Reaksiyonlarının Raporlanmasına İlişkin Bilgi, Tutum ve Uygulamaları: Kesitsel Bir Çalışma

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ÖZ

Amaç: Diş hekimleri/doktorlar tarafından kullanılan/reçete edilen ya da hastaların aldığı ilaçlar, advers ilaç reaksiyonlarına (AİR) yol açabilmektedirler. Bu yüzden, diş hekimlerinin profesyonel hayatları boyunca AİR ile karşılaşma olasılıkları göz ardı edilemez ve diş hekimlerinin AİR raporlarını spontan bildirimleri ile farmakovijilans sistemlerine katkıları, AİR'nin erken tespiti ve önlenmesinde önemli rol oynamaktadır. Bu çalışma, diş hekimlerinin farmakovijilans ve AİR raporlaması hakkında bilgi, tutum ve uygulamalarının değerlendirilmesini amaçlamaktadır.

Gereç ve Yöntemler: Türkiye'nin kuzeybatı bölgesinde genel diş hekimleri (GDH) ve uzman diş hekimleri (UDH) arasında, farmakovijilans ve AİR raporlaması hakkında bilgi, tutum ve uygulamalarını değerlendiren 30 soruluk bir anket, elektronik olarak dağıtılmıştır. Elde edilen veriler istatistiksel olarak analiz edilmiştir ($p<0,05$).

Bulgular: Katılımcıların büyük çoğunluğu, farmakovijilans (%64,7), AİR (%74,9) ve yan etki (%58,1) terimlerini tanımlayabilmiştir. UDH'ler, diş hekimleri/doktorlar tarafından kullanılan/reçete edilen ilaçlar ya da hastaların aldığı diğer ilaçlarla ilgili AİR'lerin, GDH'lere göre önemli ölçüde daha fazla farkındaydı. Ayrıca, bu ilaçlarla ilgili AİR farkındalığı, ≤12 yıllık deneyime sahip katılımcılar arasında anlamlı olarak daha yüksekti ($p<0,05$). Katılımcıların yalnızca %2,8'i (4 GDH, 6 UDH) profesyonel hayatlarında bir AİR bildirmiştir. Ancak, katılımcıların %52,5'i profesyonel hayatlarında oral mukozal AİR ile karşılaşmışlardır; bu oran UDH grubunda ve >12 yıllık deneyime sahip katılımcılarda istatistiksel olarak daha yüksekti ($p<0,05$).

Sonuçlar: AİR'lerin teşhisinde ve raporlanmasında diş hekimlerinin rolü, sağlık sisteminin ayrılmaz bir parçası oldukları için küçümsenmemelidir. Türkiye'de hem GDH'lerin hem de UDH'lerin AİR raporlama sistemine katkılarının iyileştirilmesi gerekmektedir. Ek olarak, AİR raporlaması diş hekimlerinin günlük pratiklerine entegre edilmelidir.

Anahtar Kelimeler: Advers Ilaç Reaksiyonu; Diş Hekimleri; Farmakovijilans.

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Introduction

The worldwide increase in drug consumption, including in Turkey, the use of over-the-counter drugs and/or herbal remedies in addition to prescribed drugs, and polypharmacy, especially among elderly patients, require dentists to be careful about potential adverse drug reactions (ADRs).[1] These reactions may develop due to the drugs commonly used/prescribed by dentists/physicians or consumed by patients.[2,3] The frequency of many drug-related oral reactions is not known precisely because of their subclinical course.[4] However, more than 200 drugs have been demonstrated to be involved in ADRs in oral tissues.[1] Furthermore, antibiotics and analgesics, which are prescribed routinely by dentists, are among the major causes of ADRs.[5] Despite the high possibility of encountering an ADR during routine dental practice, dentists' contributions to ADR reporting are reported to be less than 1%.[6]

The knowledge, attitudes and practices (KAP) of health care professionals (HPs) regarding ADRs and their contribution to pharmacovigilance (PV) systems by providing spontaneous ADR reports to competent authorities play an important role in the early detection and prevention of ADRs.[7-9]

Limited contributions of HPs to PV activities in Turkey were reported due to their scarce PV knowledge, similar to the findings of studies in other countries. Most of these studies have been predominantly focused on the KAP of physicians, nurses and pharmacists.[7,10-15] The possibility of both oral mucosal ADRs due to various drugs and ADRs due to used/prescribed drugs by dentists cannot be underestimated, and it is of the utmost importance to create awareness among dentists about the progression of PV in Turkey. Therefore, this study aimed to assess the KAP of dentists regarding PV and ADR reporting and its association with the demographic characteristics of dentists (sex, profession, and professional experience).

Materials and Methods

The protocol of this study was approved by the Ethics Committee of Istanbul Aydin University (Protocol no: B.30.2.AYD.0.00.00-050.06.04/455). Between March 2021-September 2021, this cross-sectional study was conducted to evaluate the KAP regarding PV and ADR reporting among general dentists (GDs) and specialist dentists (SDs) working in the northwestern region of Turkey. The questionnaire was designed with the guidance of regulatory instructions and informative documents published on the website of the Turkish Pharmacovigilance Center (TUFAM) and previous reports.[3,4,16,17-19] The questionnaire consisted of 30 closed-ended multiple-choice questions (in some questions, multiple responses were allowed) and was subdivided into four sections:

1. Demographic characteristics of the participants (5 questions)
2. Assessment of the participants' knowledge about PV, ADRs and ADR reporting (8 questions)
3. Assessment of the participants' attitudes regarding ADRs and ADR reporting (5 questions)
4. Assessment of the participants' practices regarding ADRs and ADR reporting (12 questions)

The questionnaire was distributed to dentists electronically via the Istanbul Chamber of Dentists. The webpage opened with information outlining the aims of this study and an informed consent form. Only after approval of the form to voluntarily answer the questions was the participant directed to the question page. A total of 360 questionnaires were available for analysis.

The data were analyzed using the Statistical Package for the Social Sciences (SPSS, version 15.0; Armonk, NY: IBM Corp.) according to descriptive statistics. A chi-square test was performed to verify the differences between the groups. The level of significance was set to $p<0.05$.

Results

A total of 170 GDs and 190 SDs aged between 23-72 years (37.0±9.8) participated in this study. The participants were divided into two groups of ≤12 years and >12 years, considering the median years of professional experience (Table 1).

Knowledge about PV, ADRs and ADR reporting

Most of the dentists (71.4%) correctly defined ADR. Female participants (74.9%) seemed to be more knowledgeable about ADR than males (65.1%) ($p=0.049$). More than half of the dentists had knowledge of the terms "PV" and "side effect" (64.7% and 58.1%, respectively). There was no statistically significant difference between GDs and SDs regarding the previously mentioned terms ($p>0.05$). Dentists with ≤12 years of experience had significantly more knowledge about side effect ($p=0.002$).

Only 13.9% of the dentists know the time period to report ADRs after encountering them. The participants' responses were statistically nonsignificant regarding sex, profession, and professional experience ($p>0.05$).

Female dentists seemed to have greater knowledge about how to complete the ADR reporting forms than males ($p<0.05$). Compared to GDs, SDs indicated writing identity of the patient and the reporter in the form significantly more often ($p<0.05$).

The most well-known drugs commonly used/prescribed in dentistry that cause ADRs are listed in Table 2. Only 8.1% of the dentists did not know any of these drugs, which was statistically lower in the group of SDs ($p=0.04$). Awareness of ADRs regarding these drugs was significantly higher among participants with ≤12 years of experience than among participants with >12 years of experience ($p<0.05$). Moreover, the participants were asked "Which drugs cause an oral mucosal ADR?". GDs had significantly poorer knowledge about these drugs than SDs, which was also significant in the group of participants with > 12 years of experience compared to participants with ≤12 years of experience ($p<0.05$) (Table 3).

Table 1: The demographic characteristics of the dentists who participated in the study

			n	%
Gender		Female	231	64.2
		Male	129	35.8
Professional experience (years)		≤12	199	55.3
		>12	161	44.7
Profession	**GDs**		170	47.2
	SDs	Maxillofacial Radiologist	15	4.2
		Maxillofacial Surgeon	24	6.7
		Endodontist	18	5.0
		Orthodontist	28	7.8
		Pedodontist	25	6.9
		Periodontist	25	6.9
		Prosthodontist	37	10.3
		Restorative Dentistry	18	5.0
		Total	190	52.8
Institution		Faculty	125	34.7
		Private practice	34	9.4
		State hospital	82	22.8
		Polyclinic/Private Hospital	119	33.1

GD, General dentist; *SD,* Specialist dentist.

Table 2: The distribution of the commonly used/prescribed drugs in dentistry that cause ADRs

Commonly drugs used/ prescribed in dentistry*	Gender					Profession					Professional experience				
	Female		Male		p	GDs		SDs		p	≤12 years		>12 years		p
	n	%	n	%		n	%	n	%		n	%	n	%	
Local anesthetics	196	84.8	102	79.1	0.164	134	78.8	164	86.3	0.060	163	81.9	135	83.9	0.628
Analgesics	168	72.7	97	75.2	0.611	119	70.0	146	76.8	0.141	149	74.9	116	72.0	0.545
Antibiotics	202	87.4	115	89.1	0.633	148	87.1	169	88.9	0.581	173	86.9	144	89.4	0.466
Antifungals	119	51.5	60	46.5	0.363	64	37.6	115	60.5	**< 0.001**	115	57.8	64	39.8	**0.001**
Antiinflammatory mouthwashes	128	55.4	68	52.7	0.622	80	47.1	116	61.1	**0.008**	118	59.3	78	48.4	**0.040**
Sedatives/general anesthetics	164	71.0	74	57.4	**0.009**	94	55.3	144	75.8	**< 0.001**	145	72.9	93	57.8	**0.003**
Do not know	18	7.8	11	8.5	0.806	19	11.2	10	5.3	**0.040**	17	8.5	12	7.5	0.706

Chi-squared test; p<0.05

*More than one option could be selected

ADR, Adverse drug reaction; *GD,* General dentist; *SD,* Specialist dentist.

Table 3: The distribution of the commonly known drugs which are responsible for oral mucosal ADRs

The drugs causing oral mucosal ADRs*	Gender					Profession					Professional experience				
	Female		Male		p	GDs		SDs		p	≤12 years		>12 years		p
	n	%	n	%		n	%	n	%		n	%	n	%	
Local anesthetics	134	58.0	75	58.1	0.981	93	54.7	116	61.1	0.223	130	65.3	79	49.1	**0.002**
Antiinflammatory analgesics	84	36.4	49	38.0	0.760	56	32.9	77	40.5	0.137	77	38.7	56	34.8	0.445
Antiinflammatory mouthwashes	124	53.7	69	53.5	0.972	80	47.1	113	59.5	**0.018**	113	56.8	80	49.7	0.180
Antibiotics	148	64.1	91	70.5	0.212	112	65.9	127	66.8	0.847	137	68.8	102	63.4	0.273
Antifungals	99	42.9	67	51.9	0.097	66	38.8	100	52.6	**0.009**	100	50.3	66	41.0	0.080
Antidepressants	101	43.7	59	45.7	0.712	69	40.6	91	47.9	0.164	93	46.7	67	41.6	0.331
Antihypertensives	121	52.4	61	47.3	0.354	76	44.7	106	55.8	**0.036**	111	55.8	71	44.1	**0.028**
Anticonvulsants	111	48.1	58	45.0	0.573	64	37.6	105	55.3	**0.001**	108	54.3	61	37.9	**0.002**
Immunosuppressive drugs	142	61.5	84	65.1	0.493	99	58.2	127	66.8	0.092	132	66.3	94	58.4	0.121
Corticosteroids	119	51.5	67	51.9	1.000	88	51.8	98	51.6	0.972	115	57.8	71	44.1	**0.010**
Bisphosphonates/ Antiresorptives	137	59.3	86	66.7	0.168	99	58.2	124	65.3	0.170	131	65.8	92	57.1	0.091
Antiangiogenic drugs	59	25.5	34	26.4	0.865	28	16.5	65	34.2	**< 0.001**	65	32.7	28	17.4	**0.001**
Herbal drugs	57	24.7	36	27.9	0.502	30	17.6	63	33.2	**0.001**	55	27.6	38	23.6	0.384
Do not know	29	12.6	11	8.5	0.244	22	12.9	18	9.5	0.296	25	12.6	15	9.3	0.330

Chi-squared test; p<0.05.

*More than one option could be selected.

ADR, Adverse drug reaction; *GD,* General dentist; *SD,* Specialist dentist.

Table 4: The distribution of discouraging reasons for reporting ADRs

Reasons*	Gender					Profession					Professional experience				
	Female		Male		p	GDs		SDs		p	≤12 years		>12 years		p
	n	%	n	%		n	%	n	%		n	%	n	%	
Lack of time to report	10	4.3	5	3.9	0.837	10	5.9	5	2.6	0.123	6	3.0	9	5.6	0.224
Not knowing how and where to report	51	22.1	16	12.4	**0.024**	37	21.8	30	15.8	0.146	30	15.1	37	23.0	0.055
Not being sure whether it is an ADR or not	20	8.7	9	7.0	0.574	17	10.0	12	6.3	0.200	11	5.5	18	11.2	0.050
No need to report it since it is a common ADR	27	11.7	14	10.9	0.811	19	11.2	22	11.6	0.904	18	9.0	23	14.3	0.120
The idea of one single ADR report could not make a difference	15	6.5	7	5.4	0.685	11	6.5	11	5.8	0.788	12	6.0	10	6.2	0.943
Not having the knowledge or courage to discuss ADRs with my colleagues	6	2.6	5	3.9	0.532	9	5.3	2	1.1	**0.020**	6	3.0	5	3.1	1.000
Concerns about the negative impact on my professional life or the pharmaceutical company	3	1.3	1	0.8	1.000	3	1.8	5	2.6	0.347	2	1.0	2	1.2	1.000
Legal liability issues	4	1.7	3	2.3	0.705	4	2.4	30	15.8	0.711	4	2.0	3	1.9	1.000

Chi-squared test; p<0.05.
*More than one option could be selected.
ADR, Adverse drug reaction; *GD,* General dentist; *SD,* Specialist dentist.

Attitudes regarding ADRs and ADR reporting

The majority of the dentists (75%) accepted that spontaneous reporting of ADRs was necessary, which was significantly higher among participants with ≤12 years of experience (p<0.013). The reasons of the participants who stated that this was not necessary or were unsure about it are listed in Table 4.

Of the dentists, 59.7% stated that all suspected reactions should be reported. The other responses regarded ADRs associated with newly marketed drugs (49.2%), unexpected ADRs (43.9%), serious ADRs (43.1%) and well-defined ADRs (41.4%). The participants' responses were statistically nonsignificant regarding sex, profession and professional experience (p>0.05).

Most of the dentists preferred to consult with a physician (68.9%) and to discontinue the suspected drug (62.5%) in the suspicion of an oral mucosal ADR. The number of dentists who opted to inform the authorities was significantly higher in the group of male dentists and participants with ≤12 years of experience (p<0.05). GDs tended to hospitalize patients more frequently than SDs (p=0.034). Younger dentists opted to reduce the dose of the suspected drug, whereas older dentists opted to discontinue the suspected drug (p<0.05) (Table 5).

Among the dentists, only 5% approved the spontaneous reporting of ADRs and 86.4% thought that ADR reporting was a professional responsibility, followed by a professional obligation (37.2%) and voluntary action (13.9%). The participants' responses were statistically nonsignificant regarding sex, profession, and professional experience (p>0.05).

Practices regarding ADRs and ADR reporting

Only 2.8% of dentists (4 GDs, 6 SDs) had reported an ADR in their professional lives. The majority of the reports were made to the pharmacovigilance contact person (PCP) of their institutions (50%), followed by the pharmacy (20%), Turkish Medicines and Medical Devices Agency (10%), TUFAM (10%) and the pharmaceutical company (10%).

Of the dentists, 52.5% had encountered an oral mucosal ADR during their professional lives, which was statistically higher in the group of SDs and participants with >12 years of experience (p<0.05). The frequencies of ADRs were "once or twice during their professional lives" (36.5%), "once a year" (29.1%), "once to ten times a year" (29.6%) and "more than ten times a year" (4.8%). Among the participants, 34.7% had never diagnosed an oral mucosal ADR, whereas 12.8% were unsure about this.

Gingival overgrowth (63.6%) was the most frequently diagnosed oral mucosal ADR. Male dentists seemed to diagnose oral mucosal ADRs more often than females (p<0.05). Dentists with >12 years of experience detected significantly more ADRs in the oral mucosa (p<0.05) (Table 6).

The dentists were asked whether they asked about the patient's ADR history during anamnesis or before prescribing a drug. Compared to GDs, SDs were significantly more likely to ask about and record all the drugs, including herbal drugs (78.2% and 92.6%, respectively) and the patient's ADR history (64.1% and 73.2%, respectively) (p<0.05). Additionally, female dentists had a relatively higher rate of recording the patient's ADR history than males (90.5% and 81.4%, respectively) (p=0.002). The majority of the dentists prescribed any drug by taking into consideration the patient's ADR history (82.8%) or the possibility of ADRs, especially for elderly patients or patients with polypharmacy (82.5%). The participants' responses were statistically nonsignificant regarding professional experience (p>0.05).

Among the dentists, 50.3% had received training regarding ADRs during their education or professional lives, which was statistically higher among participants with ≤12 years of experience (p=0.002). Training regarding ADRs

occurred mostly in undergraduate education (79.5%), followed by postgraduate education (8.1%), conferences/continuing education courses with credits (7.6%), congresses (2.7%) and specialization exam prep courses (2.2%). Older dentists learned about ADRs mostly in postgraduate education (p=0.001).

Discussion

This study's main findings revealed that the knowledge and perspectives of both GDs and SDs regarding PV and ADR reporting are unsatisfactory. Previous studies highlighted the poor knowledge of PV and ADRs among HPs.[7,8,10-14,16-18,20-22] In a study of dental research assistants in Turkey, the majority of the participants were unable to define PV (60%) and ADR (80%).[8] However, in this study, the majority of the participants were able to define these terms (64.7%; 71.4%). This difference may be due to the type of questions used in the studies.[8] Nevertheless, 17.5% of the participants mixed the terms "ADR" and "side effect" in this study, which was similar to a recent study among HPs that included dentists (22.7%).[14]

Recent Turkish studies demonstrated that most dentists had never seen or experienced any ADR before.[8,21] In contrast to these studies, the rate of dentists who had never diagnosed an ADR was low (34.7%) in this study, which was similar to that in Khan *et al.'s*[17] study (34.4%). Furthermore, 52.5% of the dentists, most of whom were SDs and participants with >12 years of experience, had encountered an oral mucosal ADR during their professional lives in this study. Unfortunately, the reporting rate in this study was too low (2.8%) compared to that in the aforementioned study (13.7%).[17] This poor reporting level was similar to that in previous studies.[18,21,22] Torwane *et al.*[18] noted a large gap between ADRs experienced (52.29%) and ADRs reported (6.12%) by HPs, especially among dentists, which was confirmed by the present study (52.5% and 2.8%, respectively). Additionally, the frequencies of ADRs experienced in a year in this study were remarkable at 29.1% for once a year and 34.4% for more than once a year. These findings are a matter of great concern for dentists and indicate the need for immediate attention to improve the contribution of dentists to ADR identification and reporting.

The findings of this study showed that the rate of dentists who experienced oral mucosal ADRs in clinical practice cannot be underestimated. The top five oral mucosal ADRs diagnosed by dentists in this study were gingival overgrowth (63.6%), discoloration of teeth (46.7%), xerostomia (40.8%), oral candidosis (30.3%), taste alterations (28.9%) and oral mucosal pigmentation (28.1%).

The TUFAM is the main contact point for the spontaneous reporting of ADRs by HPs in Turkey. However, dentists working in the hospital can also forward ADR reports to the TUFAM through the PCP. Only one SD reported ADR to the TUFAM in this study. The PCP of the institution was the most frequently preferred contact by dentists to report ADRs likewise in a previous Turkish study of physicians/nurses, in which only 30% of the participants were aware of the TUFAM.[16] These findings showed the lack of knowledge of dentists on ADR reporting to the TUFAM as well as that of physicians and nurses in Turkey.[12,16] Moreover, it is recommended to report an ADR within 15 days after encountering it, which was known only by 13.9% of the dentists in this study.

The TUFAM manages the monitoring and assessment of national ADR reports via an online notification form. First, the identity of the patient and the reporter must be determined in the form for validation of the report. Almost half of the dentists were not willing to provide the identity of the reporter, which was significantly lower among SDs in this study. However, the majority of the dentists were well informed about how to fill out this form.

According to current regulations, all HPs must be actively involved in PV activities within the context of their practices as a professional responsibility. Most of the dentists (86.4%) in this study agreed that reporting ADRs is a professional responsibility rather than a professional obligation (37.2%), which was similar to the findings of a recent study among dentists (89%).[19] Furthermore, only 5% of dentists participated in spontaneous reporting, although being the cornerstone of PV.[23]

Since underreporting is a global problem, the reasons dentists do not report ADRs are multifactorial and are also similar to those in other studies in the literature.[6,16-19,23] Identifying these factors will help authorities develop a specific strategy targeted at the main problem since attitudes are potentially modifiable variables.[24] Every ADR submitted to the system will help to improve patient safety and spontaneous reporting of ADRs. Furthermore, concerns about not having the knowledge or courage to discuss ADRs with their colleagues, which was significantly higher among GDs, and difficulty in deciding whether it's an ADR or not indicate a lack of training among dentists in identifying ADRs.

Regarding the responses about which ADRs should be reported, dentists were unaware of the risk of ADRs and the importance of their contribution to the detection of these risks. Indeed, the diagnosis and identification of osteochemonecrosis of jaw due to the ADRs of bisphosphonates through ADR reporting during the postmarketing phase of these drugs have been an important contribution of dentists that influenced the dental and medical management of the patients currently treated with these drugs.[25]

During their routine practice, it is the responsibility of dentists to thoroughly check and record the general health and medication history of patients and to update the history at every visit.[6] In a recent study, 60% of dental research assistants stated that they asked about the patient's drug history when interacting with a patient for the first time.[8] Similarly, the majority of the participants in this study indicated that they asked about and recorded all the drugs, including herbal drugs, and the patient's ADR history. Moreover, they were cautious about prescribing a drug to elderly patients and patients with polypharmacy or with an ADR history.

Table 5: The attitudes of the dentists in the suspicion of an oral mucosal ADR

Attitudes of the dentists*	Gender					Profession					Professional experience				
	Female		Male		p	GDs		SDs		p	≤12 years		>12 years		p
	n	%	n	%		n	%	n	%		n	%	n	%	
To follow up the patient without doing anything	17	7.4	8	6.2	0.679	11	6.5	14	7.4	0.738	11	5.5	14	8.7	0.240
To follow up the patient after reducing the dose of the suspected drug	49	21.2	19	14.7	0.132	30	17.6	38	20.0	0.569	47	23.6	21	13.0	**0.011**
To discontinue the suspected drug if it's possible	138	59.7	87	67.4	0.148	104	61.2	121	63.7	0.624	113	56.8	112	69.6	**0.013**
To give an alternative drug	87	37.7	47	36.4	0.817	63	37.1	71	37.4	0.952	80	40.2	54	33.5	0.194
To hospitalize the patient	46	19.9	24	18.6	0.764	41	24.1	29	15.3	**0.034**	44	22.1	26	16.1	0.155
To consult with a physician	167	72.3	81	62.8	0.062	108	63.5	140	73.7	**0.038**	144	72.4	104	64.6	0.114
To inform the authorities	43	18.6	45	34.9	**0.001**	45	26.5	43	22.6	0.397	58	29.1	30	18.6	**0.021**
Do not know	11	4.8	8	6.2	0.558	14	8.2	5	2.6	0.018	11	5.5	8	5.0	0.814

Chi-squared test; p<0.05.
*More than one option could be selected.
ADR, Adverse drug reaction; *GD,* General dentist; *SD,* Specialist dentist.

Table 6: The distribution of commonly diagnosed ADRs in the oral mucosa, *Chi-squared test; p<0.05.*

Oral mucosal ADRs*	Gender					Profession					Professional experience				
	Female		Male		p	GDs		SDs		p	≤12 years		>12 years		p
	n	%	n	%		n	%	n	%		n	%	n	%	
Gingival overgrowth	149	64.5	80	62.0	0.638	100	58.8	129	67.9	0.074	127	63.8	102	63.4	0.927
Discoloration of teeth	105	45.5	63	48.8	0.537	84	49.4	84	44.2	0.323	100	50.3	68	42.2	0.130
Xerestomia	99	42.9	48	37.2	0.296	56	32.9	91	47.9	**0.004**	88	44.2	59	36.6	0.146
Oral candidosis	67	29.0	42	32.6	0.482	45	26.5	64	33.7	0.137	55	27.6	54	33.5	0.226
Taste alterations	59	25.5	45	34.9	0.061	50	29.4	54	28.4	0.836	51	25.6	53	32.9	0.129
Oral mucosal pigmentation	59	25.5	42	32.6	0.155	44	25.9	57	30.0	0.385	61	30.7	40	24.8	0.223
Burning mouth syndrome	53	22.9	39	30.2	0.128	43	25.3	49	25.8	0.914	39	19.6	53	32.9	**0.004**
Oral ulcer	39	16.9	42	32.6	**0.001**	45	26.5	36	18.9	0.088	42	21.1	39	24.2	0.481
Mukositis	44	19.0	30	23.3	0.343	33	19.4	41	21.6	0.611	33	16.6	41	25.5	**0.038**
Bruxism	42	18.2	21	16.3	0.649	28	16.5	35	18.4	0.627	42	21.1	21	13.0	**0.045**
Hairy tongue	36	15.6	21	16.3	0.863	25	14.7	32	16.8	0.579	31	15.6	26	16.1	0.883
Lichenoid reaction	32	13.9	19	14.7	0.819	18	10.6	33	17.4	0.066	26	13.1	25	15.5	0.505
Chelitis	29	12.6	18	14.0	0.706	18	10.6	29	15.3	0.189	19	9.5	28	17.4	**0.028**
Hypersalivation	28	12.1	17	13.2	0.771	21	12.4	24	12.6	0.936	27	13.6	18	11.2	0.496
Paresthesia	20	8.7	15	11.6	0.362	20	11.8	15	7.9	0.216	15	7.5	20	12.4	0.120
Orofacial pain	17	7.4	13	10.1	0.371	16	9.4	14	7.4	0.484	16	8.0	14	8.7	0.823
Bullous reactions	11	4.8	18	14.0	**0.002**	14	8.2	15	7.9	0.906	10	5.0	19	11.8	**0.019**
Angioedema	16	6.9	12	9.3	0.420	15	8.8	13	6.8	0.483	14	7.0	14	8.7	0.559
Pain/swelling in the salivary gland	13	5.6	14	10.9	0.071	14	8.2	13	6.8	0.616	14	7.0	13	8.1	0.710
Lupus like reactions	16	6.9	10	7.8	0.772	11	6.5	15	7.9	0.602	11	5.5	15	9.3	0.167
Erythema multiforme	9	3.9	14	10.9	**0.010**	5	2.9	18	9.5	**0.011**	7	3.5	16	9.9	**0.013**
Pemfigoid-like reactions	6	2.6	10	7.8	**0.023**	6	3.5	10	5.3	0.426	8	4.0	8	5.0	0.664
Do not know	23	10.0	22	17.1	0.051	29	17.1	16	8.4	**0.013**	25	12.6	20	12.4	0.968

*More than one option could be selected.
ADR, Adverse drug reaction; *GD,* General dentist; *SD,* Specialist dentist.

Dentists may be the first to observe an ADR to a drug prescribed elsewhere, although ADRs in dental practice are less frequently observed than in medical practice.[26] Therefore, dentists should be familiar with the drugs that cause oral mucosal ADRs. Unfortunately, poor knowledge about these drugs was significantly higher in the group of GDs and participants with >12 years of experience in this study. Furthermore, SDs and participants with ≤12 years of experience were more aware of ADRs due to antifungals, anti-inflammatory mouthwashes and sedatives/general anesthetics. These findings could be explained by the fact that SDs prescribe a wide spectrum of drugs and manage the treatment of medically compromised patients more frequently, in addition to having more advanced educational levels and being more eager to update their knowledge about drugs compared to GDs. Moreover, the greater knowledge of dentists with ≤12 years of experience may be an outcome of the improvements in PV activities in Turkey with the publication of subsequent regulations in 2014 after the establishment of ADR reporting system in 2005.[9]

In the suspicion of an oral mucosal ADR, the primary attitudes of participants were to consult with a physician and to discontinue the suspected drug. Regarding all the selected options, the findings of this study suggest that most dentists lack the experience to manage oral mucosal ADRs properly. Dentists should manage minor suspected ADRs. However, if a serious/severe ADR occurs, the patient should be immediately referred to the hospital. GDs seemed to have a greater tendency to hospitalize patients.[27] Additionally, the willingness of dentists to inform authorities was also found to be quite low (24.4%) in this study.

Since 2013, the Higher Education Council has included PV training in the curricula of HP schools.[7] This may explain the higher rate of participants with ≤12 years of experience who received training about ADRs during their undergraduate education.

Educational interventions and other activities to promote ADR reporting have been shown to increase awareness of ADRs, thus increase the ADR reporting rates.[28,29] Unfortunately, the low ADR reporting rate among dentists (2.8%) was not compatible with receiving training about ADRs (50.3%) in this study. This finding indicates that the inclusion of PV and ADR reporting trainings in conferences/continuing education course programs in addition to education curricula is highly needed for dentists.

We believe that the findings of this study will help to guide authorities in defining the training needs and practice points of dentists regarding PV and ADR reporting. The practice points must include the diagnosis and treatment steps of ADRs and ADR reporting as well as rational drug use and accurate prescribing activities. Implementation of these training programs at both the undergraduate and postgraduate levels of dentistry would help to improve the dentists' skills in diagnosing and managing ADRs. Additionally, these activities should be mandatory for all dentists in Turkey. Furthermore, integrating the ADR reporting system into the electronic prescribing system or developing a mobile application for ADR reporting to facilitate the reporting process, providing feedback by the TUFAM to ADR reporters will help to improve reporting rates.[30]

The most important limitation of this study was its sample size. Future studies with a greater number of participants, including both GDs and SDs, can represent the exact KAP of dentists in Turkey. However, this was a multicentric study among dentists working in different institutions, and Istanbul is the largest metropolis in Turkey. Therefore, our study population represented a small sample of Turkey. Another limitation was the electronic distribution of the questionnaire, which may have caused selection bias. Additionally, some of the dentists might have been discouraged from participating because of the length of the questionnaire.

Conclusions

The role of dentists in the diagnosis and reporting of ADRs should not be underestimated since they are an integral part of the health care system. The contribution of both GDs and SDs to the ADR reporting system needs to be improved in Turkey and worldwide. Future attempts should be made to increase awareness about PV and ADRs among dentists and to improve the skills of dentists in the diagnosis and reporting of ADRs. Additionally, ADR reporting should be integrated into the daily practice of dentists.

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Conflict of Interest

Authors declare no conflict of interest.

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