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An Evaluation of Physicians' and Pharmacists' Knowledge, Attitudes and Behaviours About Pharmacovigilance: Cross-Sectional Study

Hekim ve Eczacıların Farmakovijilans Hakkında Bilgi, Tutum ve Davranışlarının Değerlendirilmesi: Kesitsel Araştırma

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ABSTRACT Objective: As defined by the World Health Organization, pharmacovigilance encompasses the scientific and operational aspects of detecting, evaluating, understanding and preventing adverse effects and other problems associated with medicines. The aim of this study, conducted between March and April 2024, was to assess the knowledge, attitudes and practices of physicians and pharmacists in Türkiye regarding pharmacovigilance, reporting and follow-up of an adverse drug reaction (ADR). **Material and Methods:** The survey questions were developed through a process of reviewing and adapting those used in similar studies. **Results:** A total of 101 doctors and 101 pharmacists participated in the study. The proportion of pharmacists trained in reporting ADRs is significantly higher than that of physicians ($p<0.001$). Most of the participants surveyed believed that they were responsible for reporting ADRs. However, at 12.9% for doctors and 50.5% for pharmacists, the proportion of participants who had experienced and reported such reactions was relatively low. A higher proportion of pharmacists than of doctors believed that there would be no consequences if they failed to report an ADR ($p<0.001$). In 2023, a total of 32 participants reported ADRs. Almost all participants considered pharmacovigilance and ADR reporting to be important and that detailed pharmacovigilance training should be provided to healthcare workers. It was observed that doctors and pharmacists in this survey had a limited understanding of pharmacovigilance and ADR reporting. **Conclusion:** The results indicate that participants are open to receiving training on monitoring and reporting ADRs, will take the training seriously, and will report ADRs when adequately informed.

Keywords: Pharmacovigilance; pharmacists; physicians; drug-related side effects and adverse reactions

ÖZET Amaç: Dünya Sağlık Örgütü tarafından tanımlandığı şekliyle farmakovijilans, ilaçlarla ilişkili advers etkilerin ve diğer sorunların tespit edilmesi, değerlendirilmesi, anlaşılması ve önlenmesinin bilimsel ve operasyonel yönlerini kapsamaktadır. Mart-Nisan 2024 tarihleri arasında gerçekleştirilen bu çalışmanın amacı, Türkiye'deki hekim ve eczacıların farmakovijilans, advers ilaç reaksiyonlarının (AİR) raporlanması ve takibine ilişkin bilgi, tutum ve uygulamalarını değerlendirmektir. **Gereç ve Yöntemler:** Anket soruları, benzer çalışmalarda kullanılan soruların incelenmesi ve uyarlanması yoluyla geliştirilmiştir. **Bulgular:** Çalışmaya toplam 101 doktor ve 101 eczacı katılmıştır. AİR'nin raporlanması konusunda eğitim almış eczacıların oranı doktorlardan anlamlı derecede yüksektir ($p<0,001$). Ankete katılanların çoğu AİR'nin bildirilmesinden kendilerinin sorumlu olduğuna inanmaktadır. Ancak, doktorlar için %12,9 ve eczacılar için %50,5 olan bu oran, bu tür reaksiyonları yaşamış ve bildirmiş olan katılımcıların oranının nispeten düşük olduğunu göstermektedir. Doktorlara kıyasla eczacıların daha yüksek bir oranı, bir AİR'yi bildirmemeleri durumunda herhangi bir sonuç olmayacağına inanmaktadır ($p<0,001$). 2023 yılında toplam 32 katılımcı AİR bildirmiştir. Katılımcıların neredeyse tamamı farmakovijilans ve AİR bildiriminin önemli olduğunu ve sağlık çalışanlarına detaylı farmakovijilans eğitimi verilmesi gerektiğini düşünmektedir. Bu ankete katılan doktor ve eczacıların farmakovijilans ve AİR bildirimi konusunda sınırlı bir anlayışa sahip oldukları görülmüştür. **Sonuç:** Sonuçlar, katılımcıların AİR'lerin izlenmesi ve raporlanması konusunda eğitim almaya açık olduklarını, eğitimi ciddiye alacaklarını ve yeterince bilgilendirildiklerinde AİR'leri raporlayacaklarını göstermektedir.

Anahtar Kelimeler: Farmakovijilans; eczacılar; doktorlar; ilaç ilişkili yan etkiler ve istenmeyen reaksiyonlar

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Pharmacovigilance plays an important role in pharmaceutical care, with the aim of optimizing the utilization of pharmaceuticals for the treatment or prevention of diseases.[1] Adverse drug reactions (ADRs) are defined as harmful and unintended responses that occur at doses typically used in humans.[2] ADRs represent a significant cause of morbidity and mortality in patient care. They are recognized as a significant "drug-related problem" within the scope of all health services, including primary care.[3] With pharmacovigilance, the effective recording and transmission of information on the adverse effects of drugs or vaccines allows for rational and evidence-based drug use and can prevent adverse reactions. As a result, pharmacovigilance practices help patients to receive optimum treatment, to accept public health programmes in the community and to prove their effectiveness.[1] A multidisciplinary approach is essential for the identification and reporting of ADRs. The implementation of multifaceted educational interventions with multidisciplinary teams led to a significant improvement in the reporting of ADRs by healthcare professionals. In a study by Varallo et al., there was an observed increase of over 100% in the number of drug-related adverse event reports during the study period.[4] It is recommended that spontaneous or voluntary reporting of ADRs be considered as a primary approach for postmarketing surveillance of suspected medicines. This could include the reporting of ADRs by healthcare professionals or patients.[4] The effectiveness of spontaneous reporting systems depends on the quality of the reports submitted, especially those from healthcare professionals.[5,6] In many countries, healthcare professionals, such as physicians and pharmacists, are now required to report ADRs.[7]

Pharmacists have the potential to contribute to the prevention of adverse drug events in a number of ways. These include improving health literacy, educating patients, managing medications, and facilitating communication within the healthcare team and with patients or their caregivers.[8] In addition, physicians play a key role in preventing ADRs by identifying patients who are more likely to experience them, adjusting treatment options accordingly, and developing treatment plans to minimize potential side effects.[9]

The objective of this study was to evaluate the knowledge and attitudes of pharmacists and physicians regarding pharmacovigilance and to inquire about their previous practices related to pharmacovigilance.

MATERIAL AND METHODS

This study was conducted between March 1st, and April 1st, 2024. The survey form was prepared and administered using Google Forms (Google, USA) (https://forms.gle/ZkJUUaw2Fx8Y4v9H8). The survey link was distributed via email, messaging groups, and social media platforms where physicians and pharmacists were present. Participants were kindly asked to forward the survey to anyone they thought might be interested. The study excluded academician pharmacists working at the university and non-active pharmacists. The study was approved by the Hacettepe University Health Sciences Research Ethics Committee (date: January 23, no: 2024/SBA-24-100). Informed consent was obtained from all participants before starting to answer survey questions. This study was conducted in accordance with the principles of the Declaration of Helsinki.

The survey questions were designed by a process of review and adaptation, drawing on the questions posed in similar studies.[10-14] A pretest study was conducted on the pre-determined survey questions with a sample of 30 physicians and pharmacists who would not be included in the study population. The pilot test was conducted to evaluate the comprehensibility of the survey language and visual appropriateness, as well as to finalize the survey questions. As a result of the pilot test, no questions were removed from the survey and no new questions were added.

The sample size for the study was determined based on the number of items in the questionnaire. The questionnaire included more than 10 questions and was designed to include at least 300 participants in the study.[15]

STATISTICAL ANALYSIS

Data were analyzed using descriptive statistics (including mean, standard deviation, median, interquar-

tile range, minimum, maximum, frequencies, and percentages). To analyze differences between groups, the chi-squared test or Fisher's exact test was used for categorical variables, and the t-test or Mann-Whitney U test was used for continuous numerical variables, depending on the normal distribution. A p value of <0.05 was considered statistically significant. IBM SPSS version 23.0 (IBM, Armonk, NY) software was used to analyze the data.

RESULTS

A total of 202 participants, 101 physicians, and 101 pharmacists, were included in the study. The answers of all participants were analysed and no participant was excluded.

The mean age (standard deviation, SD) of the participants was 37.1 (±12.8) years, and 55.4% (n=112) were female. The study cohort was comprised of 50% physicians and 50% pharmacists. The work settings of participants were as follows: 26.3% in university hospitals, 19.8% in government hospitals, and 21.3% in private hospitals. The majority of physicians (70.3%) were either specialists or in residency training. The most common physician specialties among respondents were infectious diseases and clinical microbiology (8.9%), radiology (8.9%), and internal medicine (5.9%). Forty-eight (47.5%) physicians had expertise in non-surgical specialties, while 23 (22.8%) had expertise in surgical specialties. (Table 1).

TABLE 1: Sociodemographics of participants

Parameters	Total (n=202)	Pharmacists (n=101)	Physicians (n=101)
Gender n (%)			
Female	112 (55.4)	79 (78.2)	33 (32.7)
Male	90 (44.6)	22 (21.8)	68 (67.3)
Age (SD)	37.1 (12.8)	33.4 (9.0)	40.9 (14.8)
Title n (%)			
General practitioner	29 (14.4)	-	29 (28.7)
Residency physician/dentist/pharmacist	45 (21.8)	13 (12.9)	32 (31.7)
Specialist physician/dentist/pharmacist	38 (18.8)	4 (4.0)	34 (33.7)
Assistant professor	6 (3.0)	5 (5.0)	1 (1.0)
Associate professor	4 (2.0)	-	4 (4.0)
Professor	1 (0.5)	-	1 (1.0)
Hospital pharmacist	51 (25.2)	51 (50.5)	-
Community pharmacist	16 (7.9)	16 (15.8)	-
Pharmacist (industry)	7 (3.5)	7 (6.9)	-
Pharmacist (ministry of health)	4 (2.0)	4 (4.0)	-
Assistant pharmacist (in community pharmacy)	1 (0.5)	1 (1.0)	-
Work institution n (%)			
Government hospital	40 (19.8)	29 (28.7)	11 (10.9)
Training and research hospital	14 (6.9)	9 (8.9)	5 (5.0)
University hospital	53 (26.3)	20 (19.8)	33 (32.7)
City hospital	9 (4.5)	8 (7.9)	1 (1.0)
Private hospital	43 (21.3)	6 (5.9)	37 (36.6)
Community pharmacy	18 (8.9)	18 (17.8)	-
Family medicine	12 (5.9)	-	12 (11.9)
Pharmaceutical company	5 (2.5)	5 (5.0)	-
Ministry of health	5 (2.5)	4 (4.0)	1 (1.0)
Other	3 (1.5)	2 (2.0)	1(1.0)

SD: Standard deviation

TABLE 2: Physician and pharmacist knowledge of pharmacovigilance n (%)

Questions and answers	Total (n=202)	Pharmacists (n=101)	Physicians (n=101)	p value
Which of the following best defines pharmacovigilance?				
Activities and scientific studies to detect, evaluate, understand, and prevent ADRs and other drug-related problems.	138 (68.3)	88 (87.1)	50 (49.5)	<0.001
Detection of drug allergies	1 (0.5)	-	1 (1.0)	
Collection and destruction of expired medications	-	-	-	
Identify and prevent overdose situations	-	-	-	
All of them	62 (30.7)	13 (12.9)	49 (48.5)	
None of them	1 (0.5)	-	1 (1.0)	
What is the purpose of pharmacovigilance?				
Monitoring adverse reactions	14 (6.9)	10 (9.9)	4 (4.0)	0.287
Ensuring safe use of medicines	14 (6.9)	6 (5.9)	8 (7.9)	
Minimizing harm from medications	4 (2.0)	3 (3.0)	1 (1.0)	
All of them	169 (83.7)	82 (81.2)	87 (86.1)	
None of them	1 (0.5)	-	1 (1.0)	
Which of the following is responsible for monitoring ADRs in Türkiye?				
Turkish pharmacovigilance center	175 (86.6)	99 (98.0)	76 (75.2)	<0.001
Social security institution	6 (3.0)	6 (5.9)	-	0.029
Pharmacovigilance association	26 (12.9)	8 (7.9)	18 (17.8)	0.057
Turkish medical association	10 (5.0)	8 (7.9)	2 (2.0)	0.105
World health organization	18 (8.9)	11 (10.9)	7 (6.9)	0.459
The Turkish red crescent	-	-	-	-
I don't know	27 (13.4)	2 (2.0)	25 (24.8)	<0.001
Which healthcare professional is responsible for reporting ADRs?				
Physician/dentist	190 (94.1)	89 (88.1)	101 (100.0)	<0.001
Pharmacist	169 (83.7)	99 (98.0)	70 (69.3)	<0.001
Nurse	120 (59.4)	52 (51.5)	68 (67.3)	0.022
Which of the following is/are considered an ADR?				
Drug abuse	83 (41.1)	38 (37.6)	45 (44.6)	0.317
Overdose	116 (57.4)	54 (53.5)	62 (61.4)	0.255
Packaging errors	83 (41.1)	37 (36.6)	46 (45.5)	0.198
Stability issues	133 (65.8)	73 (72.3)	60 (59.4)	0.054
Suspected contamination	133 (65.8)	64 (63.4)	69 (68.3)	0.458
Ineffectiveness	130 (64.4)	81 (80.2)	49 (48.5)	<0.001
How many days after the event should an ADR be reported?				
5 days	54 (26.7)	22 (21.8)	32 (31.7)	<0.001
10 days	10 (5.0)	3 (3.0)	7 (6.9)	
15 days	49 (24.3)	14 (13.9)	35 (34.7)	
20 days	1 (0.5)	-	1 (1.0)	
I don't know	89 (44.1)	63 (62.4)	26 (25.7)	
Do you think you are legally responsible for any problems that may occur if you report an ADR?				
Always	38 (18.8)	15 (14.9)	23 (22.8)	0.012
Frequently	37 (18.3)	12 (11.9)	25 (24.8)	
Occasionally	38 (18.8)	14 (13.9)	24 (23.8)	
Rarely	25 (12.4)	12 (11.9)	13 (12.9)	
Never	64 (31.7)	40 (39.7)	24 (23.8)	
Do you think you are legally responsible for any problems that may occur if you do not report an ADR?				
Always	80 (39.6)	44 (43.6)	36 (35.6)	0.110
Frequently	48 (23.8)	18 (17.8)	30 (29.7)	
Occasionally	39 (19.3)	17 (16.8)	22 (21.8)	
Rarely	18 (8.9)	10 (9.9)	8 (7.9)	
Never	17 (8.4)	11 (10.9)	6 (5.9)	

ADR: Adverse drug reaction

KNOWLEDGE OF PHYSICIANS AND PHARMACISTS TOWARD PHARMACOVIGILANCE

The findings regarding the knowledge of pharmacovigilance among physicians and pharmacists are presented in Table 2. The proportion of pharmacists who have received training in the reporting of ADRs is higher than that of physicians (p<0.001). The number of physicians who did not know where to report

TABLE 3: Physicians' and pharmacists' attitudes toward pharmacovigilance

Questions and answers	Total (n=202)	Pharmacists (n=101)	Physicians (n=101)	p value
What should I do if I suspect an adverse reaction?				
Determine the cause	156 (77.2)	83 (82.2)	73 (72.3)	0.131
Discontinue the causative	168 (83.2)	82 (81.2)	86 (85.1)	0.573
Provide the treatment with alternative drug	126 (62.4)	59 (58.4)	67 (66.3)	0.384
Reduce the dose of the causative drug	35 (17.3)	22 (21.8)	13 (12.9)	0.137
Report the ADRs	191 (94.6)	98 (97.0)	93 (92.1)	0.215
What adverse reaction(s) should I report?				
Suspicious reactions where it is not clear which drug is the cause	131 (64.9)	63 (62.4)	68 (67.3)	0.461
All reactions. including nausea and vomiting	97 (48.0)	54 (53.5)	43 (42.6)	0.121
Reactions that cause permanent damage to the patient	190 (94.1)	94 (93.1)	96 (95.0)	0.766
Reactions requiring hospitalization	188 (93.1)	95 (94.1)	93 (92.1)	0.782
Reactions to drugs that have been used for >10 years	119 (58.9)	67 (66.3)	52 (51.5)	0.032
Reactions to drugs that have been used for <10 years	135 (66.8)	76 (75.2)	59 (58.4)	0.011
Observed in special patient groups (such as pregnant women, children, elderly)	176 (87.1)	91 (90.1)	85 (84.2)	0.293
Which of the following will result in more adverse reaction reports?				
Increasing awareness of pharmacovigilance	184 (91.1)	94 (93.1)	90 (89.1)	0.459
Pharmacovigilance training for healthcare professionals	190 (94.1)	96 (95.0)	94 (93.1)	0.766
Easy and practical reporting processes	186 (92.1)	96 (95.0)	90 (89.1)	0.193
Possibility of electronically reporting	180 (89.1)	95 (94.1)	85 (84.2)	0.042
Easy access to the reporting form	173 (85.6)	91 (90.1)	82 (81.2)	0.108
Feeling responsible	160 (79.2)	88 (87.1)	72 (71.3)	0.009
Which one(s) of the following may lead to non-reporting of ADRs?				
Not knowing the need to report	175 (86.6)	86 (85.1)	89 (88.1)	0.679
Not knowing how to report	181 (89.6)	91 (90.1)	90 (89.1)	1.000
Lack of time to report	136 (67.3)	71 (70.3)	65 (64.4)	0.453
Do not think that any report will make a difference	155 (76.7)	91 (90.1)	64 (63.4)	<0.001
Not wanting to take responsibility	173 (85.6)	92 (91.1)	81 (80.2)	0.045
Thinking the patient should do the reporting	62 (30.7)	41 (40.6)	21 (20.8)	0.004
Thinking that approved drugs are safe	106 (52.5)	58 (57.4)	48 (47.5)	0.159
Believe that reporting would violate patient privacy	72 (35.6)	44 (43.6)	28 (27.7)	0.019
Reporting of ADRs is important.				
Strongly agree	197 (97.5)	101 (100.0)	96 (95.0)	0.077
Agree	4 (2.0)	-	4 (4.0)	
Neither agree nor disagree	1 (0.5)	-	1 (1.0)	
Disagree	-	-	-	
Strongly disagree	-	-	-	
Detailed pharmacovigilance training should be provided to healthcare professionals.				
Strongly agree	189 (93.6)	98 (97.0)	91 (90.1)	0.077
Agree	10 (5.0)	7 (6.9)	3 (3.0)	
Neither agree nor disagree	-	-	-	
Disagree	2 (1.0)	-	2 (2.0)	
Strongly disagree	1 (0.5)	1 (1.0)	-	
ADR reporting improves treatment and patient safety.				
Strongly agree	193 (95.5)	98 (97.0)	95 (94.1)	0.605
Agree	5 (2.5)	1 (1.0)	4 (4.0)	
Neither agree nor disagree	2 (1.0)	1 (1.0)	1 (1.0)	
Disagree	-	-	-	
Strongly disagree	2 (1.0)	1 (1.0)	1 (1.0)	

ADR: Adverse drug reaction

ADRs was higher than the number of pharmacists (p<0.001). All physicians agreed that ADR reporting is the responsibility of the physician. However, 98% of pharmacists held the view that ADR reporting was their responsibility (p<0.001) (Table 2).

ATTITUDES OF PHYSICIANS AND PHARMACISTS TOWARD PHARMACOVIGILANCE

Table 3 presents the findings regarding the attitudes of physicians and pharmacists toward pharmacovigilance. The proportion of pharmacists who considered the reporting of ADRs to be a significant undertaking was greater than that of physicians (p=0.077). The proportion of physicians and pharmacists who believed that the education of healthcare professionals in pharmacovigilance would result in an increased reporting of ADRs was comparable (p=0.766). The number of pharmacists who believe that thinking any notification would not make a difference leads to not making an ADR notification is higher than the number of physicians who think the same (p<0.001) (Table 3).

PRACTICES OF PHYSICIANS AND PHARMACISTS RELATED TO PHARMACOVIGILANCE

The findings regarding the knowledge of pharmacovigilance among physicians and pharmacists are presented in Table 4. A total of 13 physicians (12.9%) and 51 pharmacists (50.5%) had previously encountered and reported ADRs. The number of pharmacists who believed they could obtain assistance from Turkish Pharmacovigilance Center (TUFAM) in the

TABLE 4: Physician and pharmacist practices related to pharmacovigilance

Questions and answers	Total (n=202)	Pharmacists (n=101)	Physicians (n=101)	p value
Have you ever received training on reporting ADRs?				
Yes	113 (55.9)	76 (75.2)	37 (36.6)	<0.001
No	89 (44.1)	25 (24.8)	64 (63.4)	
Have you been informed by your institution about ADR reporting and/or the hospital's pharmacovigilance contact?				
Yes	97 (48.0)	74 (73.3)	23 (22.8)	<0.001
No	105 (52.0)	27 (26.7)	78 (77.2)	
Have you ever encountered an ADR, and if so, did you report it?				
I have encountered and reported it	64 (31.7)	51 (50.5)	13 (12.9)	<0.001
I came across it and did not report it	40 (19.8)	6 (6.0)	34 (33.7)	
I have not encountered	98 (48.5)	44 (43.6)	54 (53.5)	
Which one(s) can help you if you need to make a report?				
Hospital pharmacy	122 (60.4)	58 (57.4)	64 (63.4)	0.388
Pharmaceutical company	69 (34.2)	44 (43.6)	25 (24.8)	0.002
Turkish medicines and medical devices agency	98 (48.5)	60 (59.4)	38 (37.6)	0.002
Turkish pharmacovigilance center	168 (83.2)	96 (95.0)	72 (71.3)	<0.001
Written sources (internet, books, journals, etc.)	82 (40.6)	33 (32.7)	49 (48.6)	0.022
What are the problems with reporting ADRs?				
Inability to access the reporting form	129 (63.9)	59 (58.4)	70 (69.3)	0.107
Uncertainty about where to send the completed form	153 (75.7)	71 (70.3)	82(82.2)	0.101
Inadequate communication between patient and physician/dentist/pharmacist	144 (71.3)	78 (77.2)	66 (65.3)	0.087
Failure of the patient to recognize the reaction	126 (62.4)	71 (70.3)	55 (54.5)	0.020
Lack of time	109 (54.0)	49 (48.5)	60 (59.4)	0.120
Lack of financial/moral reward for reporting	51 (25.2)	21 (20.8)	30 (29.7)	0.145
If you had sufficient information about the reporting process, would you consider reporting a new ADR?				
Always	131 (64.9)	70 (69.3)	61 (60.4)	0.087
Frequently	56 (27.7)	24 (23.8)	32 (31.7)	
Occasionally	11 (5.4)	7 (6.9)	4 (4.0)	
Rarely	4 (2.0)	-	4 (4.0)	
Never	-	-	-	

ADR: Adverse drug reaction

event of a report was greater than that of physicians ($p<0.001$). Similarly, a greater number of pharmacists indicated that they would seek assistance from the pharmaceutical company, the manufacturer of the drug in question, compared to physicians ($p=0.020$). A total of 70 physicians (69.3%) and 59 pharmacists (58.4%) identified a lack of access to the reporting form as a significant obstacle to the reporting of ADRs. In 2023, a total of 32 participants reported ADRs (Table 4).

DISCUSSION

The aim of this study was to evaluate the knowledge, attitudes, and practices of physicians and pharmacists in Türkiye regarding the reporting and follow-up of ADRs and pharmacovigilance. A survey revealed that physicians and pharmacists demonstrated a lack of familiarity with the principles of pharmacovigilance and the process of ADR reporting, despite acknowledging their professional responsibility in this regard. Despite the fact that the majority of physicians and pharmacists indicated that they considered it to be their professional responsibility to report ADRs, the number of participants who had encountered and reported ADRs was significantly lower than expected, particularly among physicians. The reasons for the insufficient number of notifications may include uncertainty about where to forward the completed form, lack of time, inability to access notification forms, and inadequate communication between the patient and the physician or pharmacist. These factors were identified as the most common reasons for non-reporting in our study and other studies.[11,16,17] The majority of participants indicated that pharmacovigilance and ADR reporting are very important and that health professionals should receive comprehensive training in pharmacovigilance. These results suggest that training on ADRs and pharmacovigilance should be added to pharmacy and medical education programs. Furthermore, the importance, theory, and practice of ADRs and pharmacovigilance monitoring and follow-up programs should be included in postgraduate education.

In a study of pharmacists in Poland, the rate of those who had previously received training in reporting ADRs was lower (16%).[18] In another study conducted in Türkiye, the proportion of physicians who had previously received training in pharmacovigilance was found to be 10.4%.[2] A total of 55.9% of the participants had received training in the reporting of ADR. It can be observed that, in comparison to physicians, pharmacists receive more training, which may be indicative of a greater level of education among pharmacists with regard to ADR reporting. The proportion of healthcare professionals in our study who received pharmacovigilance training was higher than in other studies. The observation that pharmacists are more likely to receive information about ADR reports and/or pharmacovigilance contact points from their workplace suggests that institutions place more responsibility for reporting on pharmacists.[19]

It was observed that the majority of pharmacists and approximately half of the physicians demonstrated an accurate understanding of the definition of pharmacovigilance. Similarly, a study conducted by Aydın et al. with physicians revealed that 53.9% of respondents provided an accurate definition of pharmacovigilance.[17] In contrast, a separate study conducted by Albayrak et al. with pharmacists yielded a higher level of accuracy in defining pharmacovigilance, with the majority of participants (68.3%) providing an appropriate response.[13] In contrast, a study conducted among healthcare professionals in Saudi Arabia revealed a lower proportion of participants with accurate knowledge regarding the purpose of pharmacovigilance.[20] The majority of participants in our study demonstrated an accurate understanding of the purpose of pharmacovigilance. Our findings show that there are important deficiencies in pharmacovigilance practices, even though its definition and purpose are well known. The majority of participants indicated that if they had access to sufficient information regarding the reporting process, they would consider reporting an ADR when they encountered a new ADR. This finding is consistent with the study conducted by Shroukh et al. with physicians, which demonstrated that an increase in ADR reporting may be observed when healthcare professionals have access to sufficient information and resources.[21] The majority of participants indicated a willingness to seek support from TUFAM, the institution responsible for ADR follow-up in Türkiye. This highlights

the importance of pharmacovigilance and ADR reporting training, which should be conducted with the active involvement of TUFAM. Training programs should be designed to address the specific needs of various healthcare professionals to enhance their comprehension of ADRs and the reporting process. These programs should be made available in either a face-to-face or an online format.

Pharmacists demonstrated a higher level of concern than physicians regarding the potential legal liability associated with the failure to report ADRs. This may indicate that pharmacists are more likely to recognize that reporting ADRs is part of their professional responsibilities. The most common reasons for not-reporting ADRs were not knowing the point of contact for delivering completed forms, lack of time, not finding the forms, and inadequate communication between patients and physicians or pharmacists, as previously mentioned.[2-4] The lack of information regarding the nature and types of ADRs gives rise to questions concerning the efficacy of undergraduate and postgraduate education programs. The inclusion of a more comprehensive approach to pharmacovigilance and ADR topics at the undergraduate, specialty, master's, and doctoral levels of education, coupled with the integration of practical training alongside theoretical instruction, has the potential to facilitate notable enhancements.

This study has several limitations. First, the study was designed to include 300 participants, but despite a long-term active survey link and reminders, participation was limited to 202 participants. Since the total number of people reached by the survey is unknown, the response rate could not be calculated. Because a validated survey was not used, each question was analyzed separately and no overall knowledge or attitude/practice score was found. The strength of this study is that it is the first study to include both physicians and pharmacists and to investigate pharmacovigilance knowledge, attitudes, and behaviors between the 2 professional groups.

CONCLUSION

In conclusion, the findings of this survey study offer valuable insights into the knowledge, attitudes, and practices of physicians and pharmacists in Türkiye regarding pharmacovigilance and ADR reporting. The study revealed a deficiency in the participants' knowledge, particularly with regard to the identification of ADR situations and the appropriate timeline for reporting. This finding indicates that regular training and the use of reminder materials could facilitate knowledge retention. Furthermore, the incorporation of interactive and practical components into training programs may facilitate the consolidation of this knowledge. It is evident that enhancing the awareness of healthcare professionals regarding the significance of ADR reporting for patient safety, coupled with the improvement of communication and collaboration among them, could serve to further augment ADR reporting rates.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Serav Yıldırım, Emre Kara;* ***Design:*** *Serav Yıldırım, Özgenur Geridönmez, Emre Kara;* ***Control/Supervision:*** *Emre Kara;* ***Data Collection and/or Processing:*** *Serav Yıldırım, Özgenur Geridönmez;* ***Analysis and/or Interpretation:*** *Serav Yıldırım, Emre Kara, Özgenur Geridönmez;* ***Literature Review:*** *Serav Yıldırım, Özgenur Geridönmez;* ***Writing the Article:*** *Serav Yıldırım, Özgenur Geridönmez, Emre Kara;* ***Critical Review:*** *Serav Yıldırım, Özgenur Geridönmez, Emre Kara.*

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