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## Knowledge, Attitude, and Practice of Pharmacovigilance and Adverse Drug Reactions Reporting Among Healthcare Providers in the Middle East: A Systematic Review

Amina H. Saleem

*Department of Clinical Pharmacy, College of Pharmacy, University of Mosul, Nineveh, Iraq,*  
amina.23php35@student.uomosul.edu.iq

Harith Kh. Al-Qazaz

*Department of Clinical Pharmacy, College of Pharmacy, University of Mosul, Nineveh, Iraq,*  
al\_qazaz73@uomosul.edu.iq

Omer Q. Allela

*Department of Clinical Pharmacy, College of Pharmacy, Al-Noor University, Nineveh, Iraq, chief-editor-*  
bmvj@alnoor.edu.iq

Ramadan M. Elkalmi

*Department of Pharmacology, Faculty of Medicine, Sebha University, Sebha, Libya, edriph@gmail.com*

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## REVIEW

# Knowledge, Attitude, and Practice of Pharmacovigilance and Adverse Drug Reactions Reporting Among Healthcare Providers in the Middle East: A Systematic Review

Amina H. Saleem <sup>a,\*</sup>, Harith Kh. Al-Qazaz <sup>a</sup>, Omer Q. Allela <sup>b</sup>,  
Ramadan M. Elkalmi <sup>c</sup>

<sup>a</sup> Department of Clinical Pharmacy, College of Pharmacy, University of Mosul, Nineveh, Iraq

<sup>b</sup> Department of Clinical Pharmacy, College of Pharmacy, Al-Noor University, Nineveh, Iraq

<sup>c</sup> Department of Pharmacology, Faculty of Medicine, Sebha University, Sebha, Libya

## ABSTRACT

The main purpose of pharmacovigilance (PV) is to ensure medication safety through detecting, assessing, and preventing adverse drug reactions (ADRs). Healthcare providers (HCPs) are the main contributors in PV systems all over the world. However, their knowledge, attitudes, and practices (KAP) of PV and ADRs reporting vary among different medical professions and different countries.

**Aim:** To assess the knowledge, attitudes, and practices among the HCPs in the Middle East, toward PV and ADRs reporting.

**Methods:** A systematic review was performed. EBSCO, PubMed, and Semantic Scholar, FreeFullPDF and Google Scholar were searched for articles published from January 2014 to December 2024. The selected observational studies were written in English and focused mainly on the knowledge, attitudes, practice, and perceived barriers regarding PV and ADR reporting among HCPs in the Middle East countries.

**Results:** The overall knowledge levels were shown variation across different countries of the Middle East, with various studies indicating a lack of knowledge. The attitudes of HCPs toward PV were generally positive, with the highest levels attained among pharmacists. The HCPs' practices of PV and ADRs reporting were disappointing. A significant under-reporting was observed among physicians and nurses.

**Conclusion:** Improving the PV systems in the Middle East requires a multi-faceted approach that combines education, technological advancements and continuous professional initiatives to ensure improved patient outcomes and safer healthcare practices.

**Keywords:** Pharmacovigilance, Adverse drug reactions, Healthcare providers, Middle East

## 1. Introduction

Pharmacovigilance (PV) is concerned mainly with adverse drug reactions (ADRs) reporting. It is described by the WHO as “the science and activities relating to the detection, assessment, understanding, and prevention of adverse effects or any other

possible drug-related problems” (Salehi et al., 2021). This post-marketing surveillance process, specifically of the new medications entering the market, has become an absolute necessity to avoid any disaster and ensure medications' safety (Abubakar, Simbak, and Haque, 2014). Following the thalidomide disaster in pregnant women in 1961, studying and

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\* Corresponding author.  
E-mail address: [amina.23php35@student.uomosul.edu.iq](mailto:amina.23php35@student.uomosul.edu.iq) (A. H. Saleem).

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understanding the concept of PV became a necessity (Mainul, Nor Iza, and Ahmed Ghazi, 2013). Most of the world countries initiated PV activities after this disaster by developing their PV systems and based on the WHO Programme for International Drug Monitoring (WHO PIDM) (Ampadu et al., 2016). Healthcare providers (HCPs) (physicians, pharmacists, nurses) are mainly responsible for the detection, assessment, and reporting of ADRs to the PV centers (Lathifa and Aman-Ullah, 2022). HCPs who understand the importance of PV systems and ADRs reporting are more likely to prioritize ADRs reporting. They also tend to possess a positive attitude towards ADRs reporting and consider it as a professional obligation to maintain the patient's safety (Lathifa and Aman-Ullah, 2022). HCPs should have sufficient knowledge of ADRs and their prompt identification and prevention strategies (Palaian et al., 2021). The attitudes of HCPs toward ADRs affect the actual rate of ADRs reporting (Herdeiro et al., 2005; Granas et al., 2007). Many studies have stated that HCPs have shown poor knowledge and perception on PV. Therefore, changes in their attitudes are crucial for improving the rate of ADRs reporting (Palaian et al., 2021).

PV has become popular in the Middle East in an expeditious manner (Alshammari, Alenzi, and Ata, 2020). Before 2000, only 4 Middle East countries (Palestine, Oman, Turkey, and Iran) were members of the World Health Organization-Uppsala Monitoring Centre (WHO-UMC). Nowadays all the Middle East countries are full members of the WHO-UMC, except Bahrain and Qatar which are associate members (World Health Organization). ADRs are influenced by some factors, such as the local traditions of different countries, the variation in the food and diets consumed, and the use of alternative and herbal medicines; therefore, every country must develop its own national PV system (Alshami and Azm, 2014).

The ADR reporting rate is influenced by various factors, including the regulations of the national PV programs, the awareness and attitudes of HCPs. Therefore, assessing HCPs' knowledge, attitudes, and practices regarding PV and ADR reporting can help in creating strategies to improve reporting systems and ensure an elite healthcare service. Hence, the aim of this systematic review is to assess the knowledge, attitude, and practice among the HCPs in the Middle East, toward PV and ADRs reporting and to identify the associated barriers.

### 1.1. Objectives

To evaluate the existing level of knowledge among the HCPs in the Middle East regarding PV and ADRs

reporting. To explore HCPs' attitudes, beliefs, and ADR reporting practices. And to analyze variations among different Middle Eastern countries.

## 2. Materials and methods

### 2.1. Protocol and registration

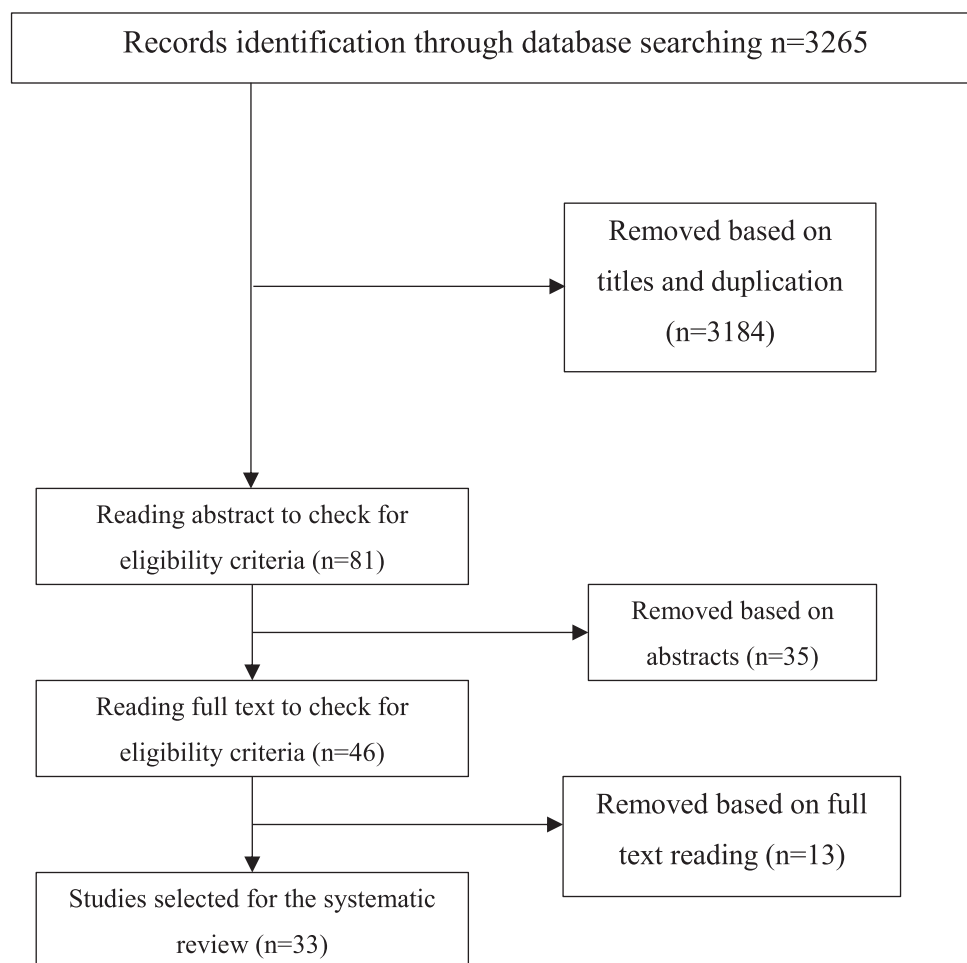
All observational studies in relation to PV and ADR, which had been carried out in the Middle East were considered. This systematic review was registered in PROSPERO under the code of "CRD42025063 6837".

### 2.2. Search process and eligibility criteria

The research team held discussions to identify the appropriate keywords to search for relevant literature. To extract the selected studies, the Boolean method was used during the search process. The following keywords were used: (pharmacovigilance\* AND ("adverse reactions" OR "drug-related side effects" OR "adverse drug reaction reporting")) AND (knowledge OR attitude OR practice OR KAP) AND (healthcare providers OR HCPs OR physicians OR doctors OR pharmacists OR nurses) AND (Iraq OR Jordan OR Saudi Arabia OR KSA OR Egypt OR Syria OR Yemen OR Turkey OR Kuwait OR Lebanon OR UAE OR Qatar OR Oman)). EBSCO, PubMed and Semantic scholar where the three electronic online databases were used to retrieve the articles, in addition to using FreeFullPDF and Google Scholar as search engines, the targeted articles were published in peer-reviewed journals from 1<sup>st</sup> January 2014 to 31<sup>st</sup> December 2024. The selection of relevant studies was performed according to the eligibility criteria which included observational studies, specifically survey-based, cross-sectional studies that focused on the HCPs' KAP towards PV and ADRs reporting in the Middle East countries within the period mentioned above. All studies with no relevance to the HCPs' KAP toward PV and ADRs, all studies performed before 2014, studies conducted in countries outside the Middle East, and studies performed on the public were excluded.

### 2.3. Study selection

The primary investigation process involved screening the titles for relevant articles, then abstracts for eligibility. After that, the team examined the full text for those considered relevant and the text read in full. This process resulted in thirty-three studies covered in this systematic review (Fig. 1) and (Table 1).



**Fig. 1.** Flow chart of the studies selection.

**Table 1.** The search strategy and appraisal for the studies selection.

Records from 2014 to 2024	Total no.	Title selection no.	Abstract selection no.	Full text appraisal no.
Google scholar and FreeFullPDF	1381	47	24	20
Semantic scholar	425	15	9	7
PubMed	1122	7	4	2
EBSCO	337	12	9	4
<b>Total studies</b>	<b>3265</b>	<b>81</b>	<b>46</b>	<b>33</b>

#### 2.4. Data extraction and quality appraisal

The review authors extracted the required data, which includes information about the study's characteristics, methodology details, measures of main outcomes, and findings. The extracted data was tabulated to assist in the assessment of the studies' quality using the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) appraisal tool. This tool is assigned for cross-sectional studies appraisal (von Elm et al., 2008). This tool contains twenty-two criteria (32 with subpoints), the higher scores indicate the better quality of the study (Table 2).

### 3. Results and discussion

#### 3.1. Search outcomes and studies selection

The search process of the databases is demonstrated in (Table 1). During this process, a total of 3265 articles were obtained by using the specified keywords. Eventually, after removing duplicate and irrelevant titles, and completing the abstract and full-text reading, thirty-three studies were assigned for data analysis. These 33 studies met the eligibility criteria specified in the final review. The full-text appraisal of the selected articles included the evaluation of the methodology quality and assessment of the

main outcomes and findings. The systematic review flow chart is shown in (Fig. 1).

### 3.2. General characteristics of selected studies

The selected studies' (n = 33) general characteristics were presented in (Table 2). All studies were published from 2014 to 2024, in English. Five studies were from Saudi Arabia (Alharbi, Bahnassi, and Alonazie, 2016; Alshabi et al., 2022; Abdulsalim et al., 2023; Alqahtani et al., 2023; Almandil, 2016), five from Jordan (Banat et al., 2022; Al Rabayah and Al Rumman, 2019; Shroukh et al., 2018; Abu Assab et al., 2024; Alnawaiseh and AL-Oroud, 2022), five from Iraq (Sharrad, 2017; Muhannad et al., 2016; Salih et al., 2016; Allela, Shekhany, and Shekhany, 2017; Mohammed and Al-Razaq, 2017), four from Yemen (Al-Worafi et al., 2017; Alshakka et al., 2015; Zawiah et al., 2019; Alshakka et al., 2016), four from United Arab Emirates (Hayek et al., 2024; Shanableh et al., 2023; Qassim et al., 2014; Shareef et al., 2024), three from Turkey (Ergün et al., 2019; Khan, Karatas, and Hamid, 2023; Albayrak and Karahalil, 2022), two from Egypt (ELkhwsky et al., 2021; Tolba, Abdel-Latif, and Hassan, 2022), one from Lebanon (Hajj et al., 2018), one from Oman (Al Kablani, Al Shamsi, and Almutairi, 2018), one from Syria (Bahnassi and Al-Harbi, 2018), one from Kuwait (Alsaleh et al., 2017), and one from Qatar (RSK et al., 2023).

All studies had cross-sectional study design. All studies were performed in hospitals and specialized care centers, except nine shown in (Table 1) (Al-Worafi et al., 2017; Hajj et al., 2018; Qassim et al., 2014; Abu Assab et al., 2024; Shareef et al., 2024; Alnawaiseh and AL-Oroud, 2022; Sharrad, 2017; Muhannad et al., 2016; Salih et al., 2016). The total number of HCPs involved in the selected studies was 11683.

### 3.3. Quality assessment

In general, the included studies effectively outlined the study design, the target population, the measurement, interpretation, and discussion of the outcomes. However, the primary concerns were the failure to report the non-response rate and the lack of provided information regarding missing data in completed surveys in several studies.

### 3.4. HCPs' knowledge of PV and ADRs reporting

The knowledge of HCPs about PV and ADRs reporting differs widely across the Middle East countries. A number of studies were highlighted the lack of knowledge among HCPs, with poor awareness reported

in Saudi Arabia (Alharbi, Bahnassi, and Alonazie, 2016), Iraq (Salih et al., 2016; Mohammed and Al-Razaq, 2017), Turkey (Khan, Karatas, and Hamid, 2023), and Jordan (Banat et al., 2022; Shroukh et al., 2018), indicating poor awareness of reporting. Furthermore, in Jordan (Banat et al., 2022; Shroukh et al., 2018), many physicians showed insufficient knowledge, due to unawareness of the national pharmacovigilance center. Similar studies were reported inadequate knowledge about PV among physicians and nurses in Turkey (Ergün et al., 2019) and Yemen (Alshakka et al., 2016). On the other hand, the Iraqi physicians had seemed more familiar with the term of PV, although their inability to define it precisely (Muhannad et al., 2016). In addition, studies in Egypt (ELkhwsky et al., 2021) and the United Arab Emirates (UAE) (Hayek et al., 2024) were reported higher knowledge levels regarding PV awareness among pharmacists as compared to physicians and nurses. Moreover, pharmacists in Kuwait (Alsaleh et al., 2017), Lebanon (Hajj et al., 2018), Egypt (Tolba, Abdel-Latif, and Hassan, 2022), and Iraq (Sharrad, 2017) have shown good familiarity with PV concepts and ADR reporting. An intermediate knowledge levels among HCPs in Yemen (Zawiah et al., 2019) and Jordan (Al Rabayah and Al Rumman, 2019) was also reported.

However, a variation in the levels of knowledge among community pharmacists in Yemen (Al-Worafi et al., 2017) and the UAE (Shareef et al., 2024) was also revealed. Although the positive findings in this review, there is a clear gap especially among physicians in Jordan (Alnawaiseh and AL-Oroud, 2022) and Oman (Al Kablani, Al Shamsi, and Almutairi, 2018). In addition, inconsistency in the awareness among physicians and nurses in different regions of Saudi Arabia (Abdulsalim et al., 2023) was also reported.

### 3.5. HCPs' attitude towards PV and ADRs reporting

A positive attitude of HCPs towards PV and ADRs reporting was reported in various studies in Saudi Arabia (Abdulsalim et al., 2023), Turkey (Ergün et al., 2019; Khan, Karatas, and Hamid, 2023), Qatar (RSK et al., 2023), UAE (Hayek et al., 2024; Shanableh et al., 2023), and Jordan (Al Rabayah and Al Rumman, 2019). Community pharmacists in Yemen (Alshakka et al., 2015), Saudi Arabia (Alqahtani et al., 2023; Almandil, 2016), Egypt (Tolba, Abdel-Latif, and Hassan, 2022), Jordan (Banat et al., 2022), Iraq (Salih et al., 2016; Allela, Shekhany, and Shekhany, 2017; Mohammed and Al-Razaq, 2017), Lebanon (Hajj et al., 2018) and the UAE (Shareef et al., 2024) have shown positive attitudes towards ADR

**Table 2.** General characteristics of the included studies.

Authors	Country	Study design	Setting	Sample size	Full-text appraisal score*
Al-Worafi et al. (2017)	Yemen	Cross-sectional survey	289 pharmacies	428	21
Ergün et al. (2019)	Turkey	Observational, cross-sectional study	one hospital	783	19
Alharbi, Bahnassi, and Alonazie (2016)	Saudi Arabia	Cross-sectional study	11 hospitals	130	21
Banat et al. (2022)	Jordan	Cross-sectional study	public and private hospitals in Jordan	341	20
Hajj et al. (2018)	Lebanon	Cross-sectional descriptive study	1200 pharmacies	1857	26
Alshabi et al. (2022)	Saudi Arabia	Cross-sectional questionnaire-based study	5 hospitals	145	24
Abdulsalim et al. (2023)	Saudi Arabia	Cross-sectional study	all Al-Qassim hospitals	218	23
Alsaleh et al. (2017)	Kuwait	Cross-sectional study	7 hospitals	342	21
Al Rabayah and Al Rumman (2019)	Jordan	Cross-sectional survey	one hospital	306	23
Hayek et al. (2024)	United Arab Emirates	Cross-sectional study	8 hospitals	316	23
Khan, Karatas, and Hamid (2023)	Turkey	Cross-sectional survey	3 hospitals	412	23
Shanableh et al. (2023)	United Arab Emirates	Cross-sectional survey	3 hospitals	342	25
Alqahtani et al. (2023)	Saudi Arabia	Cross-sectional survey	all Jazan hospitals	460	22
Alshakka et al. (2015)	Yemen	Cross-sectional survey	all Aden hospitals	500	20
Shroukh et al. (2018)	Jordan	Cross-sectional survey	20 health centers.	106	22
Bahnassi and Al-Harbi (2018)	Syria	Cross-sectional study	all hospitals in Damascus	656	24
Al Kablani, Al Shamsi, and Almutairi (2018)	Oman	Cross-sectional study	all health institutes in Al-Buraimi governate	117	22
Almandil (2016)	Saudi Arabia	Descriptive cross-sectional study	one hospital	331	22
Qassim et al. (2014)	United Arab Emirates	Cross-sectional study	all pharmacies in Ajman and Sharjah	223	20
RSK et al. (2023)	Qatar	Cross-sectional survey	one intensive care unit	222	22
Abu Assab et al. (2024)	Jordan	Cross-sectional study	all community pharmacists in Jordan	325	24
Albayrak and Karahalil (2022)	Turkey	Cross-sectional study	all pharmacists in Turkey	406	21
ELkhwsy et al. (2021)	Egypt	Cross-sectional survey	three hospitals	547	24
Zawiah et al. (2019)	Yemen	Cross-sectional descriptive study	hospitals in 5 governates	260	23
Shareef et al. (2024)	United Arab Emirates	Cross-sectional study	pharmacies in Ras Al-Khaimah	177	25
Alnawaiseh and AL-Oroud (2022)	Jordan	Cross-sectional study	pharmacies in Al-Karak governate	337	19
Tolba, Abdel-Latif, and Hassan (2022)	Egypt	Cross-sectional survey	different practice settings	258	21
Alshakka et al. (2016)	Yemen	Cross-sectional study	one hospital	130	21
Sharrad (2017)	Iraq	cross-sectional analytical study	all pharmacists in Basra province	530	19
Muhannad et al. (2016)	Iraq	Cross-sectional study	private clinics in several districts in Baghdad	70	22
Salih et al. (2016)	Iraq	Cross-sectional survey	Baghdad (Karkh and Rusafa zones)	123	24
Allela, Shekhany, and Shekhany (2017)	Iraq	Cross-sectional prospective study	Erbil pharmacists	135	23
Mohammed and Al-Razaq (2017)	Iraq	Cross-sectional descriptive survey	pharmacists working in 3 hospitals, 3 colleges of pharmacy, and 20 community pharmacies	150	22

\*Score out of 32.

reporting. In addition, hospital pharmacists in Kuwait (Alsaleh et al., 2017) and Iraq (Sharrad, 2017; Allela, Shekhany, and Shekhany, 2017; Mohammed and Al-Razaq, 2017) were shown strong positive attitudes. Physicians in Jordan (Shroukh et al., 2018; Alnawaiseh and AL-Oroud, 2022), Oman (Al Kablani, Al Shamsi, and Almutairi, 2018), Iraq (Muhannad et al., 2016), Egypt (ELkhwsy et al., 2021) and Yemen (Alshakka et al., 2016) have also shown positive attitudes toward PV. In addition, nurses in Yemen (Alshakka et al., 2016) showed better attitude as compared to physicians.

Generally, HCPs in Turkey demonstrated positive attitudes (Khan, Karatas, and Hamid, 2023). In addition, no statistically significant differences were seen in total attitude scores between physicians and nurses (Ergün et al., 2019). Finally, Syrian pharmacists showed mixed attitudes, where a range of both positive and negative opinions were observed (Bahnassi and Al-Harbi, 2018).

### 3.6. HCPs' practice of PV and ADRs reporting

The practice of HCPs of PV and ADRs reporting was generally poor as reported in several studies. A significant underreporting observed among specific medical professions. A number of studies were highlighted low reporting rates among physicians and nurses in Oman (Al Kablani, Al Shamsi, and Almutairi, 2018), Turkey (Ergün et al., 2019), Jordan (Banat et al., 2022; Shroukh et al., 2018), and the UAE (Hayek et al., 2024). In addition, similar reporting rates were shown among pharmacists in the UAE (Shanableh et al., 2023; Qassim et al., 2014; Shareef et al., 2024), Lebanon (Haji et al., 2018), Egypt (ELkhwsy et al., 2021), Syria (Bahnassi and Al-Harbi, 2018), Turkey (Khan, Karatas, and Hamid, 2023; Albayrak and Karahalil, 2022), Jordan (Al Rabayah and Al Rumman, 2019; Alnawaiseh and AL-Oroud, 2022), Saudi Arabia (Alqahtani et al., 2023), and Iraq (Sharrad, 2017). Furthermore, community pharmacists in Yemen (Alshakka et al., 2015), Saudi Arabia (Alqahtani et al., 2023), Jordan (Abu Assab et al., 2024), and Kuwait (Alsaleh et al., 2017) were also shown ADR under-reporting. While in Qatar (RSK et al., 2023) the clinical pharmacists were looked more likely to report ADRs as compared to other HCPs.

The findings of our review indicate that knowledge of PV and ADRs held by physicians and nurses fails to attain the required levels in all the Middle East countries. Similar finding were obtained in a systematic review studying the KAP of nurses in various health-care settings (Salehi et al., 2021). Most studies found that pharmacists exhibited the highest knowledge

scores. Community pharmacists had varied in understanding the concepts of PV and ADRs reporting. Despite some positive outcomes, knowledge gaps still affecting the rate of ADRs reporting. Therefore, the authorities in the health sector should increase their efforts to improve the overall knowledge and awareness of PV among HCPs. This might be implemented through applying different approaches including lectures, seminars, and educational workshops.

In general, the attitude of HCPs tends to be shifted more toward a positive scale, with variable levels among different professionals. The strongest attitudes were seen among pharmacists, particularly hospital pharmacists as seen in Kuwait and Iraq (Sharrad, 2017; Allela, Shekhany, and Shekhany, 2017; Mohammed and Al-Razaq, 2017; Alsaleh et al., 2017). Community pharmacists also have shown positive attitudes in many countries (Alshakka et al., 2015; Salih et al., 2016). However, in Syria pharmacists presented with mixed levels of attitude towards PV (Bahnassi and Al-Harbi, 2018). Both physicians and nurses presented a lower level of attitude toward PV as compared to pharmacists. Although, the nurses were shown to have a better ADR reporting rate than physicians (Ergün et al., 2019). A similar result from the systematic review carried out by Abdullahi et al. regarding the attitude of physicians on KAP was quite discouraging (Abubakar, Simbak, and Haque, 2014).

Several studies in this review showed interesting results indicating the presence of a correlation between knowledge and attitudes towards PV and ADRs reporting (Al Kablani, Al Shamsi, and Almutairi, 2018; Qassim et al., 2014). This might be as a result of the implementation of effective educational programs of PV concepts. In addition, the process of reporting ADRs could improve the knowledge of HCPs of PV, which might be reflected in their attitudes as well.

The overall reporting practices of PV and ADRs were disappointing. The least effective medical professionals in reporting ADRs were physicians. ADR reporting among pharmacists remains suboptimal across various countries, with significant underreporting observed among hospital and community pharmacists (Hayek et al., 2024; Khan, Karatas, and Hamid, 2023; Sharrad, 2017). However, clinical pharmacists in Qatar showed a higher commitment of ADRs reporting (RSK et al., 2023).

The results shown in this review indicate the necessity for the implementation of methods and strategies to improve the overall KAP of HCPs all over the Middle East. Many barriers listed by HCPs that hindered the ADRs reporting such as inability to identify ADRs, lack of time, no knowing how or where to report, inability to access ADRs reporting forms, and fear of

legal penalties (Salehi et al., 2021; Menang et al., 2023). Therefore, it is important to adopt strategies such as educational intervention in order to overcome these barriers and improve the KAP of HCPs and ADR reporting. This strategy might be very effective in changing the HCPs' attitude towards PV practice. A scoping review was conducted to study educational interventions that strengthen PV systems in low- and middle-income countries. It concluded that educational sessions are the most effective in enhancing the knowledge of HCPs and increasing in the quality and number of reports (Menang et al., 2023). Another strategy includes facilitating electronic ADRs reporting by providing different methods, such as creating electronic applications for direct ADRs reporting to the national PV centers. Finally, yearly, or monthly rotating lectures should be conducted to keep HCPs informed and updated with the constantly evolving guidelines, tools, and policies related to PV and ADR reporting.

This study is a comprehensive systematic review aimed at assessing the knowledge, attitude, and practice of HCPs toward PV and ADRs reporting. In different Middle East countries. However, this systematic review has a number of limitations such as the use of heterogeneous measures for assessment used by different studies in different countries. In addition, none of the articles fulfilling the eligibility criteria were done in Palestine, Bahrain, or Iran.

#### 4. Conclusion

Globally, ADRs are considered critical problems in the health sector. Knowledge, attitude, and practice of HCPs are the most crucial factors among many others that affect PV and ADRs reporting. This systematic review assessed the knowledge, attitude, and practice of HCPs towards PV and ADRs reporting in the Middle East. The pharmacists have shown higher knowledge and attitude levels, physicians and nurses. Although the overall attitude observed was positive, substantial under-reporting was still persistent.

This review suggested a number of strategies to enhance the KAP of HCPs, such as educational interventions, electronic reporting, and continuous HCPs updating. The accessibility to ADRs reporting tools should be improved. In addition, trying to integrate PV education into the curricula of medical, pharmacy, and nursing colleges could significantly enhance the competence and willingness of HCPs to practice ADRs reporting. So, improving the PV systems in the Middle East requires a multi-faceted approach that combines education, technological advancements and continuous professional initiatives to

ensure improved patient outcomes and safer health-care practices.

#### Conflict of interest

The authors declare that they have no conflict of interest.

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