

Knowledge, Perception, and Reporting Practices of Healthcare Providers about Adverse Events Following the COVID-19 Vaccination in Iraq

(Conference Paper)#

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Abstract

Routine vaccination activities, such as detection, reporting, and management of adverse events following immunization (AEFIs), are generally handled by healthcare providers (HCPs). Safe vaccines against severe acute respiratory syndrome coronavirus (SARS-CoV-2) were introduced to control the Coronavirus Disease-19 (COVID-19) pandemic. The study aimed to assess the knowledge, perceptions, and practice of HCPs in Iraq about reporting adverse events following COVID-19 vaccination, and their association with sociodemographic variables. The study was a cross-sectional study that was carried out between August and September 2021 at the COVID-19 vaccination centers in Iraq. This study used an online and paper-based questionnaire, which was distributed among HCPs (physicians and pharmacists) in COVID-19 vaccination centers. A total of 117 pharmacists and physicians responded to the survey. Two-thirds of respondents were pharmacists. The majority of the respondents (49.6%) had fair knowledge levels on AEFIs. The perception of 43% of the participants was very good, whereas the perception of 28%, 23%, and 6% of the participants was fair, good, and poor, respectively. The reporting practice of HCPs was inadequate in 53% of respondents. The number of pharmacists who had good knowledge of AEFIs was significantly higher than that of the physicians. The age group (30-39) years of HCPs was significantly associated with more positive perception towards AEFIs. The number of pharmacists that had good perception was significantly higher than that of the physicians. Furthermore, HCPs aged 30 to 39 years had significantly higher reporting practices than other age groups. The study highlighted that the HCPs working at the COVID-19 vaccination centers have low knowledge of AEFIs. On the other hand, HCPs had more positive perception towards reporting AEFIs. Education programs and reference materials are needed to increase their awareness about AEFIs.

Keywords: Adverse events following immunization, COVID-19, Healthcare providers, knowledge, Perception, Reporting practice.

معرفة وفهم وممارسات مقدمي الرعاية الصحية في الإبلاغ عن الآثار الجانبية بعد التطعيم بلقاح

كوفيد-19 في العراق (بحث مؤتمر)#

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الخلاصة

يتولى مقدمو الرعاية الصحية عموماً أنشطة التطعيم الروتينية، مثل الكشف عن الآثار الجانبية بعد التطعيم والإبلاغ عنها ومعالجتها. تم إدخال لقاحات آمنة ضد فيروس كورونا للسيطرة على جائحة كوفيد-19. تهدف الدراسة إلى تقييم معرفة وتصورات وممارسات مقدمي الرعاية الصحية في العراق حول الإبلاغ عن الآثار الجانبية بعد التطعيم بلقاح كوفيد-19، وكذلك لتقييم تأثير الخصائص الديموغرافية لمقدمي الرعاية الصحية على معرفتهم وتصوراتهم وممارساتهم في الإبلاغ عن الآثار الجانبية بعد التطعيم بلقاح كوفيد-19. كانت الدراسة عبارة عن دراسة مقطعية أجريت بين اب و ايلول ٢٠٢١ في مراكز التلقيح ضد فيروس كورونا في العراق. استخدمت هذه الدراسة استبياناً عبر الإنترنت واستبياناً ورقياً، تم توزيعه بين الأطباء والصيدالدة في تلك المراكز. قدم ما مجموعه ١١٧ صيدلياً وطبيبياً ردودهم. كان ثلثا المستجيبين من الصيدالدة. غالبية المستجيبين (٤٩,٦٪) لديهم مستويات معرفة مقبولة بالآثار الجانبية بعد التطعيم. كان لدى ٤٣٪ من المشاركين تصور جيداً جداً، بينما كان تصور ٢٨٪ و ٢٣٪ و ٦٪ مقبولاً وجيداً وضعيفاً على التوالي. كانت ممارسة الإبلاغ عن مقدمي الرعاية الصحية غير مناسبة في ٥٣٪ من المستجيبين. كان عدد الصيدالدة الذين لديهم معرفة جيدة بالتأثير الضار للآثار الجانبية أعلى بكثير من الأطباء. ارتبطت الفئة العمرية (٣٠-٣٩) سنة لمقدمي الرعاية الصحية بشكل كبير مع التصورات تجاه الآثار الجانبية الضارة بعد التطعيم. كان عدد الصيدالدة الذين لديهم تصور جيد أعلى بكثير من عدد الأطباء. علاوة على ذلك، كان لمقدمي الرعاية الصحية الذين تتراوح أعمارهم بين ٣٠ و ٣٩ عاماً ممارسات إبلاغ أعلى بكثير من الفئات العمرية الأخرى. سلطت الدراسة الضوء على أن مقدمي الرعاية الصحية العاملين في مراكز التطعيم ضد فيروس كورونا لديهم معرفة منخفضة عن الآثار الجانبية بعد التطعيم. من ناحية أخرى، كان لدى مقدمي الرعاية الصحية تصور أكثر إيجابية تجاه الإبلاغ عن الآثار الجانبية بعد التطعيم. هناك حاجة إلى برامج تعليمية ومواد مرجعية لزيادة وعيهم حول الآثار الجانبية بعد التطعيم.

الكلمات المفتاحية: الأعراض الجانبية بعد التطعيم، كوفيد-19، مقدمو الرعاية الصحية، معرفة، فهم، ممارسات.

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Introduction

Adverse Events Following Immunization (AEFIs) is defined as "any untoward medical occurrence which follows immunization and which does not necessarily have a causal relationship with the use of the vaccine. The adverse event may be any unfavourable or unintended sign, abnormal laboratory finding, symptom or disease."⁽¹⁾ To improve vaccination safety, there is a need to increase the reporting of AEFIs in order to identify problems and take appropriate corrective action^(2,3). To ensure that any safety signals can be detected rapidly and responded to in an appropriate and timely manner, AEFIs reporting from health facilities may need to be more frequent than usual reporting.⁽⁴⁾ Reports should be done by using a standardized AEFI reporting form⁽⁵⁾.

As most of the infected countries, Iraq has reported its first confirmed case of SARS-CoV-2 infection in 24th February / 2020⁽⁶⁾. High rates of successful vaccinations may aid in overcoming the global health threat posed by the COVID-19 pandemic⁽⁷⁾. Regarding vaccine status in Iraq, a total of 4,908,532,010 individuals had received the vaccine by September 12, 2022⁽⁸⁾.

Although adverse events from the different COVID-19 vaccines may vary, those commonly reported include pain at the injection site, fatigue, ache of muscles, chills, and fever⁽⁹⁾. These side effects normally subside within a few days and are a sign that the immune system is functioning properly⁽¹⁰⁾. If an individual receives the vaccine and experience a negative reaction, s/he should be informed about the possible adverse events to seek medical attention⁽¹¹⁾.

The COVID-19 vaccine is a new vaccine⁽¹²⁾. When a new vaccine is introduced, adverse events associated with this new vaccine should be reported⁽¹³⁾. All AEFIs, both major and minor, encountered should be reported⁽¹⁴⁾. This is done by using the standard COVID-19 AEFI reporting form⁽¹⁵⁾.

In Iraq, there are numerous routes for receiving and documenting AEFI reports that were established within the system which has evolved with time. The major sources are through the designated safety personals at the vaccination centers that are informed and then fill and submit the paper-based or online reporting AEFI form to document the report. In addition to that, the online self-assessment form was designed to be filled by the vaccines themselves and can be accessed through the Whatsapp number of the Iraq Pharmacovigilance Center (IPvC)⁽¹⁶⁾. The IPvC has an official reporting form for the COVID-19 vaccine.

Routine immunization activities, such as detection, reporting, and management of AEFIs are generally performed by HCPs in hospitals and primary health care centers. They must have good knowledge of AEFIs and its management in order to effectively carry out these obligations⁽¹⁷⁾. It is noteworthy that there is a study of vaccine safety conducted using the IPvC database in the Iraqi Ministry of Health from 2014 till the end of 2018. The results of this study have shown that the number of

reports of AEFI reports had increased during 2017 and 2018 where they were 1080 (51%) and 684 (32%), respectively, which may be related to increased awareness of HCPs compared with previous years⁽¹⁸⁾.

The published studies in Iraq were more focused on the medicines adverse drug reactions and were not specific to vaccines. Despite the pharmacists having a positive attitude, they lacked of adequate knowledge and reporting practice to adverse drug reactions^(19,20).

It is very important to assess these aspects of knowledge, attitude, and practice of AEFIs, particularly those concerning the COVID-19 vaccine being a new agent introduced to the market.

The aims of the current study were to assess the knowledge, perceptions, and practice of HCPs (physicians and pharmacists) about reporting adverse events following COVID-19 vaccination in Iraqi vaccination centers, and their association with sociodemographic variables.

Subjects and Methods

This was a cross-sectional study carried out between 16th August until 16th September/ 2021 in COVID-19 vaccination centers in Iraq. The study population included a convenient sample healthcare providers (physicians and pharmacists) involved in COVID-19 vaccination who gave consent to participate in the study. The exclusion criteria were healthcare providers (physicians, and pharmacists) who were not involved in COVID-19 vaccination, those who did not give consent to participate in the study and those who provided incomplete information during the completion of the questionnaire. A paper-based, self-administered questionnaire in English language was used for data collection. The study was conducted in primary health care institutions and hospitals that were concerned with COVID-19 vaccination in Baghdad. These centers were AL-Qanat health care center, AL-Mustansirya health care center and Al-Kindy teaching hospital. Because of the low response rate due to the workload, an online questionnaire through a Google form was used for this study in addition to the paper-based questionnaire and distributed through specialized medical groups on social media throughout the study period. The questionnaire was adopted from two previous studies with some modifications made to be suitable for COVID-19 vaccines^(17,21). The questionnaire was reviewed and approved by members of the ethical and scientific committee at the College of Pharmacy/University of Baghdad. No validation of the questionnaire was performed.

There were four sections to the questionnaire. The first section consisted of five questions, which were used to collect the data about socio-demographic characteristics. In the second section, there were six questions, which were used to collect data on their AEFIs knowledge. Section three comprised eight questions, which were used to assess the respondents' AEFIs perceptions. The last section included eight questions about the practices of reporting AEFIs among the respondents. Some of the questions in this section were not given a score since they were designed to evaluate the information rather than the respondents' reporting practices. The questionnaire was first pretested on ten HCPs to ensure the clarity of the questions. Then it was distributed to other HCPs.

This study was approved by the ethical and scientific committee at the College of Pharmacy/University of Baghdad. The participants were informed about the research objectives and confidentiality of their responses.

The statistical analyses were performed using Microsoft Excel and Statistical Package for Social sciences (SPSS) (version 23.1). The study population's characteristics were summarized using descriptive statistics. Frequencies and percentages were used to represent categorical variables. The knowledge score was determined by allocating a score of 1 to each correct response and a score of zero for each incorrect response. To calculate the knowledge score, all correct responses were summed, divided by all possible correct responses, and multiplied by 100. A knowledge score of more than 50% was considered as good knowledge on AEFI; whereas a score of 40-50% was considered fair knowledge and a score of less than 40% was considered as poor knowledge.⁽¹⁷⁾ For the

determination of perception, 'yes' responses were considered as positive perception and were given a score of 1 whereas 'no' answers were considered as a negative perception and were given a score of 0. Participants who scored less than 2 were considered to have a poor perception, those more scoring 2-5 to have a fair perception, those scoring 5-7 to have a good perception, and those who scored 7 or to have very good perception.^(17,21) For reporting practice, each correct response represented an adequate practice and was scored one, whereas incorrect response represented an inadequate practice and was scored zero. A cumulative score of 50% or more was considered as good reporting practice, whereas poor reporting practice was considered when the cumulative score was less than 50%.⁽¹⁷⁾

The effect of demographic characteristics on knowledge, perception, and reporting practice was calculated using the Chi-Square test or Fisher's Exact test if needed. Fisher's Exact test was employed when more than 20% of cells have anticipated frequencies of less than 5. The *p* value of less than 0.05 was considered to be significant.

Results

Demographic characteristics of the study population

A total of 117 pharmacists and physicians provided their responses, where 28 responses were paper-based and 89 responses were online. All responses obtained were complete and 9 HCPs did not consent to participate in the paper-based study. The largest age group was 30–39 years (55.6%). Approximately, two-thirds of respondents (67.52%) were pharmacists. The demographic characteristics are summarized in Table 1.

Table 1. Demographic characteristics of the study population.

	Variables	Frequency (n)	Percentage (%)
Age (Years)	<30	44	37.6
	30-39	65	55.6
	40-59	8	6.8
Profession	Physicians	38	32.48
	Pharmacists	79	67.52
Place of work	Primary Health Care Centre	70	59.83
	Hospital	47	40.17
Gender	Male	32	27.35
	Female	85	72.65
Degree/ Qualification	Bachelor	102	87.18
	Post graduate	15	12.82

Knowledge of healthcare providers of AEFIs:

Knowledge was assessed by asking questions about the causes, and features of AEFIs.

The majority of the respondents 50% had fair knowledge levels on AEFI while 40% had poor and 10% had good knowledge (Figure 1).

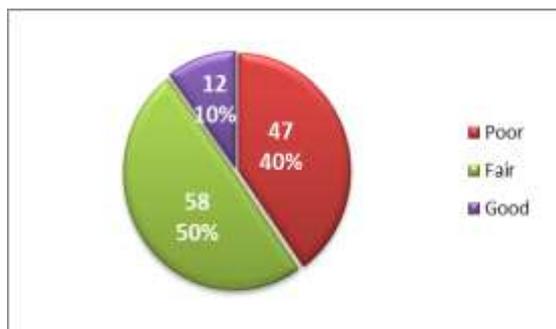


Figure 1. Knowledge scores of healthcare providers. Good knowledge: score of > 50%, fair knowledge: score of 40-50% and poor knowledge: score of < 40%.

The majority of the respondents (74%) knew that vaccine-product related reaction is one of the AEFIs causes, while only 25% of them knew that

immunization error-related reaction is considered as a cause of it and 19% knew that immunization anxiety-related reaction is also classified as a form of AEFIs. About three quarters of the respondents knew that the methods of reporting adverse events that following the COVID-19 vaccines is by filling AEFI reporting form, but also 6% of the respondents considered talking to colleague as a method of reporting. Also 65% of the respondents did not know about the COVID-19 vaccine reporting form. When asked participants about adverse events of COVID-19 vaccine that should be reported, 62.4% of the respondents knew that all of adverse events should be reported and only 37.6% of them did not know that. The results also demonstrated that only 14% of the participants knew that the investigation of AEFIs should be started within 24 hours (Table 2).

Table 2. Knowledge of study participants about AEFIs of COVID-19 vaccine.

Questions	Frequency(N)	Percentage
AEFIs causes: (Multiple answers possible):		
Vaccine-product related reaction	86	74
Vaccine-quality defect-related reaction	26	22
Immunization error-related reaction	29	25
Immunization anxiety-related reaction	22	19
Coincidental reaction	26	22
Methods of COVID-19 vaccine AEFI reporting:		
Filling of AEFI form	85	73
Reporting via social media group	15	13
Email/online	10	9
Talking to colleague	7	6
AEFI can be caused by reconstituted vaccines stored longer than normal, vaccine reaction, inappropriate route of administration, vaccines stored beyond the expiry date, or contaminated vaccines.		
Yes	48	41
No	69	59
Do you know about the COVID-19 vaccine reporting form?		
Yes	41	35
No	76	65
The Investigation of an AEFI should start within 24 hours:		
Yes	17	14
No	100	86

Perceptions of healthcare providers about AEFIs:

Forty-three percent of the participants had very good perception while 28%, 23%, and 6% had fair, good, and poor perception, respectively (Figure 2).

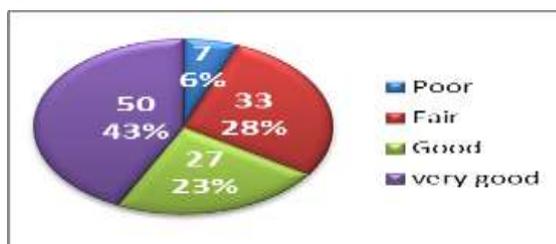


Figure 1. Perceptions of AEFIs among healthcare providers

Most of the respondents (91.5%) who reported an AEFI believed that reporting AEFIs does not involve personal consequences or punishment. Also 76.9% of the respondents felt that inadequate monitoring of adverse events can lead to a decline in immunization coverage. Furthermore, 92.3% agreed that improving AEFIs observation can aid in public trust in the immunization program. Moreover, 97.3% of respondents wanted to learn more about how to diagnose, report, investigate, and manage AEFIs (Table 3).

Table 2. Perceptions of study participants about AEFIs.

Variables	Yes*		No*	
	Frequency (n)	Percentage	Frequency (n)	Percentage
I believe that reporting an AEFI cannot lead to personal consequences/ punishment	107	91.50	10	8.50
I believe that reporting an AEFI will not make me feel guilty about having caused harm to a person taking the vaccine	106	90.60	11	9.40
I believe that healthcare providers are willing to report an AEFI even when they are not confident about the diagnosis	82	70.10	35	29.90
I believe that poor monitoring of adverse events can cause a reduction in immunization coverage.	90	76.90	27	23.10
I believe that the process of reporting an AEFI is not long and boring?	93	79.50	24	20.50
I believe that if adverse events are reported, something will be done about it.	103	88	14	12
I believe that enhancing the observation of AEFI can help build public trust in the immunization program.	108	92.30	9	7.70
I desire to learn more about how to diagnose, report, investigate and manage AEFI	114	97.40	3	2.60

*'Yes' answers signify positive perception whereas 'No' answers signify negative perception.

Reporting Practices of Healthcare Providers on AEFIs

Overall, the reporting practice of HCPs was inadequate in 53% of respondents while it was adequate in 47% of them (Figure 3). More than half of the respondents (57.3%) stated that they encountered AEFIs. The most commonly encountered AEFI with COVID19 vaccine was pain and swelling at the injected site (83%), fever (76.1%), fatigue (61.2%), and headache (55.2%). About 50% of the HCPs indicated that they routinely report the AEFIs that they encounter and most of them (62%) reported within 24 hours of detecting AEFI. The methods used for AEFI reporting by the respondents were filling AEFI forms (67.5%) and via other methods (32.5%). Approximately half of the respondents (49.6%) reported that they have seen an AEFI reporting and investigation form and the rest indicated that they have not. In addition, more than half of the respondents (56.4%) indicated that they didn't have AEFI reference guidelines in their facilities and 86.3% of the respondents stated that they routinely tell the patients about the side effects of a vaccine. On the other hand, 49.6% of HCPs stated that they did not routinely report the AEFIs that they encounter. About 32.7% of the participants who did not report AEFIs stated that they didn't know how

and where to report it. Only 8.6% of them felt that it was not related to immunization. The results of the reporting practice are shown in Table 4.

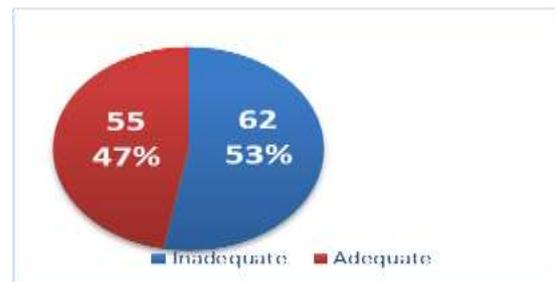


Figure 2. Level of reporting practice of health care providers toward AEFI. Adequate reporting practice: cumulative score of $\geq 50\%$, inadequate reporting practice: cumulative score of $< 50\%$.

Table 3. Reporting practice of AEFI of COVID-19 vaccine by study participants

	Frequency (n)	Percentage	Frequency (n)	Percentage
Have you encountered a COVID-19 AEFI in your practice?	67	57.3	50	42.7
Do you routinely report an AEFI you encountered?	59	50.4	58	49.6
Have you ever seen an AEFI reporting and investigation form?	58	49.6	59	50.4
Do you have AEFI reference guidelines materials at your workstation?	51	43.6	66	56.4
Do you routinely tell the patient about the side effect of a vaccine?	101	86.3	16	13.7

Association of Socio-Demographic Characteristics and AEFI Knowledge, Perception and Practice

Respondents' profession was found to significantly affect knowledge on AEFI (Table 5). The percentage of pharmacists who had good knowledge of AEFIs was significantly higher than that of the physicians.

In contrast, respondents' age group and profession were significantly associated with perception towards AEFIs (Table 6). The age group (30-39) had significantly higher perceptions than other groups. In addition, age group was significantly associated with reporting practice where the age group (30-39) had significantly higher reporting practice than other age groups (Table 7).

Table 5. Association between AEFI knowledge and study participant characteristics

Classification	Variables	Knowledge AEFI			P-value
		Poor	Fair	Good	
Age (Years)	<30	19	17	8	0.154
	30-39	25	37	3	
	40-59	3	4	1	
Profession	Physicians	14	24	0	0.018*
	Pharmacists	33	34	12	
Place of work	Primary Health Care Centre	20	21	6	0.615
	Hospital	27	37	6	
Gender	Male	15	15	2	0.536
	Female	32	43	10	
Degree/ Qualification	Bachelor	43	50	9	0.075
	Diploma	0	0	0	
	Master	3	3	2	
	PhD	1	0	1	
	Board Certificate	0	5	0	

*Significant at (P-value < 0.05) according to Chi-Square Tests.

Table 6. Association between study participants' characteristics and perception of AEFI

Classification	Variables	Perception of AEFI				P-value
		Poor	Fair	Good	Very good	
Age (Years)#	<30	5	11	6	22	0.008*
	30-39	0	21	19	25	
	40-59	2	1	2	3	
Profession	Physicians	1	8	4	25	0.005*
	Pharmacists	6	25	23	25	
Place of work	Primary Health Care Centre	3	13	12	18	0.776
	Hospital	4	20	14	32	

Continued table 6.

Classification	Variables	Perception of AEFI				P-value
		Poor	Fair	Good	Very good	
Gender	Male	2	10	7	13	0.974
	Female	5	23	20	37	
Degree/ Qualification	Bachelor	6	25	25	46	0.227
	Diploma	0	0	0	0	
	Master	1	4	1	2	
	PhD	0	0	1	1	
	Board Certificate	0	4	0	1	

*Significant at (P-value < 0.05) according to Chi-Square Tests/ Fisher exact test.

Fisher exact test.

Table 7. Association between study participants' characteristics and reporting practices on AEFIs

Classification	Variables	Reporting practices on AEFIs		P-value
		Inadequate	Adequate	
Age (Years)	<30	31	13	0.008*
	30-39	29	36	
	40-59	2	6	
Profession	Physicians	20	18	0.957
	Pharmacists	42	37	
Place of work	Primary Health Care Centre	25	21	0.857
	Hospital	37	33	
Gender	Male	15	17	0.461
	Female	47	38	
Degree/ Qualification	Bachelor	55	47	0.938
	Diploma	0	0	
	Master	4	4	
	PhD	1	1	
	Board Certificate	2	3	

*Significant at (P-value < 0.05) according to Chi-Square Tests.

Discussion

To our knowledge, this is the first study in Iraq concerning AEFIs with COVID-19 vaccines among pharmacists and physicians working in vaccination centers. The quality and safety of immunization services, as well as the monitoring of AEFI, are influenced by HCPs' knowledge, perceptions, and reporting practices on AEFI. Furthermore, it promotes public confidence in vaccinations, resulting in increased vaccine coverage and a reduction in the burden of infectious diseases as more people are vaccinated⁽²²⁾. This is especially important in the case of the COVID-19 pandemic which has had a wide spread impact on health, including significant mortality among older adults and those with pre-existing health conditions, as well as global economic repercussions caused by physical distancing measures⁽²³⁾.

Based on the scores obtained in this study, knowledge about AEFIs was inadequate. A small percentage of the study participants had good knowledge, with the vast majority having fair to poor knowledge. This low level of knowledge of

study participants may be due to their inadequate knowledge about the causes of AEFIs, the presence of a COVID-19 AEFIs reporting form, and the time within which investigations of AEFIs should be started. This is similar to the findings of an Albanian study in which majority of the respondents had poor knowledge levels on AEFI and only 7.8% of HCPs have good knowledge⁽²⁴⁾.

Most of the study respondents knew that reporting of COVID-19 vaccine adverse events is done by filling a form. This is similar to a study done in Lagos, Nigeria when the participants were asked about AEFI reporting forms were 92.7% of them knew about filling the form as a method of reporting⁽²⁵⁾. However, a small percent of the study participants believed that reporting can occur via social media groups which indicate the need to educate them that reporting is done only via the official form of COVID-19 vaccine

According to this study, the majority of the respondents did not know about the COVID-19 vaccine reporting form, which can be considered

among the reasons that lead to a decrease in reporting adverse events of the vaccine⁽²⁶⁾. Also, most of the respondents were unaware that the investigation of AEFIs should be started within 24 hours. On the contrary high percentage of respondents (62.3%) who were recruited in a similar study in Ghana showed good awareness⁽²¹⁾. The investigation of AEFIs must start nearly to the time an event occurs, especially for serious as well as unexpected AEFIs to assess the causality of AEFI and also managing of it in hospitals⁽³⁾. In addition, a previous study conducted in Baghdad has shown that Iraqi pharmacists had insufficient knowledge about the Iraqi Pharmacovigilance System⁽²⁷⁾. Knowledge regarding pharmacovigilance is very important for HCPs to report AEFI to the Pharmacovigilance center and have a positive perception towards reporting

The perception of AEFIs reporting was very good for the majority of the study participants. The majority of respondents believed that reporting AEFIs does not involve personal consequences and will not make them feel responsible for causing harm to people receiving the vaccine. Additionally, a good perception level was obtained from the respondents who believed that most of the HCPs were willing to report AEFIs even if they were not confident about the diagnosis and that poor monitoring may cause a reduction in immunization coverage. A positive and encouraging finding from the current study is that most of the health workers were conscious that reporting AEFIs can help build trust in immunization programs and most of them also desire to learn more about how to diagnose report and manage AEFIs. This will be essential to immunization managers, especially at the health center level, to offer AEFI training opportunities. These findings, however, differ from the low perception levels on AEFIs recorded by nurses in Nairobi, Kenya⁽²²⁾. Among the reasons for the low of perception level is the fear of being blamed and personal consequences after reporting. In contrast to the study in Ghana which showed that about three-quarters of study participants believed that reporting an AEFI can lead to such personal consequences⁽²¹⁾.

The profession and age were the only factors that significantly affected the perception of AEFIs. Pharmacists' perception was more positive than the perception of the physicians. However, it is worth noting that fewer physicians participated in the present study compared to pharmacists. The good perception was also affected by the age (the age group 30-39) years. This may suggest that most of the study participants were within this group of age and they have more practice in their work than other groups. This is in agreement with similar to study on AEFI among nurses in Kenya were respondents aged 30–39 years were three times more likely to have a good perception towards AEFI surveillance⁽²²⁾.

The majority of the respondents' reporting practice toward the AEFIs was inadequate. This suggests that although HCPs had good perception about AEFIs, they did not have as much good practice of reporting AEFIs. In contrast, in the study of Nigeria, the reporting practices were appropriate in (86.8%) respondents⁽¹⁷⁾. This under reporting practice may be due to that they didn't have AEFI reference guidelines materials at their workstation.

The participants in the current study that didn't report AEFIs stated the main reasons behind this were that they were not aware of how and where to report it, reporting form was not available, and they were busy and had no time as a result of their work pressure

The most commonly used method for reporting was through filling the AEFI form. Similar findings have been reported in Australia where all nurses were familiar with paper reporting procedures to the local Department of Health and also described their workplace reporting processes, such as having the report forms on hand and/or an existing protocol for reporting adverse events⁽²⁸⁾.

Good practices such as routinely telling the patient about the side effects of the vaccine were observed among the majority of the respondents. However, this study results also indicated that age was the only socio-demographic characteristic that significantly influenced the reporting practice of AEFIs because age reflects years of experience in the practice. Gender, profession, and place of work did not have a significant influence on AEFI reporting practice.

The major limitation of the study was the small and convenient sample size and the short time for data collection. Another limitation was that physicians were not well represented, as compared to pharmacists.

Conclusion

A low level of knowledge was observed among HCPs towards AEFIs, so it is important to raise awareness and improve the knowledge of all HCPs through regular training programs. On the other hand, an adequate perception level was observed in approximately two-thirds of the study participants. However, the reporting practice of HCPs was inadequate in more than half of the participants.

Because the COVID-19 vaccines are newly introduced to the market, healthcare providers who provide immunizations require extra education about their role in vaccine safety and reporting adverse events. Therefore, there is a need to increase the knowledge of pharmacists and physicians about AEFIs and the importance of their reporting. This can be achieved by providing opportunities like training and seminars regularly. In addition; this study suggests working on making the reporting forms more available to the HCPs to encourage them

to report AEFI. This is important not only for the COVID-19 vaccines but also to all vaccines available. Finally, strengthening COVID-19 vaccine reporting systems will help enhance post-marketing vaccine safety assessments, which will inform public health decisions about vaccine distribution and boost public confidence in vaccine safety.

Conflict of interests

The authors declare no conflict of interests.

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