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Original Research

Awareness, perceptions, and concerns of community pharmacists regarding online pharmacies: A Cross-sectional survey

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Abstract

Background: The numerous benefits offered by online pharmacies have led to their spread in many countries. These pharmacies provide consumers with a source for purchasing drugs and services online and delivering them to their homes. **Objective:** To explore the concerns, awareness, and perceptions of community pharmacists regarding online pharmacies. **Method:** This was a web-based survey conducted from November 2022 to October 2023 through the distribution of a self-administered questionnaire. A hybrid sampling strategy was employed to increase reach and guarantee sufficient participation. **Results:** A total of 478 pharmacists agreed to participate in this study, with a response rate of 88.5% (478/540). The mean awareness score for all participants was 11.94 ±3.72 out of 25 (median: 12, IQR: 6). And the perception score was 17.07 ±5.42 out of 30 (median: 17, IQR: 6). Around three-quarters (73.01%) of the participants are willing to offer online services, but most of them are concerned about the safe delivery of medications (63.18%). **Conclusion:** In conclusion, the study underscores the need for targeted interventions to enhance community pharmacists' awareness of online pharmacies, particularly in Amman. Factors such as recent graduation, social media activity, and frequent internet use play crucial roles. These findings address critical gaps in understanding Jordanian pharmacists' concerns, perceptions, and awareness regarding online pharmacy services.

Keywords: Online pharmacies, awareness, perception, concerns, community pharmacist, Jordan.

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INTRODUCTION

An online pharmacy, for the purpose of this study, is defined as a commercial website or digital platform that facilitates the purchase and delivery of pharmaceutical products, including both over-the-counter (OTC) and prescription medications, via the Internet[1]. Websites that abide by the rules and legislation of the nation in which their activities take place, as well as the location to which their pharmaceutical items are transported to the final customer, are considered legitimate online pharmacies[2]. The numerous benefits offered by online pharmacies have led to their spread in many countries. These pharmacies provide consumers with a source for purchasing drugs/services online and deliver them to their homes[3]. They offer customers many advantages such as ease of obtaining drugs, especially to those who are old or live in remote areas, reduced costs, and some offer E-consultation[4]. Online pharmacies offer a safer alternative for consumers compared to websites that can sell poor quality drugs and are not trustworthy[5].

The COVID-19 pandemic played a pivotal role in the increase of online drug purchases. Many online pharmacies sold drugs used for treatment such as dexamethasone, lopinavir-ritonavir, and hydroxychloroquine, without requesting a prescription[6]. Sun et al studied the process and accessibility of imatinib purchase through online pharmacies. They revealed that most of the included online pharmacies selling imatinib did not provide the patient with pharmacist consultations[7].

Purchasing drugs from online pharmacies is not free from

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drawbacks; a serious concern is the presence of rogue online pharmacies that can be an available source for counterfeit drugs and illegal selling of drugs[8]. Additionally, illicit websites present themselves as legal online pharmacies and sell drugs of poor quality, and provide patients with an opportunity to buy prescription only medications that have serious side effects and drug-drug interactions and require patient counseling[9,10]. Mackey and Nayyar revealed that Illicit online pharmacies are increasing in number and are considered a threat to consumers. They propose legal and regulatory measures to address this issue[11,12]. Limbu et al study showed that one in five online pharmacies in the US did not comply with FDA recommendations[14].

Prescription drugs are especially alarming since patients must provide a prescription to obtain these drugs. However, studies have shown that they can be purchased online with or without prescriptions[13,14]. In addition, patients who purchase prescription drugs from online pharmacies can use the same prescription to buy from several sources, which will make these drugs highly accessible and subject consumers to many health risks.

Unfortunately, in Jordan there is no legislation to regulate online pharmacies[15]. Much work is needed for this practice to provide a safe and credible source of online drug purchasing. Efforts should be on both national and international levels, should include campaigns to increase public health awareness, and should address different aspects related to this subject such as promotion, websites, prices, and quality of products.

This is the first study in Jordan that explores the concerns, awareness, and perceptions of community pharmacists regarding online pharmacies.

METHODOLOGY

This cross-sectional study was carried out by distributing a self-administered questionnaire between November 2022 and October 2023. We conducted an online survey using a self-administered questionnaire. The sampling strategy employed was hybrid. In addition to in-person recruitment, which involved approaching pharmacists at their places of employment, the study used snowball sampling by distributing the questionnaire online. To increase reach and guarantee sufficient participation, this combined strategy was employed. Consent for participation was obtained as a question in the first section after a cover letter at the beginning of the questionnaire explained the aim and ensured the anonymity of the participants. If the participant agreed to participate in this study, the next section will be opened; otherwise, it will be closed.

Al-Ahliyya Amman University's (AAU) Institutional Review Board (IRB) granted ethical approval (document number AAU/4/14/2021-2022).

Development of the questionnaire

Following an extensive and in-depth assessment of the literature, the questionnaire was created [16, 17, 18]. Licensed pharmacists who have worked in a community pharmacy for at least three months are eligible to participate. Pharmacy interns, pharmacists working in hospitals or non-community settings (such as industrial or regulatory roles), and any pharmacist with less than three months of experience are not eligible to apply. The questions were written in English, reviewed for scientific accuracy by two external examiners, and then translated into Arabic by a language specialist. Back translation to English was the final step to make sure the meanings matched. Considering the varying language proficiency of pharmacists, respondents answered the Arabic version.

The questionnaire was divided into four sections: Section A dealt with demographic data; Section B evaluated the behaviours and practices of pharmacists; Section C addressed issues pertaining to online pharmacy services; and Section D assessed pharmacists' awareness and perceptions of online pharmacies. The "concerns" portion contained multiple-choice questions with three possible answers: agree, disagree, and neutral. A five-point Likert scale (strongly agree, agree, neutral, disagree, strongly disagree) was used for assessing perceptions and awareness.

Ten known volunteers took part in a pilot study to give input on how clear the questions were. Every piece of feedback was considered, and the necessary changes were made. The analysis did not include responses from the pilot study. The questionnaire's Cronbach's alpha was determined to be 0.8442, indicating good reliability.

Data analysis

Results from the survey were described using descriptive statistics. The Kolmogorov-Smirnov test was used to determine the normality of the continuous variables, and either the mean and standard deviation (SD) or the median (interquartile range) was used. When describing categorical variables, percentages and frequencies were used. Utilizing the chi-squared technique, categorical variables were examined. Participants' knowledge and perception scores were compared to demographic information such as age, gender, employment, and years since graduation using univariate analysis. In order to identify independent determinants of awareness and perception scores about internet pharmacies, binary logistic regression with a backward stepwise (Wald) approach was then applied. For all analyses, SPSS® software version 27 was used. At 0.05, the significance level was established.

RESULTS

A total of 478 pharmacists agreed to participate in this study, with a response rate of 88.5% (478/540). More than half of the

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Table 1. Pharmacists' demographic data and experiences with online purchasing (N=478)

Factor	N	(%)
Gender		
• Male	223	46.65
• Female	255	53.35
Age		
Mean ±SD	31.41±7.49	
Level of Education		
• BSc in pharmacy	339	70.92
• Pharm (D)	76	15.9
• Graduate studies	63	13.18
Employment		
• Pharmacy Owner	98	20.5
• Community pharmacist	380	79.5
Type of University		
• Public	276	57.74
• Private	202	42.26
Year of graduation (N=471)		
• ≤2009	128	27.18
• >2009	343	72.82
Years after graduation		
Mean±SD	**9.14+8.0**	
Experience after graduation (years)		
Mean ±SD	**7.12+6.74**	
Site of pharmacy		
• North of Jordan	106	22.18
• Middle of Jordan	355	74.28
• South of Jordan	17	3.56
Location of pharmacy		
• Rural	30	6.78
• Suburb	184	38.49
• Commercial area	264	55.3
Practicing prior online purchase of any drug		
• Yes		
• No	115	24.06
	363	75.94
Active on social media		
• Yes	319	66.74
• No	159	33.26
Practicing online banking		
• Yes	353	73.85
• No	125	26.15
Having internet-enabled devices		
• Yes	391	81.8
• No	87	18.2
Frequent internet users		
• Yes	390	81.59
• No	88	18.41
Willingness to offer online service		
• Yes	349	73.01
• No	129	26.99

respondents (53.35%) were female. The mean age was 31.41 ± 7.49. Regarding the experience of pharmacists with online purchasing, the results revealed that most pharmacists 81.59% (390) are frequent internet users, have internet-enabled devices, online banking accounts, and are active on social media. However, only one-fourth 24.06% (115) of the pharmacists have made a prior online purchase for a drug. Furthermore, around three-quarters 73.01% (349) of the participants are willing to offer online service. Table 1 Shows more details regarding the demographic characteristics and experiences of the 478 included pharmacists.

Regarding community pharmacies' concerns with the service of online pharmacies, the highest concerns were as follows: the safe delivery of medications (63.18%), the risk that ordered medicine can be replaced by counterfeit medicine (57.11%), and the increased chances of providing the wrong medicine (56.28). Table 2 shows the detailed concerns' data.

Moreover, 252 (52.72%) of participants reported that the purchase of prescription medication is unsafe. 177 (37.03) participants agreed that they can buy prescription medication once it can be checked. Most participants (83.47%) reported that online pharmacy should be applied in both independent community pharmacies and chain pharmacies. Most participants (63.81%) reported that online pharmacies should be applied to both OTC medications and prescription medications.

Table 3 and Table 4 show the results for participants' awareness and perceptions about online pharmacies, respectively.

The mean awareness score for all participants was 11.94 ±3.72 out of 25 (median: 12, IQR: 6), and the perception score was 17.07 ±5.42 out of 30 (median: 17, IQR: 6). Table 5 shows factors affecting awareness scores and perception scores about online pharmacies.

Finally, the results show that the site of pharmacy was recognized as a predictor of community pharmacists' awareness

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Table 2. Concerns with the service of online pharmacy

	Number	%
An online pharmacy increases the risk of using low quality drugs by the consumer.		
• Agree	234	48.95
• Disagree	80	16.74
• Neutral	164	17.57
Poor internet connection may cause a problem.		
• Agree	240	50.2
• Disagree	76	15.9
• Neutral	162	33.89
Internet security may reduce privacy		
• Agree	196	41
• Disagree	123	25.73
• Neutral	159	33.26
Increased chances of providing the wrong medicines		
• Agree	269	56.28
• Disagree	77	16.11
• Neutral	132	27.62
The cost of delivery is considered an obstacle.		
• Agree	206	43.01
• Disagree	111	23.22
• Neutral	161	33.68
Risk that ordered medicine can be replaced by counterfeit.		
• Agree	273	57.11
• Disagree	88	18.41
• Neutral	117	24.48
Ensure safe delivery service before starting the online purchasing process.		
• Agree		63.18
• Disagree	302	14.44
• Neutral	69	22.38
	107	

, while year after graduation, being active on social media, and frequent use of the internet were predictors of community pharmacists' perceptions (Table 6).

DISCUSSION

The online ordering of pharmaceutical products and the services of online pharmacies are required nowadays due to increased e-commerce, mobile internet, and digitalization[19]. In 1999, several companies (such as planetrx.com, drugstore.com, and cyberpharmacy.com) launched commercial websites that allow consumers to purchase over the counter and prescription medications online, typically at a lower price. It has been reported that legitimate pharmacies are mostly located in the United States and Europe[20-22]. The current study aims to assess the awareness, perceptions, and concerns of community pharmacists in Jordan toward online pharmacies.

Despite the fact that most of the respondents were frequent internet users, had internet-enabled devices and online banking accounts, and were active on social media, only one-fourth of them had purchased a drug online. On the other hand, around three-fourths of the participants in this study are willing to offer online services in the future. In spite of the pharmacists' willingness to provide the service in Jordan, their major concerns towards online pharmacies were mainly: ensuring safe delivery service before starting the online purchasing process; the high risk that ordered medicine can be replaced by counterfeit medicine; and the high chance of providing the wrong medicine. In consistence, the concerns raised in this study have been reported in other studies[22,23]. Similarly, community pharmacist awareness, perception, and concerns regarding online pharmacies in Nigeria were studied. The reported concerns were related to the possibility of providing the wrong or counterfeit medications, in addition to online security and poor internet penetration issues. Furthermore, the study in Nigeria reveals that there was a correlation between pharmacists' perceptions of their clients' needs and their propensity to offer the service in the future[24]. According to a study that was done in America, the study concluded that the majority of independent community pharmacists would like to offer customized pharmaceutical services in their practices; however, before this can happen, they need further training. Subsequent endeavors ought to concentrate on creating all-encompassing educational curricula to enhance pharmacists' proficiency in delivering these services[25]. In line, Eades et al., in their ten-year systematic review, stated that training should focus on boosting pharmacists' self-assurance in delivering these services in order to enhance the quality of public health online services offered by community pharmacies[26]. Moreover, it was concluded that well-trained and self-assured pharmacists should be able to provide public health services more effectively, as this will probably improve the attitudes and health of their clients[26].

in this study, prescription medication was thought to be unsafe by almost more than half of the participants. However, 37.03% of participants agreed to purchase prescription medication after being checked. Most participants suggested that both OTC preparations and prescription drugs should be purchased online. In comparison, a study done in Malta has reported that only 4.3% Maltese patients buy OTC medications online, while others get prescription drugs from their doctors via "brick-and-mortar" pharmacies. Moreover, 89% of the respondents gave a reason for not making an online purchase, with 41% (n = 181) citing safety concerns as the main one[27].

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Table 3. Participant's Awareness about online pharmacy (n=478)

Questions	Answer					Median	IQR
	Strongly agree (N)	Agree (N)	Neutral (N)	Disagree (N)	Strongly disagree (N)		
Illegal Internet pharmacies are very common	42	64	148	123	101	3	1
Can identify illegal Internet pharmacies	59	87	112	111	109	3	2
All medications sold on the Internet to patients in Jordan are JFDA-approved	24	46	85	114	209	2	2
All medications sold on the Internet to patients in Jordan comply with Jordan drug and pharmacy laws	29	42	107	128	172	2	2
Online pharmacies are allowed according to rules	46	55	84	100	193	2	2

Table 4. Participant's perceptions about online pharmacy (n=478)

Questions	Answer					Median	IQR
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree		
In online pharmacies, the pharmacist can provide appropriate patient counseling	36	55	96	108	183	2	2
Online pharmacies offers lower prices to the consumers	75	121	114	96	72	3	2
Online pharmacies may provide larger market penetration for the pharmacy	51	85	125	104	113	3	2
Online pharmacies provide greater convenience for clients	49	85	149	87	108	3	2
There should be governmental regulations to organize and supervise online pharmacies	195	64	89	59	71	4	3
Online pharmacies in Jordan may export medicines to people in other countries	64	87	129	97	101	3	2

Notably, pharmacist awareness regarding online pharmacies was found weak, according to the outcomes of our study. These findings are close to the results of a study in Lahore, Pakistan, in which community pharmacists had displayed weak awareness about online pharmacy services[28]. Another cohort study that was done in Nigeria reported that, despite the frequent internet use, overall, the survey population had little awareness of the existence of online pharmacy services[29]. The current study revealed that one-third of the participants agreed or strongly agreed about their abilities to identify illegal Internet pharmacies. Moreover, around half of the participants disagreed or strongly disagreed that illegal internet pharmacies are very common, whereas one-fourth of the participants had a neutral opinion. In Line, a study done in the United States showed that although pharmacists are aware of the existence of illegal online pharmacies and are typically aware of the risks involved in using them, they do not currently possess the skills needed to effectively inform and safeguard the public. Additionally, pharmacists had indicated a lack of confidence in their own expertise and abilities to advise patients on illicit internet pharmacies, and they were unable to assess the legitimacy of online pharmacies based on webpage features[30]. More than half of the participants (68%) in the current study disagreed or strongly disagreed that all medications sold on the Internet to patients in Jordan are JFDA-approved. Furthermore, the majority of the participants disagreed or strongly disagreed that all medications sold on the Internet to patients in Jordan comply with Jordan drug and pharmacy laws. Re-enforcing the need for a law that regulates online medication purchasing, a recent study done in Jordan highlighted that Jordanian

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Table 5. Factors affecting Awareness score and perception score about electronic pharmacy (N=478)

Factor	Awareness score	p-value	Perception score	p-value
Age				
≤33	11.92±3.70	0.705	17.82±4.99	<0.001*
>33	12.06±3.65		15.82±5.14	
Gender				
Male	11.97±3.78	0.971	16.37±5.19	0.002*
Female	11.96±3.59		17.82±4.99	
Qualification				
BSc pharmacy	11.86±3.60	0.032*	16.94±5.30	0.377
PharmD	12.91±4.17		17.74±5.11	
Graduate study	11.38±3.23		17.54±5.13	
University				
Public university	11.91±3.59	0.692	16.70±5.4	0.026*
Private university	12.05±3.81		17.75±4.63	
Employment				
Community pharmacist	12.06±3.58	0.3	17.39±5.02	0.038*
Pharmacy owner	11.62±4.05		16.18±5.45	
Years after graduation				
≤10	11.96±3.57	0.964	17.98±5.04	<0.001*
>10	11.98±3.75		16.67±5.00	
Active on social media				
Yes	11.95±3.57	0.888	17.78±4.93	0.001*
No	12.0±.3.89		15.87±5.29	
Practice prior online purchase for any drug				
Yes	12.37±3.74	0.183	17.17±5.63	0.956
No	11.84±3.66		17.14±4.97	
Pharmacy location				
Amman	11.61±3.56	0.005*	17.28±4.98	0.43
other	12.60±3.81		16.90±5.39	
Location				
North Jordan	12.01±4.08	0.106	16.14±5.41	0.006*
Middle Jordan	11.85±3.56		17.56±5.00	
South Jordan	13.77±2.99		14.71±4.50	
Commercial area	11.73±3.54	0.151	17.29±5.25	0.143
Suburb area	12.15±3.78		16.70±501	
Rural area	12.97±4.17		18.57±4.49	
Practice online banking.		0.306	17.42±4.92	0.052
Yes	11.86±3.59		16.38±5.63	
No	12.26±3.91			
Have internet enabled devices.		0.369		.001*
Yes	11.90±3.57		17.68±4.93	
No	12.29±4.15		14.74±5.35	
Use the internet frequently.		0.655		.001*
Yes	11.93±3.54		17.79±4.89	
No	12.13±4.26		14.30±5.23	
Willing to offer online service.		0.563		.001*
Yes	12.03±3.60		17.65±5.04	
No	11.81±3.89		15.78±5.14	

*Significant difference (P value < 0.05)

Table 6. Predictors of awareness and perceptions about online pharmacy using logistic regression.

A. Predictors of awareness about online pharmacy using logistic regression

Independent variable	B	SE	Odds ratio	95% CI	p-value
Site of pharmacy	0.51	0.19	1.68	1..15-2.45	0.007*

B. Predictors of perceptions about online pharmacy using logistic regression

Independent variable	B	SE	Odds ratio	95% CI	p-value
Year after graduation (≤10 years)	0.69	0.22	2	1..31-3.06	0.001*
Being active on social media	0.49	0.23	1.64	1.04-2.58	0.033*
Frequent use of internet	-1.15	0.44	4.61	0.32-0.19	<0.001*

B, regression coefficient; SE, standard error associated with the coefficient B.*p-value < 0.05 (perception score <15 coded 0, perception score ≥15 coded 1); (awareness score <13 coded 0, awareness score ≥13 coded 1).

people understand the risks of purchasing medications online. Consequently, it was concluded that it is necessary to put in place educational programs and laws that regulate and keep an eye on the sale of drugs online[31].

Furthermore, the perception of community pharmacists about online pharmacies was reported to be good enough in this study. Around two-thirds of the participants disagreed or strongly disagreed that in online pharmacies, the pharmacist can provide appropriate patient counseling. Half of the participants agreed or strongly agreed that there should be governmental regulations to organize and supervise online pharmacies in order to ensure safe access to drugs. These research results highlight the necessity of standardized frameworks and regulatory approaches to increase community pharmacists'

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confidence in internet pharmacies. Similarly, community pharmacist awareness of illegal pharmacies was evaluated in the USA where 58% of the community pharmacist participating in the study reported their disability to council patients to identify illegal online pharmacies[30]. In Italy, community pharmacists' perceptions and opinions about the online sale of drugs and falsified drugs were evaluated. The results showed that community pharmacists had low confidence in the online pharmacies and a limited awareness about counterfeit drugs. Therefore, targeted interventions should be supported to increase community pharmacists' awareness about online purchase of drugs and how to monitor falsified medications[32]. In another study, student pharmacists' awareness and awareness of illegal online pharmacies were analyzed at Butler University in Indianapolis, Indiana. Even though the students were aware of the presence of illegal pharmacy websites, they were not aware of the importance of this concern for patient safety or how to recognize illegal websites[33]. Therefore, to ensure that the pharmacists are sufficiently equipped to protect their communities from the threat of illegal online pharmacies; this subject could be integrated into the educational curriculum of pharmacists. Furthermore, future studies investigating the prevalence of illegal pharmacy websites should be carried out[30,33].

The factors affecting the awareness score about electronic pharmacies among the community pharmacists in this study were pharmacist qualification and location. Regarding qualification, it was found that PharmD graduates gave a significantly higher score than BSc pharmacy and graduate study graduates. Regarding pharmacy location, pharmacies in other cities rather than the capital, Amman, have a significantly higher score (12.60±3.81). This could be related to the overcrowded lifestyle in big cities, which may offer restricted time for the pharmacists to improve their awareness during working hours.

A study that was done in Jordan revealed that the majority of pharmacists claimed that, in spite of their enormous workload, they would use the Internet to research patient concerns when their patients visited the pharmacy. Some pharmacists decided to put off checking the unverified information that patients brought in and spend their leisure time browsing the internet[34]. According to a recent study done in 2023, they concluded that the provision of public healthcare promotion services in community pharmacy settings has been hindered by several issues, including a shortage of awareness and skills, a lack of self-assurance, a lack of proper training and regulations, inadequate acceptance within the healthcare system, patients' resistance to utilize pharmacy services, and the presence of an inadequate number of pharmacy staff members[34]. Furthermore, the location and hours of operation are two important factors that affect customers' choice of pharmacy, as stated by Kevrekidis et al.[36].

Factors that affect the community pharmacists' perceptions scores regarding online pharmacy among those in this study, were: age, gender, type of university (public or private), employment manner by being a community pharmacist or a pharmacy owner, number of years after graduation, being active on social media, pharmacy location in the country (north, south, or middle of the country), practicing online banking, having internet-enabled devices, using the internet frequently, and willingness to offer online service. By using logistic regression, the predictor of community pharmacists' awareness was found to be only the site of the pharmacy. Whereas the predictors of community pharmacists' perceptions were the number of years after graduation, being active on social media, and the frequent use of the internet. Similar results were obtained from two studies done in Jordan[34] and Kuala Lumpur, Malaysia[37].

These findings could validate focused interventions aimed at enhancing community pharmacists' awareness of online pharmacies, especially in the capital, Amman. Furthermore, community pharmacists who graduated less than ten years ago, who are active on social media, or who use the internet frequently are more capable of interpreting the features related to the online purchase of drugs. This can be related to the fact that the pharmacists who graduated less than ten years ago are still aiming to learn new strategies, whereas the older ones rely more on their experience. Moreover, frequent use of the internet and being active on social media are extremely important to understanding e-commerce. Furthermore, research findings fill in significant gaps in Jordanian community pharmacist concerns, perceptions, and awareness of online pharmacies, as well as their willingness to offer this service.

Limitations

Several limitations should be as awareness d in this study. Firstly, the findings are based on self-reported data, which may be subject to recall and response bias. The study primarily focuses on the perspectives of community pharmacists, and additional stakeholders' viewpoints, such as patients and regulatory bodies, could provide a more comprehensive understanding. The cross-sectional design limits the ability to establish causation or temporal relationships. The study's geographical scope within Jordan may not fully capture regional variations. Additionally, the evolving nature of technology and e-commerce suggests that perceptions and practices may change over time. Finally, the study does not explore cultural or socioeconomic factors that could influence online pharmacy dynamics. Future research with a more diverse sample, longitudinal design, and a broader contextual analysis would contribute to a more nuanced understanding of the complex landscape of online pharmacies in Jordan.

CONCLUSION

In conclusion, the study illuminates the evolving landscape of online pharmacies in Jordan, emphasizing the necessity for comprehensive education and regulatory frameworks. While pharmacists exhibit a willingness to embrace online services, their concerns surrounding safe delivery, counterfeit medications, and prescription safety underscore the need for

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vigilant oversight. The global parallels in pharmacist perceptions and challenges highlight the importance of a unified approach to address gaps in awareness and confidence. Factors such as qualification, location, and online engagement influence pharmacists' perspectives, signaling the potential for targeted interventions. The findings advocate for integrating pertinent topics into pharmacists' education, focusing on recent graduates and those actively involved in online platforms. Ultimately, the study contributes valuable insights for policymakers, educators, and practitioners, emphasizing the urgency of standardized regulations and ongoing training to ensure the safe integration of online pharmacy services into the broader healthcare landscape in Jordan.

AUTHOR'S CONTRIBUTION

Mariam Alameri: acquisition, analysis, interpretation of data, original drafting, reviewing the submitted draft, responsible and accountable for all aspects of the work. **Lobna Gharaibeh:** Supervision, Conceptualization, Methodology, Writing – review & editing. **Mervat Alsous**: Conceptualization, Methodology, analysis, Writing – review & editing. **Alhareth Alsa'd**: Conceptualization, Methodology, Writing – review & editing. **Aya Y Al-Kabariti**: Conceptualization, Methodology, Writing – review & editing. **Meriem Rezigue**: Conceptualization, Methodology, Writing – review & editing. **Maha Mansoor:** Methodology, data collection, review & editing. **Sireen Shilbayeh:** Writing – review & editing. **Nadia Al Mazrouei:** Writing – review & editing.

CONFLICTS OF INTEREST

None.

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