




# A comprehensive analysis of public satisfaction: Community pharmacists' pandemic preparedness in Jordan

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## ABSTRACT

Community pharmacists' roles have expanded globally to address the COVID-19 pandemic. Given the limited information available on public satisfaction regarding pharmacy preparedness and services during this crisis in Jordan, our study aimed to assess public contentment with community pharmacists' readiness for the pandemic. Not to forget the educational services they offered, and public expectations regarding their future roles in emergencies. We employed a cross-sectional questionnaire, surveying 1,820 adults across all 12 governorates of Jordan via proportionate random sampling. A multidisciplinary committee validated the adjusted survey, and data analysis was conducted using SPSS V21. Our findings revealed that, during the COVID-19 pandemic, only approximately half of the participants expressed satisfaction with pharmacy services in Jordan. Age, gender, and urban or rural location were influential factors affecting satisfaction with pharmaceutical care during the COVID-19 pandemic. Specifically, individuals aged 55–64 exhibited a significantly higher likelihood of being satisfied with pharmacy services (OR: 7.39, 95%CI: 9.01–18.77,  $p = 0.001$ ). Moreover, females in Jordan were more inclined to express satisfaction with pharmacy services during the pandemic (OR: 4.23, 95%CI: 1.97–9.55,  $p = 0.02$ ). Conversely, individuals residing in rural areas were notably less likely to report satisfaction with pharmacy services during the pandemic (OR: 0.33, 95%CI: 0.11–0.61,  $p = 0.002$ ), as revealed by the study's findings. Overall, participants were dissatisfied with the provided pharmacy education. There was a widespread belief in the pivotal role of pharmacists in pandemic management, with expectations of expanded COVID-19-related services in the future. People trusted pharmacists to play a greater role in pandemic situations. Our study recommends a review of pharmacy practice policies, particularly in relation to public services during pandemics, and the implementation of pharmacist emergency protocols.

## INTRODUCTION

Community pharmacies are widely recognized as accessible healthcare settings, making community pharmacists pivotal in promoting health, educating patients about their conditions, advising on minor ailments, ensuring proper medication use, fostering adherence, and collaborating with healthcare providers to identify and prevent drug therapy issues

[1]. Extensive evidence supports the benefits of pharmaceutical care for patient outcomes and healthcare costs [2]. In Jordan, community pharmacies, both independent and part of chains, are the predominant pharmaceutical facilities, numbering around 2,500 across the country [3]. While easily accessible, community pharmacies in Jordan often fall short in providing patient-centered pharmaceutical care, with most pharmacists primarily focused on dispensing medications and managing inventory. Effective patient counseling and education are infrequent, and few pharmacies maintain patient records [4].

Many countries have recognized the critical role of community pharmacists in responding to the COVID-19 pandemic, entrusting them with responsibilities such as public

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education, ensuring the availability of hygiene products, and screening for suspected cases [5–8]. They are considered essential contributors to the healthcare system [9–11] and play a vital role in raising public awareness and minimizing disease transmission [5,12]. In Jordan, Basheti *et al.* [13] have highlighted pharmacists' potential role in infection control during COVID-19 by advising the public on hygiene practices. Aruru *et al.* [14] have developed a framework for expanding pharmacy professionals' roles during the pandemic, emphasizing their frontline contributions. Challenges persist, including limited access to personal protective equipment, infectious exposure risks, and legislative hurdles affecting provider status and reimbursements [13,15,14,16–18].

Public satisfaction, reflecting the positive feelings patients experience with a service, is a key quality indicator in healthcare services [19]. It assesses the alignment between service quality expectations and the actual experience from a patient's perspective [20]. Public satisfaction significantly influences patient adherence and healthcare-seeking behavior [21]. Given that community pharmacists are the most accessible healthcare professionals, their services and pandemic preparedness can profoundly impact public behavior and health. This research aims to evaluate Jordanians' satisfaction with community pharmacists' services during the pandemic, assess adult satisfaction with pharmacists' pandemic preparedness, and identify predictors of positive public satisfaction with COVID-19 control efforts. This study was conducted concurrently with an investigation into the mental impact of COVID-19 on the Jordanian public [22].

## METHODOLOGY

### Research design

A nationwide cross-sectional survey was undertaken spanning a 3-month period, commencing from August 1 to the conclusion of October 2020, covering all 12 governorates of Jordan (illustrated in Fig. 1). The survey instrument involved conducting face-to-face interviews with a random selection of adults aged 18 years and older.

### Survey sampling approach and determination of sample size

Employing a method of proportionate random sampling, the study population was stratified into four distinct geographical regions: Northern, Southern, Capital, and Central Regions. Within each of these regions, two urban and two rural areas were randomly selected. Utilizing the Raosoft sample size calculator, the recommended minimum sample size for this investigation was determined to be 385 adults at a 95% significance level with a 5% margin of error. To ensure the inclusion of a representative sample capable of generalization, the authors made the decision to incorporate a total of 1,820 individuals into the study.

### Study instrument, reliability, validity, and data analysis

The study utilized a questionnaire with four sections, comprising demographic information, pharmacist preparedness, patient education, and future pharmacist role expectations. The questionnaire's reliability was assessed using Cronbach's

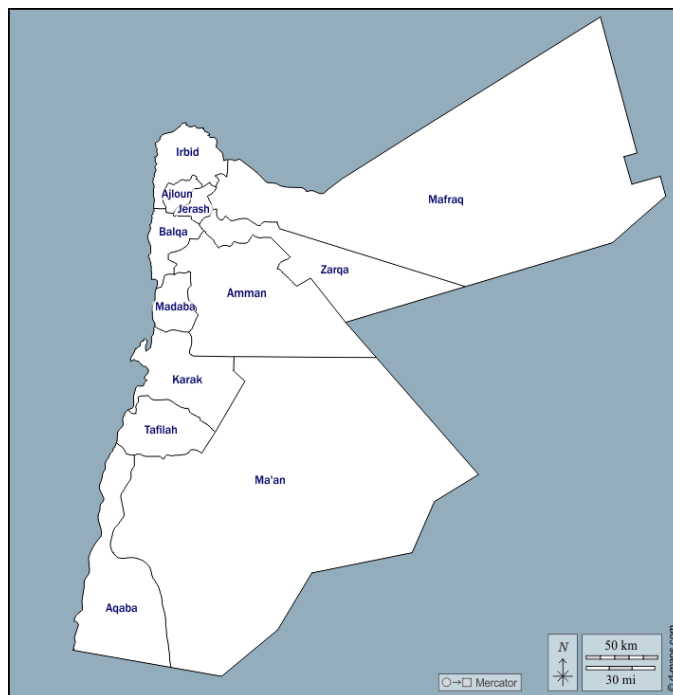


Figure 1. Map of Jordan governorates.

alpha with a pilot study conducted on 20 participants indicating marginally good reliability ( $\alpha = 0.67$ ), though this pilot data was not included in the final results. The survey underwent validation by a multidisciplinary committee, resulting in minor modifications. Data collection occurred with protective measures in place due to the COVID-19 pandemic through in-person interactions using an iPad equipped with an electronic survey while wearing masks and keeping physical distancing. Participants were informed of their right to opt out or decline to answer any questions. The questionnaire was designed for self-administration, allowing individuals to complete it independently. In cases where participants were illiterate or unwilling to do so, the researcher assisted in questionnaire completion.

Convenience sampling was employed, and data were analyzed using Microsoft Excel and SPSS. Descriptive results were presented as proportions with 95% confidence intervals, and logistic regression results as adjusted odds ratios with 95% CI. Statistical significance was determined at  $p < 0.05$ , employing Rao-Scott chi-square tests for assessing differences between categorical variables.

### Ethics approval

The Institutional Review Board (IRB) at the University of Petra approved the research (Q1/7/2020). Each participant provided a signed consent form as an expression of their voluntary participation in this study.

## RESULTS

To reach our desired sample size, we engaged with 1,820 adults, among whom 53.4% (971/1,820) expressed satisfaction with the pharmacy services in Jordan during the

COVID-19 pandemic. Of the participants who completed the questionnaire, 34.3% (624/1,820) were aged 30–55 years, 22.8% (416/1,820) aged 55–64 years, and 4.0% (72/1,820) aged >65 years (Table 1). Our findings revealed that individuals within the age group of 55–64 were notably more inclined to express satisfaction with pharmacy services during the COVID-19 period (OR: 17.79, 95%CI: 9.01–18.77,  $p = 0.001$ ). More than half 52.8%, (961/1,820) of the respondents in this study were male, however, the females were more likely to be satisfied with the pharmacy services in Jordan during COVID-19 (OR: 4.23, 95%CI: 1.97–9.55,  $p = 0.02$ ). Approximately, two-thirds 59.4%, (1,081/1,820) of the participants held a university degree. No significant differences in satisfaction levels were found across participants with different educational levels, monthly income,

or demographic regions. Present findings illustrate that residents in rural areas were less likely to be satisfied with the pharmacy services during COVID-19 (OR: 0.33, 95%CI: 0.11–0.61,  $p = 0.002$ ). The frequency of pharmacy visits was not associated with the level of participants' satisfaction.

#### Satisfaction with pharmacy preparedness

Approximately, one-third 29.1% (529/1,820) of the participants, agreed with the following statement “I am satisfied with the availability of products (medicines and hygienic products) during the pandemic.” Over half of the participants, specifically 29.4% (535/1,820), and an additional 22.6% (412/1,820), expressed strong agreement regarding the rapid and precise home delivery service of medications by Jordanian

**Table 1.** Association of demographic characteristics with satisfaction status ( $N = 1,820$ ).

Socio-demographics	Participants			
	Total ( $n$ , %)	Satisfied with pharmacy services ( $n = 971$ ) ( $n$ , %)	Dissatisfied with pharmacy services ( $n = 849$ ) ( $n$ , %)	Predicting satisfaction, OR (95% CI)
Age (years)				
18–29 (ref)	(708, 38.9%)	(221, 31.2%)	(487, 68.8%)	1.00
30–55	(624, 34.3%)	(335, 53.7%)	(289, 46.3%)	2.56 (1.41–4.84)
55–64	(416, 22.8%)	(362, 87.0%)	(54, 13.0%)	14.79 (9.01–18.77)*
≥65	(72, 4.0%)	(53, 73.6%)	(19, 26.4%)	6.16 (3.41–8.37)
Gender				
Male (ref)	(961, 52.8%)	(357, 37.1%)	(604, 62.9%)	1.00
Female	(859, 47.2%)	(614, 71.5%)	(245, 28.5%)	4.23 (1.97–9.55)*
Educational level				
High (a university degree)	(1,081, 59.4%)	(544, 50.3%)	(537, 49.7%)	1.00
Moderate (secondary school)	(632, 34.7%)	(373, 59.0%)	(259, 41.0%)	1.42 (0.56–2.66)
Low (less than secondary school)	(107, 5.9%)	(54, 50.5%)	(53, 49.5%)	1.00 (0.49–1.97)
Monthly income				
≤500 JOD (ref)	(864, 47.5%)	(421, 48.7%)	(443, 51.3%)	1.00
501–1,000 JOD	(784, 43.1%)	(446, 56.9%)	(338, 43.1%)	1.37 (0.26–3.41)
≥1,000 JOD	(172, 9.4%)	(104, 60.5%)	(68, 39.5%)	1.61 (0.79–2.99)
Location				
Capital region (ref)	(764, 42.0%)	(364, 47.6%)	(400, 52.4%)	1.00
North region	(521, 28.6%)	(343, 65.8%)	(178, 34.2%)	2.10 (1.41–4.57)
Central region	(389, 21.4%)	(186, 47.8%)	(203, 52.2%)	1.01 (0.71–3.22)
South region	(146, 8.0%)	(78, 53.4%)	(68, 46.6%)	1.26 (0.45–2.19)
Area				
Urban (ref)	(963, 24.3%)	(367, 38.1%)	(596, 61.9%)	1.00
Rural	(857, 75.7%)	(151, 17.6%)	(706, 82.4%)	0.33 (0.11–0.61)*
Pharmacy visit				
1–2 times (ref)	(594, 32.6%)	(217, 36.5%)	(377, 63.5%)	1.00
3–5 times	(609, 33.5%)	(311, 51.1%)	(298, 48.9%)	1.87 (0.97–3.51)
>5 times	(617, 33.9%)	(395, 64.0%)	(222, 36.0%)	3.12 (1.21–4.89)

\* $p < 0.05$ , which is a significant result.

pharmacies during the lockdown, although most of the participants, 85.9%, (1,563/1,820) in the present study said that remote payment was not always available in the pharmacy ( $p < 0.05$ ). The majority of participants agreed 52.9%, (964/1,820) and 22.9%, (416/1,820) strongly agreed that there was no customer crowding ( $p < 0.05$ ) in the pharmacy. More than three-quarters 64.2%, (1,169/1,820) of the participants, agreed and strongly agreed 22.3%, (405/1,820) that hand sanitizers were freely available for customer use while in the pharmacy, ( $p < 0.05$ ). Most participants, 75.4%, (1,372/1,820) said that there was no specifically designated area in the pharmacy for segregation of symptomatic patients ( $p < 0.05$ ). The findings of the present study showed that most 86.5%, (1,575/1,820) of the participants said that surfaces and floors were clean during their visits to the pharmacy ( $p < 0.05$ ) (Table 2).

### Satisfaction with pharmacy education

Regarding patient education, nearly half of the participants, with 31.3% (569/1,820) in disagreement and an additional 23% (418/1,820) strongly disagreeing, indicated that pharmacists did not offer sufficient oral and written education on COVID-19, such as through posters. Furthermore, a majority of study participants believed that pharmacists did not prioritize specialized education for geriatric (83.5%, 1,520/1,820) or chronic disease (84.0%, 1,528/1,820) patients regarding COVID-19. Roughly, a quarter 25.4%, (462/1,820) of the participants disagreed with the statement “The pharmacists provided sufficient

information about personal hygiene, e.g., hand washing and toilet use.” The majority 68.6%, (1,248/1,820) of participants thought the pharmacists counseled the public to stay at home and keep physical distancing. Our findings demonstrated that most of the participants, 85.7%, (1,560/1,820) disagreed with the statement “The pharmacists provided information about where to do the test, phone lines, and the regional quarantine hospital” (Table 3).

### Expectations for pharmacist roles in the future

In terms of participant’s envisioned future roles for pharmacists (as depicted in Fig. 2), 89.0% (1,621/1,820) believed that pharmacists would play a significant role in pandemic management, while 53.7% (978/1,820) considered it crucial for pharmacists to monitor COVID-19 patients’ signs and optimize their medication regimens. In addition, 80.6% (1,467/1,820) of participants perceived that reporting suspected COVID-19 cases should be one of the key responsibilities of pharmacists in Jordan, and 55.9% (1,017/1,820) felt that community pharmacies should serve as points for COVID-19 immunization. However, it is noteworthy that 64.1% (1,167/1,820) of respondents did not support the proposition that pharmacists in Jordan should conduct COVID-19 testing through nasopharyngeal swabbing.

### DISCUSSION

Community pharmacies play a pivotal role in COVID-19 management by offering public counseling on SARS CoV-2

**Table 2.** Attitude of participants toward pharmacy preparedness ( $N = 1,820$ ).

Items	Strongly agree (a) (n, %)	Agree (b) (n, %)	Neutral (c) (n, %)	Disagree (d) (n, %)	Strongly disagree (e) (n, %)	*p-value (a + b vs. c + d + e)
I am satisfied with the availability of products (medicines and hygienic products) during the pandemic.	(356, 19.6%)	(529, 29.1%)	(368, 20.2%)	(402, 22.1%)	(165, 9.1%)	$p > 0.05$
During the lockdown, the pharmacy had an accurate and fast home delivery service of medications.	(412, 22.6%)	(535, 29.4%)	(172, 9.5%)	(577, 31.7%)	(284, 15.6%)	$p > 0.05$
Remote payment is always available inside the pharmacy.	(103, 5.7%)	(154, 8.5%)	(96, 5.3%)	(967, 53.1%)	(500, 27.5%)	$p < 0.05^{***}$
Inside the pharmacy, there was no customer crowding.	(416, 22.9%)	(964, 52.9%)	(176, 9.7%)	(165, 9.1%)	(99, 5.4%)	$p < 0.05^{**}$
Inside the pharmacy, there was free availability of sanitizers for use by customers during visit.	(405, 22.3%)	(1,169, 64.2%)	(88, 4.8%)	(91, 5.0%)	(67, 3.7%)	$p < 0.05^{**}$
Inside the pharmacy, there were free face masks for customers during visit.	(291, 16.0%)	(470, 25.8%)	(369, 20.3%)	(549, 30.2%)	(141, 7.7%)	$p > 0.05$
Inside the pharmacy, there was a specific area for customers having suspected symptoms.	(141, 7.7%)	(307, 16.9%)	(100, 5.5%)	(841, 46.2%)	(431, 23.7%)	$p < 0.05^{***}$
I noticed that surfaces and floors were clean during my visit to the pharmacy.	(374, 20.5%)	(1,201, 66.0%)	(81, 4.4%)	(98, 5.3%)	(66, 3.6%)	$p < 0.05^{**}$
During my visit, I noticed that pharmacists taking precautions handing/dispensing prescriptions.	(197, 10.8%)	(807, 44.3%)	(469, 25.8%)	(299, 16.4%)	(48, 2.6%)	$p > 0.05$
During my visit, I noticed unnecessary workers in the pharmacy.	(67, 3.7%)	(490, 26.9%)	(476, 26.2%)	(601, 33.0%)	(186, 10.2%)	$p > 0.05$

\*p values from Rao-Scott chi-square test.

\*\* (a) + (b) significantly greater than (c) + (d) + (e).

\*\*\* (a) + (b) significantly less than (c) + (d) + (e).

**Table 3.** Attitude of participants toward pharmacy education ( $N = 1,820$ ).

Items	Strongly agree (a) (n, %)	Agree (b) (n, %)	Neutral (c) (n, %)	Disagree (d) (n, %)	Strongly disagree (e) (n, %)	*p-value (a + b vs. c + d + e)
The pharmacists provided adequate oral and written patient education about COVID-19, e.g., posters.	(208, 11.4%)	(366, 20.1%)	(262, 14.4%)	(569, 31.3%)	(418, 23%)	$p > 0.05$
The pharmacists provided special attention to geriatric education about COVID-19.	(103, 5.7%)	(197, 10.8%)	(263, 14.5%)	(863, 47.4%)	(394, 21.6%)	$p < 0.05^{***}$
The pharmacists provided special attention to chronic disease education related to COVID-19.	(118, 6.5%)	(174, 9.6%)	(302, 16.6%)	(765, 42%)	(461, 25.3%)	$p < 0.05^{***}$
The pharmacists provided sufficient information about personal hygiene, e.g., hand washing and toilet use.	(433, 22.8%)	(399, 21.9%)	(168, 9.2%)	(462, 25.4%)	(358, 19.7%)	$p > 0.05$
The pharmacists provided adequate information about care when sneezing or coughing (avoiding people, directing into elbow).	(462, 25.4%)	(361, 19.8%)	(197, 10.8%)	(409, 22.5%)	(391, 21.5%)	$p > 0.05$
The pharmacists provided patient education about avoiding unnecessary travel.	(304, 16.7%)	(457, 25.1%)	(285, 15.7%)	(449, 24.7%)	(325, 17.9%)	$p > 0.05$
The pharmacists counseled the public to stay at home and keep social distance.	(307, 16.9%)	(941, 51.7%)	(141, 7.7%)	(333, 18.3%)	(98, 5.4%)	$p < 0.05^{**}$
The pharmacists provided sufficient information to increase the public awareness about the common symptoms of COVID-19.	(351, 19.3%)	(659, 36.2%)	(71, 3.9%)	(433, 23.8%)	(306, 16.8%)	$p > 0.05$
The pharmacists provided sufficient information about the most common method of transmission of COVID-19.	(362, 19.9%)	(582, 32%)	(101, 6%)	(431, 23.7%)	(336, 18.5%)	$p > 0.05$
The pharmacists provided information about where to do the test, phone lines, and regional quarantine hospital.	(74, 4.1%)	(386, 21.2%)	(165, 9%)	(795, 43.7%)	(600, 33%)	$p < 0.05^{***}$
The pharmacists confidently answered my questions about my medications and interaction with COVID-19.	(173, 9.5%)	(463, 25.4%)	(258, 14.2%)	(566, 31.1%)	(360, 19.8%)	$p > 0.05$

\*p values from Rao-Scott chi-square test.

\*\* (a) + (b) significantly greater than (c) + (d) + (e).

\*\*\* (a) + (b) significantly less than (c) + (d) + (e).

infections, advocating for public health measures, and advising on mask wearing, hand hygiene, and other preventive practices. However, the literature suggests that pharmacy practice has yet to fully embrace its potential to alleviate healthcare system burdens in these areas. Historically, pharmacists primarily focused on medication preparation and dispensing, with limited patient-centered services. Charles Helper and Linda Strand introduced the concept of pharmaceutical care in 1990, which emphasizes patient-centered, outcome-driven care involving direct pharmacist-patient interaction to promote health, prevent disease, and ensure safe and effective medication use. Achieving this transition necessitates a systemic approach to evolve pharmacy practice in the pandemic response and beyond [23,24]

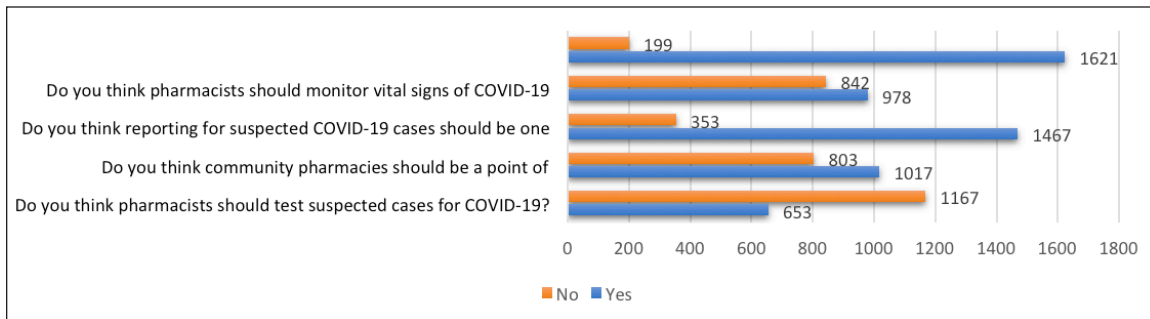
Our study encompassed three primary sections, each focusing on the satisfaction levels of Jordanian respondents with pharmacy services during the COVID-19 pandemic, specifically addressing 1) preparedness and preventive measures, 2) patient education, and 3) anticipated future roles. Each of these sections was tailored to delve deeper into our core aims and objectives.

The results obtained from this study indicate that a majority of the participants expressed satisfaction with pharmacy services in Jordan throughout the COVID-19

pandemic. Furthermore, demographic factors such as age, gender, and place of residence emerged as noteworthy predictors of public satisfaction. Notably, a significant proportion of the respondents believed that medications and hygiene-related products remained accessible during the pandemic, and the home delivery service for medications was deemed effective, particularly during periods of lockdown. Nevertheless, the majority of participants thought pharmacies in Jordan did not apply effective measures to prevent the spread of COVID-19. From the public perspective, the roles of pharmacies in educating the community about the pandemic were primitive and not revised and updated to reflect the seriousness of the crisis. Our findings indicate general public support toward more advanced roles for pharmacists in the emergency response to COVID-19.

To the best of our knowledge, this is one of the few studies to discuss satisfaction with pharmacy services among the Jordanian population [3,25]. Regarding the pandemic, we found no study investigating the public's satisfaction with pharmacy care during the COVID-19 crisis.

Our study found that roughly half of the Jordanian respondents expressed satisfaction with pharmaceutical care throughout the COVID-19 pandemic, a lower level compared to a prior study by Al Qadire *et al.* [25] that examined general



**Figure 2.** Expectations of future pharmacist roles ( $N = 1,820$ ).

satisfaction with pharmaceutical care in Jordan before the pandemic. It is important to note that while the titles of the two studies may appear similar, they are fundamentally different in scope; our study specifically addressed COVID-19-related topics related to the emergency response, while Al Qadire's *et al.* [25] study assessed general healthcare service satisfaction. To understand the findings of our study, it is crucial to consider the broader context, including local, regional, and international factors. In Jordan, as in many other countries, pharmacies remained open throughout the pandemic, but pharmacists received limited guidance or instructions on exceptional measures or evolving roles during this period, except for temporary and somewhat disorganized home medication delivery during lockdowns. Overall, pharmaceutical care in Jordan did not see significant development or expansion during the pandemic [25].

Saudi pharmaceutical services have played a crucial role in the COVID-19 response. Community pharmacists actively reported suspected cases, managed chronic illnesses, ensured medication availability, and promoted adherence. They reduced hospital visits by prescribing over the counter medications. Saudi pharmacies also simplified Ministry of Health guidelines through materials and provided door-to-door medication delivery and online counseling, particularly for high-risk and quarantined individuals, with pharmacists at the forefront of this effort [26,27]. In China, community pharmacies and physicians launched a new medication refill service, allowing patients to access hospital medications through local pharmacies instead of hospital visits. This highlights the adaptability of community pharmacists during outbreaks. Implementing a similar approach in Jordan could enhance patient satisfaction [28]. In Spain, heavily impacted by the pandemic, community pharmacists played a vital role in raising public awareness, offering advice on preventive measures and symptomatic medications during isolation, and expanding remote services significantly [29].

Our findings indicate that respondents aged 55–64 were the most satisfied with pharmacy services during COVID-19, likely because older individuals, who may face mobility challenges and difficulties in reaching the pharmacy, appreciated the convenience of finding all they needed in one trip. Although the gender distribution among respondents was almost equal (52.8% male and 47.2% female), females tended to express higher satisfaction with pharmacy services during

the pandemic. This could be attributed to males' greater access to transportation, making commuting and shopping less of an issue, and their ability to easily visit another pharmacy if needed [30]. Males also tend to prioritize quick service and may be less attentive to factors such as pharmacy cleanliness and crowding compared to women [31].

Our study revealed that rural residents expressed less satisfaction compared to their urban counterparts, primarily due to transportation challenges faced by pharmacists and supply difficulties faced by pharmaceutical companies in rural areas. Adunlin *et al.* [32] noted that rural patients often contend with extended travel times to healthcare facilities, challenging terrain, and limited transportation options, which can lead to delayed or limited access to healthcare services. In response to the pandemic, rural community pharmacies should consider expanding their services to address not only the primary care shortage but also the specific challenges arising from COVID-19.

While most participants were content with product availability, medication home delivery, and pharmacy cleanliness, dissatisfaction arose from the absence of contactless payment options and designated areas for symptomatic customers. Although home medication delivery worked well in urban areas due to shorter distances, rural regions faced difficulties. Unlike some countries, Jordan lacked specific health authority instructions for contactless payments or symptomatic patient areas. Emphasizing the importance of technology in healthcare, implementing remote payment options in pharmacies could be a feasible step forward [32,33].

In Jordan, only approximately half of the participants felt adequately informed about pandemics, largely relying on media sources for the latest COVID-19 updates [13]. Another Jordanian study [34] suggested that pharmacists could play a role in reducing COVID-19 transmission, but the study's methodology raises concerns about the reliability of this conclusion. In dealing with highly contagious diseases such as COVID-19, piecemeal efforts and individual initiatives may prove insufficient, emphasizing the need for a comprehensive, coordinated system. We argue that preparedness for viral outbreaks in pharmacies should be a collective decision, implemented and monitored by health authorities rather than individuals. This could involve issuing clear obligatory instructions to regulate contactless payment, precautionary measures, and product supply.

The study revealed that the Jordanian community expressed dissatisfaction with the educational support provided by pharmacies during the pandemic. Participants believed that pharmacists fell short in offering crucial information on topics such as geriatric care, chronic diseases, preventive measures, and emergency protocols. Several factors contributed to this shortfall. First, the early low COVID-19 impact in Jordan and neighboring countries led to a lack of urgency. Second, a notable portion of Jordanians regarded COVID-19 as a conspiracy, possibly reducing pharmacist motivation to educate. Third, questions arose about whether pharmacists themselves were adequately informed to provide pandemic-related information. This readiness was questioned in a prior study [13]. Furthermore, the absence of financial incentives for pharmacists to offer consultations and advice hindered their engagement in public education and health promotion. In addition, the concept of remote pharmaceutical care, known as telepharmacy, was not recognized in Jordan, despite its potential to facilitate patient education [32,35]. To enhance the pharmacy profession in Jordan, the authors suggested the need for an exemplary role model established by the pharmacists' association with support from health authorities, a sense of value for pharmacists in society, and ongoing professional training focusing on expanding pharmacist roles, especially in patient-centered services such as education and consultation during disasters and emergencies.

Participants from the Jordanian community sample in this study strongly believed that pharmacists should play a significant role in pandemic management. This included providing pharmacies with the necessary resources to serve as immunization points for COVID-19, granting them access to monitor patients' tests for signs of COVID-19, and optimizing their medication regimens. In addition, the participants in this study thought reporting of possible COVID-19 cases should be among the responsibilities of pharmacists. These expectations are justified and represent the urgent need for an evolving pharmacy practice in Jordan given the fact that most of these anticipated roles are practically implemented in many countries in the region [26] and worldwide [17,18].

This study's strength lies in its provision of up-to-date and current data, offering retail pharmacists and stakeholders in Jordan invaluable insights into the health needs, expectations, and perceptions of the Jordanian population. Furthermore, our research employed a rigorously validated questionnaire, designed with straightforward yet essential questions aimed at capturing vital information concerning the satisfaction levels of adults in Jordan regarding pharmacy preparedness, patient education, and their outlook on future roles. In addition, we adopted a robust and comprehensive sampling method, encompassing adults from all regions of Jordan, further enhancing the study's credibility.

However, the study does have certain limitations to consider. First, the use of self-reported questionnaires may introduce bias. Second, the data collection in rural areas of Jordan posed practical challenges, although some participants from these areas were reached through social media and email. In addition, concerns about close contact during questionnaire delivery due to the risk of virus transmission prompted the research team to take preventive measures.

Our study offers valuable insights into pharmacy preparedness for pandemics, patient education, and public expectations of pharmacists' roles in Jordan. It highlights significant limitations in current pharmaceutical responsibilities and underscores the necessity for an evolving pharmacy profession that prioritizes patient-centered care. We advocate for systematic corrective actions to be taken, involving both health officials and the pharmacists' association, to address these issues effectively.

## CONCLUSION

Approximately half of the study participants expressed dissatisfaction with pharmacy preparedness and patient education during the pandemic, highlighting the need for pharmacists to adopt a more patient-centered role in emergencies. This underscores the call for a systemic approach in Jordan, involving pharmacists and health officials, to reevaluate and enhance pharmaceutical policy and responsibilities. The study also revealed a high level of public expectation regarding pharmacists' roles in the pandemic response, necessitating collaborative efforts between health authorities and the Jordanian Pharmacists' Association to revise and improve pharmaceutical policy. Ultimately, the overarching goal should be to find ways to actively involve pharmacists in the management of future health crises.

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## AUTHOR CONTRIBUTIONS

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work. All the authors are eligible to be an author as per the International Committee of Medical Journal Editors (ICMJE) requirements/guidelines.

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## CONFLICT OF INTEREST

The authors have no conflicts of interest to report.

## ETHICAL APPROVALS

The Institutional Review Board (IRB) at the University of Petra approved the research (Q1/7/2020). Each participant provided a signed consent form as an expression of their voluntary participation in this study.

## DATA AVAILABILITY

All data generated and analyzed are included in this research article.

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