Assessing the Awareness and Attitude Towards COVID-19 Vaccination and Aids Factors among Jordanian People: *A cross-sectional Study*

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ABSTRACT

This study aimed to evaluate the awareness and attitudes toward COVID-19 vaccination among the Jordanian population. A cross-sectional survey was conducted using a validated questionnaire. The awareness and attitudes toward the COVID-19 vaccine were assessed via five-item and seven-item scales, respectively. The survey results were analyzed using SPSS with a chi-square test and multivariable logistic regression. A total of 407 participants were enrolled, with the majority being female (74.9%), under 49 years old (73.2%), holding a bachelor's degree (57.7%), and working in the private sector (46.2%). Results revealed a fairly high level of awareness about the COVID-19 vaccine (51.4%), with no significant association between awareness and demographic characteristics. While 51.4% of the participants perceived the importance of getting the vaccine, only 37.1% agreed that the newly developed vaccine was safe, and 77.4% expressed a preference for natural immunity. The overall attitude towards COVID-19 vaccination appears cautiously optimistic, with 60.2% of respondents scoring above Bloom's 60.0% cutoff point, despite mixed opinions on vaccine safety and necessity. Moreover, attitudes towards the vaccine showed a significant association with participants' age and occupation. Among the age group of 18-29 years old, 47.6% had a positive attitude towards the vaccine, compared to 33.3% in the 30-49 years old group, and 38.5% in the ≥50 years old group. In terms of occupation, 30.7% in the public sector had a positive attitude, compared to 44.1% in the private sector and 48.5% among students. Given the mixed but cautiously optimistic attitudes towards COVID-19 vaccination observed among the Jordanian population, this study underscores the critical importance of targeted educational and communication strategies. Such initiatives should focus on enhancing the perception of vaccine safety and efficacy to improve vaccination acceptance and uptake across different age and occupational groups within Jordan.

Keywords: Awareness, attitude, COVID-19, vaccines.

INTRODUCTION

Vaccination is widely regarded as the most effective intervention to end the pandemic, with an emphasis on achieving herd immunity to limit the spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1]. However, achieving this goal depends on the population's acceptance of and willingness to receive the vaccine. Vaccine hesitancy, defined as a delay in acceptance or refusal of vaccines despite their availability, is a significant obstacle to achieving herd immunity and is

influenced by factors such as confidence, complacency, and convenience [2-3].

Coronavirus disease 2019 (COVID-19) is a respiratory infection caused by SARS-CoV-2. Compared to other coronaviruses, SARS-CoV-2 was found to be more infectious, and rapidly spread across the world [4]. COVID-19 has caused millions of deaths worldwide. By February 2023, there were 676,496,910 confirmed cases of COVID-19 globally, with 6,773,736 fatalities, overstretching healthcare systems and prompting a race to develop effective vaccines against SARS-CoV-2 [5].

In response to this, scientists worldwide fast-tracked the development of vaccines using various platforms. By the end of 2020, several COVID-19 vaccines were authorized for emergency use. More than 5.51 billion individuals, or around 71.8% of the world's population, had received a dose of the COVID-19 vaccine by October 2022, with a total of 12,850,970,971 doses administered. According to the World Health Organization (WHO), there were 1,746,997 confirmed cases of COVID-19 in Jordan from January 2020 to November 2022, with 14,122 fatalities. Furthermore, a total of 10,057,975 vaccination doses were administered in Jordan by August 2022 [6], [7].

Vaccines are a cost-effective option for controlling the COVID-19 pandemic, albeit problematic, as morphological variations of SARS-CoV-2 could hinder global efforts for immunization [8]. Vaccine acceptance rates varied widely in a global survey, ranging from less than 55% to more than 90% among participants from 19 nations, with an overall acceptance rate of 71.5%. However, among young Jordanian adults, acceptance of the COVID-19 vaccination was only partial [9]. Furthermore, Jordanians' compliance with non-pharmaceutical intervention (NPI) measures, such as wearing face masks, practicing hand hygiene, and maintaining social distancing, was found to be inadequate [10-11]. Therefore, research on awareness and attitudes towards the vaccine is critical to address and mitigate the negative impact of further COVID-19 infections [12].

Numerous studies have examined the factors that may influence individuals' inclination toward vaccination. There is evidence to suggest that some demographic groups, such as younger individuals, those with lower levels of education, individuals with less income, and ethnic minority communities, exhibit lower rates of vaccination [13]. Another study emphasized the importance of investigating more effective strategies for engaging young people in the process of making medical decisions about their care [3].

RESEARCH OBJECTIVE

Most of the literature on COVID-19 vaccine acceptance and hesitancy has focused on high-income countries, leaving a relative scarcity of research from low- and middle-income countries, including Jordan. Moreover, the rapidly evolving nature of the COVID-19 pandemic and the continuous development and approval of new vaccines necessitate ongoing monitoring and research into public attitudes toward these vaccines. The objective of this research was to assess the awareness and attitudes toward the COVID-19 vaccine and its associated factors in Jordan.

METHODOLOGY
Study Design and Participants

A cross-sectional survey was conducted on adults over the age of 18 using a self-reported online survey. The participants were invited to complete the survey by accessing a link shared through Facebook groups, Facebook Messenger, and WhatsApp over a period spanning September 30, 2022, to December 30, 2022. A study overview was included at the beginning of the questionnaire. Participants completed the survey anonymously to mitigate bias and safeguard confidentiality. They received detailed information on the study's objectives, anticipated duration, and data collection procedures. We determined the sample size considering a significance level (alpha) of 0.05 and a desired statistical power of 80% (1 - Beta). The critical value for a two-tailed

test at the 5% significance level (alpha) was set at 1.96. A total of 307 participants were needed to achieve the target sample size.

Survey instrument

Instrument validity and reliability

The present study's questionnaire was adopted from [14]. The preliminary version of the questionnaire was initially constructed in English and subsequently translated into Arabic. A backward translation from Arabic to English was performed to ensure that the translation maintained the same meaning as the original English version. The instrument was reviewed for content validity by five experts in the field of psychology. Upon receiving their feedback, minor revisions were made to enhance the clarity and precision of the questionnaire items. These included rephrasing unclear or ambiguous questions and making language and grammar corrections. Subsequently, a pilot study with 30 participants confirmed the clarity and feasibility of the instruments. Internal consistency was evaluated using Cronbach's Alpha, obtaining high-reliability coefficients of 90% for attitude and 88% for awareness.

The instrument was structured to align with Bloom's Taxonomy categories for attitude and awareness, with committee cutoff points set at 60.0% for both. The assessment of awareness regarding the COVID-19 vaccine was carried out based on the survey questionnaire modeled after COVID-19 vaccines that had similar structures and content [14].

The awareness questionnaire consisted of five items, with respondents being asked to indicate "yes" or "no" in response to each item. The items were as follows:

- Q1: Do you know about the COVID-19 vaccine?
- Q2: Does the COVID-19 vaccination show effectiveness?
- Q3: Does COVID-19 currently have a therapeutic option?
- Q4: Does COVID-19 currently have a vaccine?
- Q5: What distinguishes the newly developed COVID-19 vaccine from other vaccines?

To assess the attitude level towards the COVID-19 vaccine, respondents were awarded one point for each correct response. The responses were then grouped into two categories: "agree" and "disagree". The survey questions used to evaluate attitudes were:

- Is the newly developed COVID-19 vaccine considered to be safe?
- Is the COVID-19 vaccine considered necessary?"
- Do you plan to get the COVID-19 vaccine?
- Is the COVID-19 vaccine the only treatment available?
- Should the COVID-19 vaccine be distributed equitably?
- Is getting the COVID-19 vaccine necessary?
- Do you prefer natural immunity over the vaccine?

Data Analysis

The Statistical Package for Social Sciences (SPSS - IBM, Chicago, IL, USA) was used to analyze the data. Categorical variables were reported as frequency counts and percentages. A chi-square test was utilized to explore the association between participants' socio-demographic data and their COVID-19 vaccine awareness and attitudes. Furthermore, any variable with a p-value less than 0.20 in the chi-square test was nominated to enter into a multivariable logistic regression model to control for potential confounding. The adjusted odds ratio with corresponding 95% CI was reported to measure the effect size or strength of association. A p-value less than or equal to 0.05 was considered statistically significant.

RESULTS

A total of 407 participants were enrolled in the survey. The majority of the participants were female (305 or 74.9%), under 49 years old (298 or 73.2%), held a bachelor's degree (235 or 57.7%), and were employed in the private sector (188 or 46.2%). Please refer to Table 1 for more details.

Table (1) participants' socio-demographic characteristics

Variable	Category	Frequency	Percentage
Gender	Male	102	25.1
	Female	305	74.9
Age groups	"18-29 years old"	145	35.6
	"30-49 years old"	153	37.6
	"≥50 years old"	109	26.8
Education level	Diploma	58	14.3
	Bachelor	235	57.7
	Higher studies	114	28.0
Occupation	Public sector	153	37.6
	Private sector	188	46.2
	Students	66	16.2

Awareness towards COVID-19 Vaccine:

The distribution of participants on each COVID-19 vaccination awareness item is summarized in Table 2. Regarding the first question, almost all the respondents had heard about the coronavirus vaccine, and more than half, 229 (56.3%), reported that the coronavirus vaccine is effective. A large percentage of the sample, 288 (70.8%), correctly stated that there is currently no effective treatment for coronavirus, and 256 (62.9%) identified that the coronavirus vaccine is different from other vaccines. Based on Bloom's categorization, a total of 209 (51.4%) demonstrated good awareness level towards COVID-19 vaccination.

Table (2) Awareness of COVID-19 Vaccine

Awareness of COVID-19 vaccination	preferred answer	No n(%)	Yes n(%)
1- Have you ever heard of the coronavirus vaccine?	Yes	6(1.5)	401(98.5)
2- Is the coronavirus vaccine effective?	Yes	178(43.7)	229(56.3)
3- Is there an effective treatment for Coronavirus at the current time?	No	288(70.8)	119(29.2)
4-Is there an effective vaccine to prevent coronavirus?	No	257(63.1)	150(36.9)
5-Is the Coronavirus vaccine different from another vaccine	Yes	151(37.1)	256(62.9)
Awareness level based on Bloom's cutoff point (60.0%)	Poor	198	48.6%
	Good	209	51.4%

Attitude towards COVID-19 Vaccine.

The results in Table 3 show that only 151 (37.1%) of participants agreed that the newly discovered vaccine is safe, and 207 (50.9%) of them acknowledged that the COVID-19 vaccine is crucial. Moreover, three quarters of them disagreed that the COVID-19 vaccine is the only solution and agreed that it should be distributed fairly.

Furthermore, the results demonstrated that only 209 (51.4%) of participants perceived that it is important to get the vaccine, and nearly three quarters expressed concern about the unforeseen effects of the vaccine and preferred natural immunity. However, according to Bloom's cutoff point, 162 (39.8%) had a positive attitude towards COVID-19 vaccination.

Table (3) Attitude towards COVID-19 Vaccine

Attitude towards COVID-19 vaccination	Disagree	Agree
1-Is the newly discovered vaccine safe?	256(62.9)	151(37.1)
2-Is the COVID-19 vaccine essential for us?	200(49.1)	207(50.9)
3-Is the vaccine the only solution for us?	310(76.2)	97(23.8)
4- If the COVID-19 vaccine should have been distributed fairly!	101(24.8)	306(75.2)
5- Is important to get a vaccine?	198(48.6)	209(51.4)
6- Worried about unforeseen impact?	105(25.8)	302(74.2)
7- Preferred natural immunity rather than the vaccine?	92(22.6)	315(77.4)
Attitude level based on bloom's cutoff point (60.0%)3.93…150	245 162	60.2% 39.8%

As shown in Table 3, only 37.1% of participants agreed that the newly discovered vaccine is safe, suggesting that a majority (62.9%) may have concerns or doubts about the vaccine's safety. Consequently, there is a need for targeted public health messaging and further education to address these concerns. Just over half (50.9%) of participants considered the COVID-19 vaccine essential, indicating a relatively even divide in opinions on the vaccine's importance. The 49.1% who disagree present an opportunity for further intervention and education. The consensus among participants was more significant in response to the claim that the vaccine is the only solution, with 76.2% disagreeing. This suggests that most participants understand the necessity of additional preventative measures, such as wearing masks, maintaining social distance, and practicing hand hygiene. When asked whether the COVID-19 vaccine should be distributed fairly, the majority (75.2%) agreed, indicating broad agreement on the importance of equitable vaccine distribution. Opinions were almost evenly split in terms of whether getting the vaccine is important or whether natural immunity is preferred.

Results of the multiple logistic regression showed that none of the sociodemographic variables were associated with awareness. Regression analysis revealed that those working in the private sector are 1.64 times more likely to have a positive attitude toward the COVID-19 vaccine than those working in the public sector (Table 4).

Table (4) Factors associated with participants' attitude towards COVID-19 Vaccine

Variables	Categories	Attitude n(%)		X^2	Binary logistic regression	
		Negative	Positive	p-value	Adjusted odds ratio (95%C.I)	p-value
Age groups	18-29 years old	76(52.4)	69(47.6)		Ref	
	30-49 years old	102(66.7)	51(33.3)	.041	0.699(0.40-1.22)	.209
	≥50 years old	67(61.5)	42(38.5)		0.872(0.48-1.57)	.647
Occupation	Public sector	106(69.3)	47(30.7)		Ref	
	Private sector	105(55.9)	83(44.1)	.012	1.64(1.01-2.64)	.044
	Students	34(51.5)	32(48.5)		1.70(0.82-3.52)	.155
Gender	Female	187(61.3)	118(38.7)	.427	NA	
	Male	58(56.9)	44(43.1)			
Education level	Diploma	38(65.5)	20(34.5)			
	Bachelor	144(61.3)	91(38.7)	.376		
	Higher studies	63(55.3)	51(44.7)			

DISCUSSION

The COVID-19 pandemic has emphasized the critical role of vaccines in mitigating the spread of the virus, leading to extensive research and approval of various vaccines for global immunization efforts [15]. This study primarily sought to assess the level of awareness and attitudes toward the COVID-19 vaccine among the Jordanian population. In multiple studies exploring public comprehension and receptivity toward the COVID-19 vaccine, varied levels of understanding and sentiments were observed. Our analysis revealed that 51.4% of participants were adequately informed about the vaccine, a finding that aligns with other studies indicating a relatively good level of public awareness. Conversely, a study from Malaysia found that 62% of its participants had insufficient knowledge about the COVID-19 vaccine, even though a promising 64.5% expressed willingness to receive the vaccine, suggesting a positive disposition despite potential misinformation [16]. In Ethiopia, only 40.8% of respondents demonstrated understanding of the COVID-19 vaccines, highlighting a significant knowledge gap and underscoring the need for prompt and effective health education interventions [14]. A separate study focused on Jordan reflected a high inclination toward vaccination, with 72.3% of respondents eager to get vaccinated, indicating a strong pro-vaccination sentiment within the region [17]. Collectively, these findings underscore the need for comprehensive awareness campaigns and targeted educational efforts to reduce information disparities and foster positive perceptions of COVID-19 vaccination globally.

The COVID-19 vaccine is a key strategy to halt the progression of the pandemic, and after rigorous clinical evaluations, several of these vaccines have been authorized in various countries [15]. In Jordan, a strong vaccination campaign is underway, aiming to incorporate the COVID-19 vaccine into the national immunization program [11]. While Jordan has established immunization initiatives, the novel nature of the COVID-19 vaccination campaign prompts questions about its public visibility, interpretation, dissemination, and acceptance [18]. This study sheds light on the current state of vaccine awareness in Jordan and the associated challenges. These findings are crucial in developing tailored awareness and health education campaigns addressing the COVID-19 vaccinations [20].

Our analysis reveals a promising degree of vaccine awareness among Jordanians, with 51.4% of participants demonstrating cognizance—a figure in line with observations from Malaysia [16]. Intriguingly, an individual's educational background played a pivotal role in shaping their awareness about the COVID-19 vaccine, pinpointing the utility of customized educational interventions. However, the diversity in respondent demographics did not substantially influence awareness levels, emphasizing the importance of holistic and inclusive outreach programs [14].

While a praiseworthy 56.3% of participants acknowledged the vaccine's efficacy, this draws parallel to results from Saudi Arabia, emphasizing the incessant need to enlighten both healthcare stakeholders and the broader populace about the vaccine's potency against COVID-19 [20].

Exploring perceptions surrounding the vaccine, the study identified a notable influence of age and professional background on attitudes. Counterintuitively, a sizable portion (39.8%) of younger respondents, aged 18 to 29, exhibited a positive disposition towards the vaccine, defying traditional assumptions [21]. Furthermore, an impressive 51.4% of participants indicated their intent to receive the vaccine. This finding contrasts with some existing literature such as that by [22], suggesting differential trust in various information sources about the vaccine [23-24].

Breaking away from conventional trends, our study found that older cohorts demonstrated a more positive disposition towards the COVID-19 vaccine. This underscores the need for awareness drives tailored

specifically for younger demographics [25].

It is paramount to recognize that vaccine perceptions are shaped by a mosaic of elements—including socioeconomic status, cultural inclinations, healthcare accessibility, and previous experiences with vaccinations. Future research endeavors would benefit from a detailed exploration of these determinants to fully understand vaccine receptivity. Importantly, occupations outside the healthcare sector emerged as significant influencers of vaccination attitudes. Preliminary insights from our research suggest a potential pro-vaccination bias among frontline personnel and those in critical roles. This indicates a need for a more in-depth examination of the interplay between professional domains and vaccine perspectives, especially beyond healthcare settings.

A marked dichotomy between vaccine awareness and attitudes was unveiled in our findings, underscoring the need for refined tactics to reconcile this difference. There was a considerable inclination towards natural immunity over vaccination, highlighting prevailing vaccine apprehensions and indicating the urgency for tailored public health strategies to recalibrate such perceptions. Central to these efforts would be leveraging trusted and credible information sources, emphasizing their crucial role in bolstering public trust and conviction regarding vaccinations [23-24].

When comparing our results with a study conducted in Kuwait by Alibrahim and Awad [26-27], noticeable discrepancies in public awareness concerning the COVID-19 vaccine become apparent. In our analysis, only 37.1% of respondents perceived the newly developed vaccine as devoid of risks, suggesting considerable reservations (62.9%) regarding its safety credentials. Conversely, the Kuwaiti study posited that the main reasons for vaccine reluctance revolved around anxieties linked to potential adverse reactions, perceptions of rushed vaccine development, and skepticism about its protective efficacy, with a significant 57.2% of participants exhibiting a general aversion to vaccines.

Such observations underline the existence of multifaceted reservations and doubts about COVID-19 vaccines across regions, underscoring the pressing need for region-specific strategies to assuage individual apprehensions and bolster collective confidence in the vaccine's safety and effectiveness. Future research exploring additional factors, such as cultural beliefs and socioeconomic status, will contribute to the development of more targeted interventions [28].

Limitations of the study

The cross-sectional design of this study precludes the establishment of a cause-effect relationship. Additionally, the imbalanced gender distribution might affect the accuracy and generalizability of the study findings.

CONCLUSION

In the wake of the COVID-19 pandemic, this research highlights the need to strengthen awareness and attitudes concerning COVID-19 vaccines in order to improve health outcomes. Comprehensive health education campaigns that dispel misinformation, provide accurate information, and emphasize the safety and effectiveness of COVID-19 vaccines are necessary. Tailored communication strategies, accounting for differences in attitudes based on age and occupation, are crucial in building confidence and trust in vaccines. Furthermore, public health campaigns should underline the significance and safety of COVID-19 vaccines to counter the preference for natural immunity.

Conflict of Interest Statement:

The authors declare that there are no conflicts of interest concerning the publication of this work. They have no financial or personal relationships with individuals or organizations that could influence or bias the content of this manuscript inappropriately.

Data Availability Statement:

The data supporting the findings of this study are available from the corresponding author upon reasonable request. Interested researchers can contact the corresponding author to request access to the data. We strongly advocate for the responsible and ethical use of the

data and kindly request that any use of the data in subsequent research or publications be appropriately acknowledged and cited. We are committed to ensuring transparency and reproducibility in our research and aim to make the data available to the scientific community for

further analysis and verification of the findings. We appreciate the collaboration and interest of the research community in our work and look forward to contributing to scientific knowledge through the sharing of data.

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تقييم الوعي والاتجاه نحو التطعيم ضد فيروس كورونا وعوامل المساعدة لدى الشعب الأردني: دراسة مقطعية

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ملخص

هدفت هذه الدراسة إلى تقييم الوعي والموقف تجاه التطعيم ضد فيروس كورونا بين السكان الأردنيين. تم إجراء مسح مقطعي باستخدام استبيان تم التحقق من صحته. تم تقييم الوعي والمواقف تجاه لقاح كوفيد–19 من خلال مقياس مكون من خمسة بنود وسبعة بنود على التوالي. تم تحليل نتائج المسح باستخدام برنامج SPSS مع اختبار مربع كاي والانحدار اللوجستي متعدد المتغيرات. بلغ عدد المشاركين 407 مشاركين، غالبيتهم من الإناث (74.9%)، وأقل من 49 سنة (73.2%)، وحائزات على درجة البكالوريوس (57.7%)، ويعملن في القطاع الخاص (46.2%). أظهرت النتائج وجود مستوى مرتفع إلى حد ما من الوعي حول لقاح كوفيد–19 (51.4%)، مع عدم وجود ارتباط كبير بين الوعي والخصائص الديموغرافية. ومع ذلك، كانت المواقف تجاه اللقاح أكثر تنوعًا. وبينما رأى 51.4% أهمية الحصول على اللقاح، وافق 37.1% فقط على أن اللقاح المطور حديثاً آمن، وأعرب جزء كبير (77.4%) عن تفضيلهم للمناعة الطبيعية. أظهرت المواقف تجاه اللقاح ارتباطًا كبيرًا بعمر المشاركين ومهنتهم. وتؤكد الدراسة على الحاجة إلى التعليم المستمر والتواصل حول فعالية وسلامة لقاحات كوفيد–19، لتعزيز قبول التطعيم وتغطيته بين السكان الأردنيين.

الكلمات الدالة: التوجهات، المواقف، كوفيد–19، اللقاحات.