

A Cross-Sectional Survey of Knowledge, Attitude, and Practices Regarding Influenza Vaccination Among Jordanians Aged 18–64 With Chronic Diseases

Short Title: Influenza Vaccination Among Jordanians

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Abstract

Background: Influenza is a frequent infectious disease that can be prevented and is linked to significant mortality and morbidity. The most economical way to prevent influenza is through vaccination, although this method is not widely used. This study aimed to assess the seasonal influenza vaccination rates and the knowledge and attitudes of Jordanian adults with chronic illnesses toward the influenza vaccine.

Methods: A cross-sectional design was employed. A 26-item online survey was utilized to gather data about the patients' knowledge of and attitudes toward the influenza vaccine as well as their status as influenza vaccine recipients.

Results: A total of 19% of the 564 study participants had an influenza vaccination. The majority (81%) of individuals reported inconsistent vaccination uptake. The most important factor affect vaccination is the belief the flu is not a threat (39%) and they were not advised by their doctors about the vaccination (32%). Participants with no health insurance and with public insurance had a lower level of vaccination in comparison with private insurance ($p = 0.008$).

Conclusions: The adult population of Jordan with chronic diseases have subpar immunization rates. Also revealed is a blatant misunderstanding about the value of routine influenza vaccination. These findings emphasize how urgently the public needs to be made aware of the effectiveness of the influenza vaccine.

Keywords: influenza; vaccination; chronic disease; Jordan.

1. Introduction

Influenza is a contagious viral respiratory infection, up to 5 million people worldwide suffer from the severe influenza-related illness each year, and 645,000 people die as a result.^{1,2} The seasonal influenza vaccine is the most efficient method of preventing infection and lowering influenza-related morbidity, death, and hospitalization, as it is with most infectious diseases.^{3,4,5} For instance, it has been demonstrated that immunization in the elderly reduces the danger of death from influenza-related problems by 80%.⁶

In an effort to boost the proportion of individuals who are protected from the flu, the World Health Organization (WHO) and the U.S. Centres for Disease Control and Prevention (CDC) recommend that anyone aged 6 months and older obtain the influenza vaccination. To reduce the risk of thoughtful consequences, it is crucial for those in high-risk groups to take a once-a-year influenza vaccination.¹ High-risk patients include expectant mothers, children, the elderly, people with chronic heart or pulmonary diseases, and people with immunosuppressed

situations^{1,7,8} Despite abundant evidence of the benefits of the influenza vaccine, only a minimal proportion of people follow the provided advice.^{9,10} Based on data from several locally representative surveys, the CDC makes an educated projection as to the yearly influenza vaccination exposure in the United States. Near half of Americans had not received the advised influenza vaccination as of the beginning of November for the 2020-2021 flu season.¹¹

In December 2019 a novel virus that causes Coronavirus Disease (COVID-19) which is known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).^{12,13} SARS-CoV-2, which spread quickly and was deemed a pandemic on March 11, 2020.¹⁴ The COVID-19 pandemic is currently a significant global community health issue. More than 500,000 cases and more than 8000 fatalities have occurred in Jordan.¹⁵ Seasonal influenza viruses and COVID-19 both exhibit comparable illness symptoms.¹⁶ Two viruses generate respiratory signs, which can indicate a variety of disorders ranging from asymptomatic to fatal. Acute respiratory distress syndrome, multi-organ failure, pneumonia, and even mortality are devastating illnesses that certain COVID-19 patients may get.¹⁷ Elderly patients and those with co-morbid conditions, particularly those with diabetes, cardiovascular diseases, and chronic pulmonary diseases, were found to have more death rates and a higher hazard to emerging series problems.^{18,19} A number of researches have been evaluated the relationship between coverage rate of seasonal vaccination against influenza and COVID-19 mortality.^{20,21,22} The rationale for the significance of raising the exposure rate of influenza vaccine has appeared as a result of the resemblance in signs and symptoms of two infectious diseases and the strong evidence of reduction of COVID-19 disease mortality rate in influenza-vaccinated persons.²³ The burden that seasonal influenza infections place on medical institutions could be reduced by growing the use of the influenza vaccine, which could also lower COVID-19 death rates.^{23,24} Most Jordanians' insurance policies do not cover influenza vaccination, and the country's mandatory immunization program does not include it.^{25,26} Prior calculations of the influenza vaccination rate in Jordan revealed that the percentage rate of immunization is much below ideal (9.9% to 27.5%).²⁵ It is always important to have up-to-date information about Jordanians' awareness of, attitudes toward, and use of the influenza vaccine. Determining vaccination exposure rates and comprehending the views of Jordanians with chronic illnesses on the influenza vaccine is therefore a crucial first step in developing methods to increase uptake. As patients who have chronic illnesses are more likely to develop influenza complications, the goal of this study is to assess the seasonal influenza vaccination uptake among Jordanians with chronic diseases and identify the factors influencing such behaviours. Additionally, it aims to assess the same patients' knowledge about and attitudes toward the seasonal flu vaccine.

2. Material and Methods

2.1 Study design

A cross-sectional plan was established to study the rate of influenza vaccination among the Jordanian population who suffer from chronic diseases aged 18-64 years and the attitudes, and knowledge regarding the influenza vaccine were evaluated. The survey was directed at the beginning of the influenza season among all target patients.

2.2 Sample

The participants for this study were the patients with chronic diseases. The sample was recruited using a nonprobability convenience sampling procedure through an electronic survey. Patients were considered suitable for this study if they had chronic diseases, being 18 to 65 years old, had the ability to read and comprehend survey questions in Arabic and agreed to take a part in the study. The sample size was determined using power analysis yielded approximately 400 participants. To be more conservative and to compensate for the non-response rate, the authors collected a total of 564 respondents.

2.3 Ethical considerations

Ethical approval was obtained from Al-Balqa Applied University's Institutional Review. To protect the persons' anonymity, no personal data was collected. All participants know that the participation is completely voluntary and they have the option to withdraw at any time without facing potential risks. All patients' details were saved in electronic versions on the corresponding computer.

2.4. Instrument

Based on the current literature, a 26-point questionnaire was developed. The questionnaire was used to document influenza vaccination history and medical status, knowledge and attitudes concerning the vaccine were also gathered among Jordanians aged 18 to 64 who suffer from chronic diseases. The questionnaire consisted of six sections: socio-demographics (gender, age, educational level, health insurance, smoking, and physical activity), medical history (frequency of medical visits, medical conditions, and the number of medicinal drugs taken daily), vaccination status (received or did not receive the influenza vaccine), and general knowledge

about influenza vaccine. As binary outcomes, awareness variables were evaluated. Willingness to be vaccinated, perceived hurdles to vaccination, and vaccine information sources (physician, pharmacist, family and friends, media, organisational foundations) were also described. A test study on 20 candidates was conducted to examine the clarity of the survey questions. As a result of the volunteers' feedback, minor changes were made to the survey questions' language and design.

2.5. Data Analysis

To achieve the objectives of the study, data were entered and analysed using the SPSS statistical program, and descriptive statistics were used to estimate arithmetic averages, frequencies and percentages of the demographic variables of the sample, such as age, gender, and education level, as well as for the variables describing the social habits of the sample such as smoking, exercise, and statistical comparisons were used. Such as Chi-Square Tests: To detect the statistical significance of the correlations, the Pearson correlation coefficient, and a multivariable logistic regression were used to predict the variables that are associated with the regular use of influenza vaccine among the study sample as a dependent variable with independent variables. The study dealt with it, and the statistical significance value ($\alpha = 0.05$) or less was adopted so that the correlations could be considered statistically significant.

3. Results

3.1. Sample

564 respondents finished the questionnaire. Among the 564 study participants, (35%, $n=199$) were males vs. females (65%, $n = 365$). Almost participants had university-grade education (46.3%, $n = 261$), and 31.6% ($n = 178$) had a diploma degree while 125(22.2%) had low levels of education. More than two third of participants are not smokers (64.2%, $n=362$), the remaining are either not smokers (28.9, $n=163$) or previously smokers (6.9%, $n=39$). In Table 1, the sociodemographic information of participants is described.

3.2. Rates of Influenza Vaccine Uptake

In this survey, the total 2018-2019 influenza vaccination rate was 19%. Most of participants (81%) reported irregular uptake of the vaccine. Most of respondents did not report getting immunization against influenza. For example, 86% of patients with cardiovascular diseases, 85% with diabetes, 71% with respiratory disease and 76% of patients on chronic steroid management did not take the annual influenza vaccine.

3.3. Association of patients Socio-Demographic, Lifestyle Features and Annual Influenza Vaccine uptake

Study of correlations that associate socio-demographic and lifestyle features and regular uptake of influenza vaccine are summarized in Table 2. No significant effect of socio-demographic and lifestyle characteristics on the rate of vaccination. However, absence of health insurance and patients with public health insurance had a lower level of vaccination in comparison with private one ($p = 0.008$). Table 2. Show the socio-demographic, lifestyle features and influenza vaccination.

3.4 Relationship between Chronic Disease type and Influenza vaccination

When detecting the rates of vaccination uptake amongst participants with definite comorbidities, a significant association was recognised between chronic disease situations and influenza vaccination. Subjects who suffer from respiratory diseases were found to have nearly a two-fold rate of periodic influenza vaccination when related to people without this situation (50% vs. 26.3%, $p = 0.001$) as shown in Table 3.

3.5. Knowledge, Attitude and Practice of Influenza Vaccination

In Table 4, we find associations between knowledge, attitude and practice of influenza vaccination. Nine out of ten factors are significantly associated with vaccination. Better knowledge about the risk of influenza disease is linked with a higher regular vaccination rate ($p = 0.01$). When evaluating the reason for refusing to take the vaccine, we found most unvaccinated participants don't feel to have a risk (39%) or are not recommended by their physician (32%). When evaluating the vaccine source of information, we found that the physicians and the pharmacists are accompanying with higher regular vaccination rates. The government was shown to have the lowest role in publicising information on the influenza vaccine. On another hand, the majority of participants who are not vaccinated don't have information about the vaccine (23%). Table 4. Presented the knowledge, attitude and practice of influenza vaccination.

3.6. Multivariate Analysis and the Correlates of Regular Influenza Vaccination

The findings presented in table 5 show that the variance values expressed by (R) and the explanatory variance expressed by (R Square) in the predicted dependent variable (the use of influenza vaccine), note that all (26) variables were entered. The regression analysis model and the (Stepwise) method of analysis was chosen, which is the most appropriate method to determine the factors that explain the largest possible amount of variation in

the dependent variable. (Doctor's advice), this factor alone explained (0.161) of the variance, (Belief that the vaccine is safe) with the previous factor (Doctor's advice) explained (0.200) of the variance. (Readiness to take the vaccine if you are provided with it in the next times) It was explained with the previous two factors (doctor's advice and belief that the vaccine is safe) (0.221) from the variance in the dependent variable. The rest of the variables were excluded from the regression equation as they were not good predictors and did not explain significant values of the variance.

4. Discussion

Diverse opinions and attitudes are present between Jordanian adults about influenza vaccination. Our study is aimed to measure the knowledge, attitude and practice of adults in Jordan who suffer from chronic diseases towards influenza vaccine and the readiness of adults to take influenza vaccine. Results of this analysis are created for a specific sample of the Jordanian population based on the sample size determined to be satisfactory by statistical analysis. The findings of this study may help with broad immunization tactics in the future.

4.1. Rates of Influenza Vaccine Uptake

Our analyses' findings indicate a 19% overall vaccination rate. Because our participants completed the questionnaire on their own, the reported prevalence of vaccination among Jordanian adult subjects may be overstated. A major problem for worldwide community health is low immunization rates. Continuous research is being done across nations to project and apply useful treatments for raising the rates of influenza vaccinations. No single strategy was creative enough to overcome this problem, from patient reminders and memory systems to posters in doctor clinics tracking vaccination success.²⁴ Indeed, according to the CDC-sponsored National Internet Flu Survey, 48.4% of adults in the United States will be immunized against the flu during the 2019–2020 influenza season.¹¹ The recommended targets for influenza vaccination in European nations are likewise difficult to meet.²⁷ In high-risk groups, low vaccination coverage is especially alarming. Patients with chronic diseases (cardiovascular disease, cancer, or diabetes) or immunosuppressed states had inadequate immunization rates in our study, which ranged from 14% to 29%. According to the European CDC, immunization rates for older adults and people with chronic conditions should reach a target of 75% coverage by the 2014-15 winter season.²⁷

4.2 Factors Affecting the Acceptance of the Seasonal Influenza Vaccine

Future immunization campaigns must focus especially on populations with low vaccine acceptance. Therefore, it's crucial to identify people who refuse to get the vaccine or are against it. The availability of vaccinations is a significant contributing element. In actuality, the majority of unvaccinated patients believed the vaccination to be pricey and did not have medical insurance for the flu shot.

Analysis of patients with chronic illnesses reveals that a statistically significant fraction of them were immunized against the influenza virus ($p < 0.05$), although a significant number of patients are still unvaccinated. Given that influenza vaccination has been shown to decrease hospitalization, morbidity, and death in both the elderly and chronically ill patients), these studies emphasize the need to boost immunization energies in the individual who suffer from chronic disease.^{3,4,5} Again, immunization has been demonstrated to reduce mortality from influenza-related complications and pneumococcal illnesses in the elderly by 50% and 80%, respectively.⁶ Additionally, it has been demonstrated that routine vaccinations given to diabetic children and adults reduce hospital admissions due to diabetes by about 79%.²⁸

4.3. Knowledge and Attitude towards Vaccination

Despite a high level of education among the responders, the majority of them did not acquire an influenza vaccination. Vaccinations have only been administered to 19% of the subjects. These results are consistent with a previous study conducted in Jordan, which showed that 20.4% of the subjects had ever received the vaccine.²⁹ The study by Zalloum et al. revealed that the COVID-19 pandemic did not boost Jordanians' acceptance of vaccination.³⁰

According to the study's findings, 39% of participants do not think influenza is a serious problem, while the remaining participants have concerns about the vaccine's safety. These results are consistent with a recent survey conducted in Jordan, which discovered that 22%, 19.4%, and 18.9% of respondents, respectively, did not consider influenza to be a threat, had doubts about the vaccine's effectiveness, and had misgivings about the vaccine's safety.²⁹ Similar hurdles have been seen in many places throughout the world; for instance, in the United States, one study found that worries about the safety and effectiveness of the influenza vaccine were the most often cited reasons for vaccination refusal.³¹ Additional research revealed justifications for vaccine refusal, including concerns about vaccine-related infections, doubts about its effectiveness, and conviction that the vaccine is unnecessary. In the UK, where safety concerns and fear of side effects were the biggest obstacles to getting the vaccine among competent nurses, similar results were also attained in earlier study.³² Surprisingly, most individuals do not perceive influenza as a threat. This belief is risky because there is a greater chance of infection, especially from aggressive influenza viruses.^{33,34} Although the majority of the participants

are not yet ready for vaccination, they generally have respectable opinions regarding the value of becoming vaccinated against influenza. This is a key notion since it would be conceivable to encourage them to have the influenza vaccine in order to raise Jordan's coverage rate. Because there is a correlation between influenza vaccination rates and influenza mortality rates, encouraging these persons to get the vaccine could help reduce influenza mortality in high-risk patients.^{35,36,22,23} In Italy, a study demonstrated that general practitioners (GPs) are the most reliable source of information on the yearly influenza vaccination. The results of the current study show that pharmacists and doctors play a poor role in providing patients with vaccination information. As a result, there should be campaigns encouraging pharmacists and doctors to play an important part in spreading the word about the value of the influenza vaccination, particularly in light of the COVID-19 pandemic. Additionally, the government should make a concerted effort to direct citizens to sources of information about influenza vaccines and emphasize the importance of doctors and pharmacists in educating the public about the vaccine. Campaigns on media to provide public with information related to the importance of the influenza vaccine is crucial.

The awareness about the influenza vaccine is not sufficient, 18% of unvaccinated participants think that vaccine is not safe. Consequently, there should be more hard work to be applied to improve the awareness and clarify the picture about the safety and efficacy of influenza vaccine. Social media is where a large portion of people acquire their vaccine information. Due to the inadequate roles played by pharmacists and doctors, this is a genuine reason why some patients experience anxiety after receiving vaccinations. Additionally, it is noted that health care professionals play a very small part in informing the public about the advantages of receiving an influenza vaccination. Physicians in Italy are the most reliable source of information regarding the influenza vaccination, in contrast to the situation in Jordan.

The significance of pharmacists' and doctors' roles in educating the public about the value of the influenza vaccine should be emphasized. Furthermore, as Jordan has no national influenza vaccination programs, it is advised to create a financed government program for influenza vaccine.

4.4. Source of Vaccine Information

The primary sources of vaccination information for all of our study participants were their doctors and pharmacies. This observation emphasizes the importance of healthcare workers in encouraging and reinforcing vaccination faithfulness. Other studies found that healthcare practitioners' instructions for routine immunization were favourable predictors of adherence.^{29,37} As a result, physicians, pharmacists, and other health care workers are being asked to establish their understanding of present immunization procedures and recommendations. Surprisingly, the government's function as a foundation of information was discovered to be a minor one in the society.

Jordan's health ministry should be urged to teach the people on the value of vaccination and to remove obstacles to vaccine access. Accepting the influenza vaccine as part of the countrywide immunization program, creating awareness operations, and assigning general finances to support it, for example, are critical stages.

4.5. Limitations

Our revision has interesting results; however, it may have certain limitations. Contributors self-reported their data as in all patient-directed surveys, and vaccination statuses and awareness criteria were scored using binary outcomes. The time of the study may have also influenced the outcomes, as subjects may have been more aware of the importance of influenza vaccine following a corona attack and during the winter. The study's sample was drawn from social media, which may have introduced bias into the study by excluding persons who have difficulty using electronic devices. Despite the limitations highlighted, the most essential strength of our study is that it was oriented to general adult populations suffering from chronic diseases throughout the kingdom and reported on their periodic vaccination knowledge, attitudes, and practices.

5. Conclusions

To our knowledge, the current survey is the first to document immunization rates between a specified population of Jordanian adults with chronic illnesses. The immunization rates for seasonal flu were relatively low, according to the findings. Chronic disease patients receive subpar vaccinations. The vaccine was considered unnecessary, which is the main obstacle to vaccination abstinence. The recent findings thus highlight the urgent need to increase public awareness of the effectiveness and advantages of seasonal influenza vaccination in Jordan. Enhancing immunization possibilities requires regular interaction with medical professionals. Additionally, it is advised that governmental entities and healthcare professionals work together to enhance immunization practices through professional and public awareness initiatives.

Acknowledgment

The authors would like to express sincere thanks to all participants for their valuable contribution to this study.

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Table 1: Demographic and clinical characteristics of respondents (n = 564).

Variable	Frequency (N)	Percentage (%)
Gender		
Male	199	35%
Female	365	65%
Age (years)		
18-30	182	32.3%
31-40	98	17.4%
41-50	120	21.3%
51-64	164	29.1%
Educational level		
High school or less	125	22.2%

Diploma	178	31.6%
University level	180	31.9%
Postgraduate	81	14.4%
Smoking Status		
Non-smoker	362	64.2%
Smoker	163	28.9%
Previously smoker	39	6.9%
Exercise		
Never	335	59.4%
Less than twice/ week	139	24.6%
2–3 times/week	44	7.8%
More than 3 times/ week	46	8.2%

Table 2. Socio-demographic, lifestyle characteristics and influenza vaccination.

Characteristic		Regular Influenza Virus Vaccination N=108 (19%)	Irregular Influenza Virus Vaccination N=456 (81%)	p-value
Gender	Male	42 (39%)	157 (34%)	0.223
	Female	66 (61%)	299 (66%)	
Age	18-30 years	41 (38%)	141 (31%)	0.328
	31-40 years	20 (19%)	78 (17%)	
	41-50 years	17 (16%)	103 (23%)	
	51-64 years	30 (28%)	134 (29%)	
	55-64 years	30 (28%)	134 (29%)	
Education level	High school or less	26 (24%)	99 (22%)	0.365
	Diploma	28 (26%)	150 (33%)	
	University level	34 (31%)	146 (32%)	
	Postgraduate	20 (19%)	61 (13%)	
Smoking Status	Non-smoker	69 (64%)	293 (64%)	0.121
	Smoker	36 (33%)	127 (28%)	
	Previously smoker	3 (3%)	36 (8%)	
Exercise	Never	67 (62%)	268 (59%)	0.296
	Less than twice/week	29 (27%)	110 (24%)	
	2–3 times/week	8 (7%)	36 (8%)	
	More than 3 times/week	4 (4%)	42 (9%)	
Medical visit	Routinely	34 (31%)	122 (27%)	0.378
	When needed	64 (60%)	302 (66%)	
	Once/year	10 (9%)	32 (7%)	

Table 3. Chronic disease conditions and influenza vaccination

Characteristic		Regular Influenza Virus Vaccination N=108 (19%)	Irregular Influenza Virus Vaccination N=456 (81%)	p-Value
Heart diseases	Yes	18 (14%)	113 (86%)	0.01*
	No	90 (21%)	343 (77%)	
Respiratory disease	Yes	30 (29%)	74 (71%)	0.03*
	No	78 (17%)	382 (83%)	
Gastrointestinal disease	Yes	2 (11%)	16 (89%)	0.00*
	No	106 (19%)	440 (81%)	
Diabetes mellitus	Yes	25 (15%)	144 (85%)	0.01*
	No	83 (21%)	312 (79%)	
Disease requiring steroids treatment	Yes	8 (24%)	25 (76%)	0.03*
	No	100 (19%)	431 (81%)	

Table 4. Knowledge, attitude, and practice of influenza vaccination.

Characteristic		Regular Influenza Virus Vaccination N=108 (19%)	Irregular Influenza Virus Vaccination N=456 (81%)	p-Value
What is the reason to refuse taking the vaccine?	The physician is not recommended	37 (34%)	148 (32%)	0.00*
	I don't feel I have a risk	26 (24%)	180 (39%)	
	Vaccine is not effective	11 (10%)	25 (5%)	
	Vaccine is expensive	19 (18%)	21 (5%)	
	Vaccine is not safe	15 (14%)	82 (18%)	
The vaccine should be taken at a specific time	Yes	71 (66%)	173 (38%)	0.00*
	No	5 (5%)	42 (9%)	
	I don't know	32 (30%)	241 (53%)	
Have medical insurance	Yes	94 (87%)	350 (77%)	0.01*
	No	14 (13%)	106 (23%)	
Your medical insurance covers the price of the influenza vaccine	Yes	37 (34%)	104 (23%)	0.01*
	No	48 (44%)	196 (43%)	
	I don't know	23 (21%)	156 (34%)	
Aware of vaccination needs/availability	Yes	81 (75%)	200 (44%)	0.00*
	No	14 (13%)	85 (19%)	
	I don't know	13 (12%)	171 (38%)	
Do you think, presence of chronic disease increases the risk of influenza?	Yes	76 (70%)	268 (59%)	0.01*
	No	17 (16%)	61 (13%)	
	I don't know	15 (14%)	127 (28%)	
Your physician advises you about vaccine	Yes	70 (65%)	87 (19%)	0.00*
	No	38 (35%)	369 (81%)	
Source of information about influenza vaccine	Don't have information	10 (9%)	104 (23%)	0.00*
	Family	13 (12%)	56 (12%)	
	Pharmacist	19 (18%)	69 (15%)	
	Physician	42 (39%)	63 (14%)	
	Government	10 (9%)	59 (13%)	
	Media	14 (13%)	105 (23%)	
Are you ready to take vaccine if we provide you?	Yes	96 (89%)	227 (50%)	0.00*
	No	12 (11%)	229 (50%)	
What are the reasons to refused to take vaccine in case its available?	Not safe	25 (23%)	76 (17%)	0.15
	I think I don't need it	46 (43%)	237 (52%)	
	Not recommended by physician	37 (34%)	143 (31%)	

Table 5. Multivariate analysis: correlates of regular influenza vaccination.

The Predictor	R	R Square	Adjusted R Square	Standard Error of prediction	p-Value
Physician advise	0.402	0.161	0.160	0.361	0.00*
Physician advise + Thinks the vaccine is safe	0.448	0.200	0.198	0.353	0.00*
Physician advise + Thinks the vaccine is safe+ readiness to take vaccine if we supplied you next time	0.470	0.221	0.217	0.348	0.00*

Uncorrected proof