

RESEARCH PAPER



Seasonal influenza vaccination among older adults in Jordan: prevalence, knowledge, and attitudes

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ABSTRACT

Objectives: The current study aimed to evaluate the prevalence, level of knowledge and attitudes to seasonal influenza vaccination among older adults in Jordan.

Methods: This was a cross-sectional study in which a close-ended questionnaire was administered to older adults (65 years or older) in two major cities in Jordan between May 2018 and July 2018. A *p*-value of less than 0.05 was considered the cutoff level for statistical significance.

Results: Among 500 participants, only 1.2% (*n* = 6) received a seasonal influenza vaccine during the previous year. In assessing influenza disease and influenza vaccine knowledge, 47.8% had good knowledge. Around 61% of older adults reported influenza vaccine is effective against preventing influenza however, 49.8% reported that influenza could be treated with the influenza vaccine. Moreover, 27% thought the influenza vaccine is important for older adults. In terms of attitudes toward the vaccine, 24.6% had positive attitudes and 40.6% strongly agreed/agreed that influenza is a serious disease in older adults and they should take the influenza vaccine to prevent influenza.

Conclusion: The results of this study showed an extremely poor influenza vaccination rate among older adults and a low level of influenza vaccination knowledge and attitudes.

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Introduction

Seasonal influenza is an acute respiratory infection caused by influenza viruses that affect all age groups worldwide.¹ Influenza A and B viruses can spread easily from person to person by air droplets. In moderate climates, seasonal epidemics occur mostly during the winter season, while in tropical areas, influenza may occur throughout the year.^{1,2}

On the other hand, influenza is one of the most common vaccine-preventable infections affecting individuals. Around the globe, the annual influenza epidemics are estimated to result in about 3–5 million cases of severe illness, and about 250,000–500,000 deaths.¹ In particular, the World Health Organization (WHO) includes older adults as one of the high-risk groups recommended for annual influenza vaccination.¹ Older adults are susceptible to short and long term complications of a seasonal influenza infection including hospitalization, morbidity, and mortality.^{2,3} Previous studies shown older adults were at increased risk of influenza-associated hospitalizations and deaths compared to younger adults.^{3–6} Previous studies reported a decrease in the risk of death and complications in vaccinated older adults.^{2–5} The process of immune-senescence in older adults considered a major drive for respiratory infections through decreased production of inflammatory responses.^{7,8} Yearly vaccination against influenza virus is the most successful method to prevent influenza when given before the influenza season (e.g. October).^{9,10} Now, many countries routinely

vaccinate older adults (patients aged ≥ 65 years) against influenza.^{2,8,11} According to the WHO and Centers for Disease Control and Prevention (CDC), older adults are considered high-risk groups and should be vaccinated annually.^{1,2,11–13} In Jordan, the influenza vaccine is not part of the Ministry of Health (MOH) vaccination program. However, Jordanian citizens are recommended to receive an annual influenza vaccine by many health agencies. Surveys of older adult's knowledge and attitudes toward seasonal influenza vaccination can provide areas for improvement to enhance seasonal influenza vaccination in this high-risk group. Hence, this study aimed to assess the prevalence of seasonal influenza vaccination in older adults and to evaluate their knowledge of influenza disease and vaccine in addition to attitudes against the vaccine.

Methods

Study design

This is a cross-sectional study in which older adults (65 years or older) were approached in community pharmacies and healthcare centers as well as public places in two major cities in Jordan between May 2018 and July 2018 using a convenient sampling method. The authors developed and modified close-ended structured questionnaire in a stepwise process based on literature review.^{14–17} The questionnaire was prepared and followed by pilot testing on 25 subjects including work

colleagues and patients presenting to outpatient clinics affiliated to our teaching hospital. One of the investigators conducted a face-to-face interview with all study participants. During the pilot testing, we assessed the questionnaires' content and face validity. Data from the pilot test were excluded from the final analysis. The study questionnaire was composed of four main sections as follows: 1) Demographics and general information including gender, age, occupation, educational level, marital status, and co-morbid conditions; 2) Knowledge and beliefs of seasonal influenza among older adults, responses to these questions were framed as yes, no, and do not know; 3) Knowledge of seasonal influenza vaccination among older adults. Responses to these questions were framed as yes, no, and I do not know. 4) Attitudes of older adults toward seasonal influenza vaccination. Participants responded to questions regarding their attitudes toward seasonal influenza vaccination. Responses to attitudes questions were framed as a 5-point Likert Scale (strongly disagree, disagree, uncertain, agree, and strongly agree). In order to assess the degree of vulnerability among older adults, we used the Vulnerable Elders Survey (VES).¹⁸ VES is a 13-item questionnaire that includes self-reported health status and frailty based on respondent's level of exertion in carrying out routine daily activity. Score ≥ 3 was considered vulnerable.¹⁹ The sample size was based on the review of the literature.¹⁴⁻¹⁶

The Jordan University of Science and Technology Institutional Review Board (IRB) committee approved the study protocol. Before the administration of the questionnaire, the study goals and objectives were explained to participants and verbal informed consent was obtained.

Statistical analysis

Characteristics of participants' variables were described using frequency distribution for categorical variables, while continuous variables were described using mean and standard deviation. Seasonal influenza and influenza vaccine scores were combined ($n = 15$ question) and a median cutoff was set to classify participants as good knowledge or poor knowledge. Further, the Chi-square test was used to examine the distribution of participants' demographic characteristics according to their level of knowledge and attitudes. Regarding the attitude scores, the number of attitudes items were 9, and they were scored on a 5-point Likert Scale for a total of 45 points. Attitude score ≥ 29 (cutoff $\geq 65\%$) was considered to be a positive attitude, while attitude score < 29 was considered a negative attitude. A P -value of less than 0.05 was considered the cutoff level for statistical significance. All statistical analyses were conducted using JMP software version 10.0 (SAS Institute, Cary, NC, USA).

Results

In this study, 580 eligible subjects were approached invited to participate in the study and 500 subjects agreed to participate (response rate of 86%). Participants' recruitment was from the following sites: community pharmacies (55%), public places (8.6%) and hospitals (36.4%). Males composed 53.6% ($n = 268$) of participants. This study included only elderly

patients (≥ 65 years) with a mean age of 71.1 ± 5.29 years. Regarding the educational level, 41.8% had a diploma degree, 38.6% had tertiary education and 19.8% had primary education. When participants were asked about physician visits, 83.8% reported visiting physicians based on needs while 16.2% had routine visits. Regarding comorbidities, 74% of participants had diabetes and 50.1% had hypertension. When participants were asked about their overall health, 36.2% had visited the doctor in the last 3 months, 10% admitted to a hospital in the last 12 months, and 26.6% had deteriorated wellbeing in the last 6 months. The VES scores were collected with a mean score of 3.54 (SD 1.98) and it ranged from 0 to 8. Table 1 summarizes the demographic data of the study participants.

Among study participants, only six participants (1.2%) received an influenza vaccine during the previous year. Only these six participants acknowledged they received advice from their health care providers to take the influenza vaccine, while the rest of the participants did not receive any advice. As regards of participants' knowledge about seasonal influenza, 59% answered it is a viral disease, 73.8% believed older adults are at higher risk for seasonal influenza, 43% reported that seasonal flue could happen at any time of the year, and 34.4% believed seasonal influenza can be treated with antibiotics. These results are depicted in Table 2. When respondents were asked about seasonal influenza symptoms, all of them identified headache, fever, and runny nose. Other symptoms responses were as follows: Vomiting (20%), sore throat (77.6%), muscle ache (25%), sneezing (90.6%), cough (92.2%), diarrhea (9.2%), and abdominal pain (25.5%).

In assessing influenza vaccine knowledge as shown in Table 3, 60.6% of older adults believed that the influenza vaccine is effective against preventing influenza, 54.4%

Table 1. Demographic characteristics of the study participants ($N = 500$).

Variable	N(%)
Age (year)	
mean \pm SD	71.12 \pm 5.3
Gender	
Male	268 (53.6%)
Female	232 (46.4%)
Education	
Elementary and High School	99 (19.8%)
Diploma	208 (41.6%)
Bachelor and Graduate	193 (38.6%)
Marital Status	
Married	396 (79.2%)
Divorced and Widowed	104 (20.8%)
Insurance	
Insured	464 (92.8)
Not Insured	36 (7.2)
Occupation	
Medical	43 (8.6)
None-medical	457 (91.4)
Physician visit	
Routinely	81 (16.2)
When needed	419 (83.8)
Vulnerable Elderly Survey (VES) score (mean \pm SD)	3.54 \pm 1.98
Vulnerable, score 0-2	191 (38.2)
Score 3 \geq	309 (61.8)
Types of comorbidities	
Heart disease	70 (14)
Diabetes mellitus	370 (74)
Hypertension	252 (50.2)
Kidney Disease	57 (11.4)
Neurological Disease	21 (4.2)
Conditions treated with steroids	99 (19.8)

Table 2. Participants' knowledge about seasonal influenza disease and seasonal.

Item	Yes	No	I don't know
Influenza is viral disease	295 (59)	57 (11.4)	148 (29.6)
Older adults are at risk of influenza	369 (73.8)	32 (6.4)	99 (19.8)
Influenza is contagious disease	500 (100)	-	-
Influenza occurs at any time of the year	215 (43)	177 (35.4)	108 (21.6)
Influenza is a serious disease in older adults	221 (44)	165 (33)	114 (26.6)
Influenza can be treated with antibiotics	172 (34.4)	195 (39)	133 (26.6)

Table 3. Participants' knowledge about seasonal influenza vaccine.

Item	Yes	No	I don't know
Influenza vaccine is effective against preventing influenza	303 (60.6)	22 (4.4)	175 (35)
Influenza can be treated with flu vaccine	249 (49.8)	56 (11.2)	195 (39.0)
Influenza vaccines should be taken at specific time in the year	229 (45.8)	51 (10.2)	220 (44.2)
Flu vaccine is safe	272 (54.4)	32 (6.4)	196 (39.2)
Flu vaccine has side effects	118 (23.6)	17 (3.4)	365 (73.0)
Once vaccinated you cannot get the disease	169 (33.8)	25 (5.0)	306 (61.2)
Every time I get the vaccine I still get flue	186 (37.2)	63 (12.6)	251 (50.2)
The influenza vaccine is important for older adults	135 (27.0)	43 (8.6)	322 (64.4)
Influenza vaccine can prevents serious complications among older adults	178 (35.6)	97 (19.4)	225 (45.0)

Table 4. Participants' attitudes toward influenza vaccination in older adults.

Item	Strongly agree and Agree	Neutral	Strongly disagree and disagree
I consider influenza vaccine to be safe	330 (66)	91 (18.2)	79 (15.8)
I think influenza is a serious disease in older adults, thus the vaccine should be given to prevent the disease	200 (40.0)	203 (40.6)	97 (19.4)
It is important for healthy adults over the age of 65 to get influenza vaccine	181 (36.2)	175 (35.0)	144 (28.8)
I have to pay for influenza vaccine	207 (41.4)	120 (24.0)	173 (34.8)
I don't think I need the vaccine	175 (35.0)	174 (34.8)	151 (30.2)
Flu vaccine is expensive	135 (27.0)	196 (39.2)	169 (33.8)
I don't know where to get the vaccine	130 (26.0)	155 (31.0)	215 (43.0)
I would take influenza vaccine to prevent influenza	207 (40.6)	25 (5.0)	272 (54.4)
I am not susceptible to the influenza	214 (42.8)	92 (18.4)	194 (38.8)

reported the vaccine is safe. When participants were asked about the importance of influenza vaccine to older adults, 27% reported it is important and 35.6% reported that influenza vaccine could prevent serious complications in older adults. On the other hand, 49.8% reported that Influenza could be treated with the flu vaccine and 73% of participants did not have any information about any potential side effects of the vaccine. When participants were asked about the route of administration for the vaccine, 74.6% answered it would be given as subcutaneous (SC).

Regarding the attitude of older adults toward the influenza vaccine, 66% strongly agreed/agreed about the safety of the influenza vaccine, and 40.6% strongly agreed/agreed to take the influenza vaccine to prevent influenza. About 43% strongly agreed/agreed they are not susceptible to influenza. In addition, 40% strongly agreed/agreed that influenza is a serious disease in older adults that requires vaccination for prevention, while 40.6% were neutral about that. Finally, 35% strongly agreed/agreed they do not need the influenza vaccine as shown in Table 4. We performed additional analysis to classify knowledge and attitudes score against seasonal influenza vaccine. Influenza disease and influenza vaccine scores were combined to 15 questions. The median score was 6, the IQR ranged from 5 to 7 and the maximum score was 10. Scores above the median (6) were considered good knowledge, while scores less than ≤ 6 were considered poor knowledge. In this study, 47.8% of the

participants had good knowledge. Regarding attitudes toward influenza vaccine, 24.6% of participants were considered to have positive attitudes (scores ≥ 29). We assessed risk factors associated with good knowledge and positive attitudes. No significant predictors were identified for knowledge and attitudes except that patients who had routine visits to physicians had a higher proportion of people with good knowledge compared to those with poor knowledge ($p = .0123$).

Discussion

This study shed the light on the prevalence, knowledge, and attitudes of older adults toward the seasonal- influenza vaccine in Jordan. Among 500 participants, only 1.2% received the influenza vaccine in the previous year. Participants who received the vaccine reported receiving advice from their healthcare providers. Seasonal influenza vaccine uptake is generally low worldwide. Despite the global efforts to increase influenza vaccine doses production, only three WHO regions; Americas, Western Pacific, and Europe) represent around 95% of influenza vaccine dose distribution in 2017. The Eastern Mediterranean and Western Pacific region (Jordan is part of this region) represents only 2.72% of total dose distribution.²⁰ The uptake of seasonal influenza vaccine in older adults in this study is extremely low when compared to other studies in the literature and to the WHO target of vaccine coverage, which is 75%.^{14-17,21-23}

A report from Thailand showed the influenza vaccination rate to be 34% among 581 older adults.¹⁴ Another study from Serbia showed a proportion of 47.7% of older adults ($n = 354$) ever vaccinated against influenza.¹⁵ In Turkey, 19% of older adults ($n = 274$) received a seasonal influenza vaccine.¹⁶ For 2015/16, the crude seasonal influenza vaccine uptake among older adults in France was 48%.¹⁷ In Brazil, the coverage of seasonal influenza was 73.0% among older adults (defined as ≥ 60).²² However, a report by Wendlandt et al from Eastern China revealed less than 1% of older adults (≥ 60 years ever received influenza vaccine ($n = 1506$)).²³

This disappointing rate of vaccination is alarming given the recommendations of the WHO and CDC of considering this age group at high risk for influenza.^{2,12,13} Additionally, the burden of influenza in older adults is quite substantial. As identified by the CDC report, 70–90% of deaths attributed to seasonal influenza occurred in older adults and 60–70% of hospitalizations related to seasonal influenza occurred in older adults.^{12,13} It is noteworthy to mention that 38.2% of participants' were considered vulnerable based on the frailty of the VES score and the average score was 3.54 ± 1.98 . Given that, seasonal influenza vaccination in older adults is challenging and this opens debate on how this group of patients can be reached out to optimize vaccination.

This study evaluated the level of knowledge about influenza disease and influenza vaccine in older adults. The median overall knowledge score was 6 and 47.8% of participants were classified as good knowledge group. This comes in agreement with the previous study from Jordan by Abu-rish et al that showed 47.3% of participants to be knowledgeable about influenza disease and influenza vaccine (35/941 were > 60 years).²⁴

In general, study participants had good information about seasonal influenza; however, only 44% thought it is a serious condition in older adults and 34.4% thought antibiotics used to treat influenza. Moreover, participants held many misconceptions about the seasonal influenza vaccine. For example, the majority of older adults did not perceive the influenza vaccine as important in older adults and did not believe it can prevent serious complications of seasonal influenza. In addition, around 50% thought the influenza vaccine can treat seasonal influenza and only 54% considered the vaccine safe. These findings agreed with similar previous studies from other parts of the world in older adults. A study by Gazibara et al (2019) reported 44.9% of older adults believed that the seasonal influenza vaccine can be treated with antibiotics and 35% thought older adults as high-risk group and should be vaccinated.¹⁵ In the same context, a study by Andrew et al reported 42.9% of Canadian older adults believed influenza is a serious condition in older adults and 49.1% thought influenza vaccine is more effective in older adults than younger adults.²⁵ The inadequate knowledge observed in this study represents the most important barrier against lifelong vaccination routine from the patients' side. Patients underestimate the burden and impact of influenza, which prevents them from seeking vaccination. Other obstacles include the lack of prioritization of seasonal influenza vaccination in older adults, lack of government support as seasonal influenza vaccination is not under the umbrella of the MOH vaccination program.

This study addressed participant's attitudes toward the influenza vaccine. In most of the items, respondents were less likely to

have a positive attitude toward the vaccine. In essence, only 40% agreed and strongly agreed about the seriousness of seasonal influenza and the importance of vaccine as a prevention method. Further, 35% believed they do not need the vaccine and 27% thought it is expensive and only 40.6% agreed to take the vaccine. Despite the high level of education of our study participants, the level of vaccination uptake and vaccine knowledge was low. In Jordan, 70% of the population is covered by health insurance (this includes government and military). The other 30% are either not under the insurance program or have private insurance. Many of the private insurance plans cover the seasonal influenza vaccine. The cost of the vaccine for an individual to buy from community pharmacy is around \$13, which may not be affordable by a wide array of people. Another issue is the lack of promotion and education for older adults by social media or local media about the importance of seasonal influenza vaccination and the lack of efficient communication with patients. In this study, participants who had routine visits to physicians had a higher knowledge score compared to those who had when needed visits. This emphasizes the crucial role of healthcare providers in promoting the health of their patients.

Strategies and recommendations should be set to overcome the extremely low rate of seasonal influenza vaccination among older adults in Jordan, as there are many areas for improvement. First, the MOH policymakers should try to make the influenza vaccine included in the insurance policy or available free-of-charge for the public, in particular, higher-risk groups including older adults and enhance the coverage of influenza vaccine in primary care centers distributed all over the country. Second, there is no argument about the substantial effect of healthcare providers influence on patients.²⁶ Healthcare providers should focus more on vaccine promotion to improve vaccination coverage in older adults. Moreover, educating people with easily accessible resources could advance the knowledge and attitude toward the elderly population with higher risk. Third, regular national campaigns in public places, social media, television, and volunteer work should be encouraged to remind people about their seasonal influenza vaccine during the time of administration of vaccine could be a very useful strategy.

This study had some limitations. The convenient sampling method might affect the generalizability of our data. The fact that 91% of study responders were selected from community pharmacies and hospitals generated a sample with a high proportion of sick people (74% diabetic). The insufficient power of convenient samples to detect differences between different subgroups in the population might explain the lack of associations of socio-demographic and other variables with knowledge and attitudes. In addition, the VES score was not validated for the Jordanian population.

Conclusion

The prevalence of influenza vaccination among older adults in Jordan is extremely low. Knowledge of influenza disease and influenza vaccination is low and participants' general attitude is negative. Collaborative efforts by health care providers, health policymakers, and media should be made to enhance influenza vaccine coverage in the older adult.

Disclosure of potential conflicts of interest

No potential conflicts of interest were disclosed.

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Authors contribution statement

MA and MJ were involved in the conception and design of the study. MA, MJ, AR and FA were involved in the analysis and interpretation of the data. MA, AR, and MJ were responsible for drafting the manuscript and FA revised it critically for intellectual content. All authors approved the final versions to be published; and all authors agree to be accountable for all aspects of the work.

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