



# Knowledge, attitudes and practices related to influenza illness and vaccination in children: Role of awareness campaigns in changing parents' attitudes toward influenza vaccination in Jordan

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## ABSTRACT

**Background:** Influenza infection is associated with a significant health burden in children, especially in developing countries. The influenza vaccine is an important preventive strategy for flu illness. Aim of this study to assess knowledge, attitudes and practices (KAP) related to influenza illness and vaccination in children in the Jordanian population and to study the effect of awareness campaigns on changing the attitudes of parents toward vaccinating their children against influenza.

**Methods:** A cross-sectional study was conducted among families visiting shopping malls and parks in November 2016. A questionnaire was administered via in-person interviews. Answers to KAP questions regarding influenza illness and vaccination were summed, with a total KAP score of 30. Facts about influenza illness and vaccination were explained to parents and provided in printed pamphlets.

**Results:** There were 1241 respondents. 10.9% of participants had vaccinated their children during the last season 2015/2016. The mean KAP score (standard deviation) was 16.21 (4.61). People living in urban areas, with high monthly income >600 JD and healthcare workers had higher KAP scores than their counterparts. Compared to other sources of information about the influenza vaccine, health resources correlated most with vaccinating children. Awareness and educational pamphlets changed attitudes positively in 29% of parents who refused the influenza vaccine for their children.

**Conclusions:** Awareness about influenza illness and vaccination is insufficient, and the coverage rate of influenza vaccination in children is low in the Jordanian population. Implementing public health policies is necessary to spread knowledge about influenza illness and vaccination and to promote the practice of receiving the influenza vaccine in children. Educational campaigns are helpful in changing the attitudes of parents toward vaccinating their children against the flu.

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## 1. Introduction

Seasonal influenza infection circulates worldwide and is associated with a significant health burden in terms of serious illness, hospitalization and death [1,2]. High-risk groups for severe influenza disease and complications are older adults >65 years old, very young children <5 years old, pregnant women, immune-compromised people and people with chronic medical conditions [3]. 10% of annual respiratory hospitalizations in children

<18 years old worldwide were estimated to be related to influenza infection, and the rate of hospitalization was more than three times higher in developing countries than in developed countries [4]. In Jordan, surveillance for severe acute respiratory infections (SARI) between 2006 and 2014 demonstrated that 57% of influenza-positive patients were under 5 years of age [5].

The influenza vaccine is one of the most important preventive strategies for influenza illness. Annual influenza vaccination is recommended by the CDC's Advisory Committee on Immunization Practices (ACIP) for all persons aged ≥6 months who do not have contraindications [6]. Influenza vaccination decreases the risk of influenza infection [7] and the risk of life-threatening influenza illness in children [8]. The primary peak of the influenza epidemic in

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Jordan is in the winter (January until March) [9]; and the WHO recommends that the annual influenza vaccine campaign should be in late autumn [10].

Influenza vaccine uptake is low globally, and this low uptake contributes to the burden of influenza disease [11]. The goal of Healthy People 2020 is 70% annual coverage for those 6 months through 17 years old [12]. In Jordan, the influenza vaccine coverage rate was reported to be 9.9% in 2011/2012 [13]. In a study performed by Abu-Rish et al., only 20.4% of the adult population had ever received the vaccine before the study period in 2015/2016 [14]. There are no reported data from Jordan or a health tracking system for influenza vaccine coverage in children. The influenza vaccine is not included in the Jordanian National Immunization program. Governmental and private health insurance does not cover the cost of the influenza vaccine for people in the community, including children, with the exception of healthcare workers in the governmental health sector, who receive the vaccine for free.

Awareness about influenza illness and vaccination in Jordan is insufficient [14]. In our practice, we observe false beliefs about the efficacy and safety of the influenza vaccine, such as getting the influenza illness after the vaccine and being more susceptible to other respiratory viruses [15]. Due to inadequate knowledge, misconceptions about influenza vaccine, and the fact that the vaccine is not covered by insurance, we expected that the tendency of people to vaccinate their children would be low in Jordan. The only study that examined the attitudes of parents about vaccinating their children against influenza in Jordan showed 67.3% ( $n = 213$ ) of those surveyed had positive attitudes toward childhood vaccination; however, this study was restricted to children below the age of 5 years and had a small parental study sample ( $n = 417$ ) [14]. We conducted a cross-sectional study on a sample of the Jordanian population in Irbid (Northern Jordan) to assess public knowledge, attitudes and practices (KAP) related to influenza illness and influenza vaccination in children. During the study, we held multiple awareness campaigns to educate people about influenza illness and vaccination, specifically in children. We examined the effect of face-to-face education and educational pamphlets on parents' attitudes toward vaccinating their children against influenza.

## 2. Material and methods

### 2.1. Study design

A cross-sectional survey was conducted among families visiting shopping malls and public parks in Irbid, Northern Jordan in November 2016. The parents were interviewed by trained researchers (physicians) and answered questionnaires to assess their KAP related to influenza illness and influenza vaccination in children. The parents were verbal consented after learning about the study and its purpose. Approval for the study protocol and the questionnaire was obtained from the Institutional Review Board (IRB) of the Jordan University of Science and Technology.

Immediately after the questionnaire was completed, an awareness message was communicated face-to-face to all parents in 10 min, which included medical facts about influenza illness and vaccination from the CDC vaccination information statement in the Arabic language, and a pamphlet printed in the Arabic language which had the already explained medical facts was given to the families [16]. Then, parents' attitude toward vaccinating their children was reassessed during the 2016/2017 influenza season.

### 2.2. Questionnaire development

A questionnaire was developed after reviewing available validated questionnaires in the literature [13,14,17]. Then, the ques-

tionnaire was evaluated by two pediatric physicians (pediatric infectious disease and pediatric pulmonology subspecialists) and an epidemiologist on the research team, and adjustments were made to make the questionnaire suitable for the target population. The questionnaire was translated from English into the Arabic language, administered in Arabic and translated back to English. The questionnaire was pilot tested on 108 people, and the responses were assessed and validated.

### 2.3. Questionnaire content

The sociodemographic factors included age, gender, number of children, place of residence, education, occupation, health insurance, monthly income and having children with chronic illnesses. People who did not have children were excluded from the study.

Questions were asked to assess the KAP of people related to influenza illness and influenza vaccination. Answers to knowledge, attitude and practice questions were scored 16, 10 and 4, respectively, with a maximum summation of 30 for the KAP score.

Parents were asked about their sources of knowledge about the vaccine, the sources from which they would prefer to learn about the influenza vaccine in the future, and their reasons for accepting or declining the influenza vaccine for their children.

### 2.4. Statistical analysis

All analyses of dependent and independent variables were conducted using PC SAS (version 9.2; SAS institute, Cary, NC, USA). Frequencies and percentages were used for categorical variables (sociodemographic data), and summary measures (means and standard deviations (SD)) were used for continuous variables (age and KAP score). Student's *t*-test was used to compare the mean KAP scores among two independent groups such as gender or place of residence. Analysis of variance (ANOVA) was used to compare the mean KAP scores of more than two independent groups, such as education or monthly income. Pearson's chi-square test was used to find associations between two categorical variables. All hypothesis tests were two-sided. A *P*-value of <0.05 was considered significant.

## 3. Results

### 3.1. Sociodemographic characteristics

There were 1241 respondents out of 1254 to the questionnaire, with a participation rate of 99%. The mean (SD) age was 38.2 (8.6) years old. The majority of respondents were female (57.3%) and living in urban areas (70%). A total of 30.7% of respondents had a bachelor's degree, and 22% had a high school diploma. Among respondents, 52.7% had a job, and 10.6% worked in the healthcare sector. Of all participants, 65% had medical insurance, which was governmental for 50.4%. In addition, 27.5% and 52.8% of participants had incomes of >600 and 300–600 JD (Jordanian dinar), respectively. Finally, 10.5% of participants had at least one child with a chronic illness (first 2 columns of Table 1).

### 3.2. Knowledge about influenza illness and vaccination

The knowledge score mean (SD) and median were 9.19 (2.5) and 9, respectively (supplementary material, Table 1 shows the responses to the knowledge questions). Of the respondents, 83% knew about the existence of the influenza vaccine. Less than half (47.8%) thought that the influenza vaccine should be given to children, and 15.6% believed that children with chronic illnesses are the only candidates for receiving the vaccine. Only 16.9% knew that

**Table 1**  
Sociodemographic characteristics of participants and associations with KAP scores.

Sociodemographic characteristics	n (%)	Mean KAP score (SD)	P-value
<b>Gender<sup>α</sup></b>			0.44
Male	528 (42.8)	16.3 (4.7)	
Female	707 (57.3)	16.1 (4.5)	
<b>Number of children<sup>β</sup></b>			0.02 <sup>*</sup>
1	221 (17.8)	15.3 (4.1)	
2	315 (25.4)	14.8 (4.1)	
3	254 (20.5)	15.2 (4.4)	
4	218 (17.6)	15.8 (3.8)	
≥ 5	227 (18.3)	14.6 (4.0)	
<b>Place of residence<sup>α</sup></b>			0.003 <sup>*</sup>
Rural	369 (30)	15.6 (4.3)	
Urban	860 (70)	16.4 (4.7)	
<b>Education<sup>β</sup></b>			0.12
Bachelor's degree	380 (30.7)	15.5 (4.4)	
High school	273 (22)	14.7 (4.0)	
Institutional degree	207 (16.7)	15.2 (3.9)	
Less than high school	265 (21.4)	14.7 (3.6)	
Master's degree	77 (6.2)	15.6 (4.4)	
PhD, MD	36 (2.9)	15.9 (4.6)	
<b>Occupation<sup>β</sup></b>			0.007 <sup>*</sup>
Has a job	653 (52.7)	15.3 (4.3)	
Not working	517 (41.7)	14.7 (3.8)	
Retired	42 (3.4)	14.7 (4.0)	
Studying	27 (2.2)	17.2 (4.5)	
<b>Healthcare worker<sup>α</sup></b>			<0.0001 <sup>*</sup>
Yes	31 (10.6)	17.8 (5.3)	
No	1106 (89.4)	16 (4.8)	
<b>Insurance<sup>α</sup></b>			0.11
Present	805 (64.9)	16.4 (4.7)	
Governmental	623 (50.4)		
Private	147 (11.9)		
Absent	436 (35.1)	15.9 (4.4)	
<b>Monthly income (JD)<sup>β</sup></b>			0.04 <sup>*</sup>
300–600	649 (52.8)	15.1 (3.9)	
<300	242 (16.7)	14.6 (3.9)	
>600	338 (27.5)	15.5 (4.5)	
<b>Children with chronic illness<sup>α</sup></b>			0.64
Yes	1099 (88.8)	16.4 (4.9)	
No		16.2 (4.6)	

α: Student's *t*-test was used to compare with mean KAP score.

β: Analysis of variance (ANOVA) was used to compare with mean KAP score.

\* Value is statistically significant (*P*-value of <0.05).

the age of 6 months was the starting age for administering the influenza vaccine in children. In addition, 51.2% of respondents thought the vaccine was safe. The percentage of respondents who believed to some extent that the vaccine prevents influenza and pandemic H1N1 influenza A (pH1N1) was 46.5% and 23.0%, respectively. Incorrectly, 37.6% thought that the vaccine can prevent all causes of cold. Approximately two-thirds of respondents (67.8%) recognized that the vaccine should be received annually, and approximately one-third of respondents (28.5%) knew that autumn is the optimum season to receive the vaccine.

### 3.3. Attitudes and practices related to influenza vaccination in children

Table 2 presents the responses to the attitudes and practices questions. The table shows that 29.3% of respondents were planning to give their children the influenza vaccine during the study season (2016/2017), and 69.3% of respondents would give the vaccine if they received enough information about it. A total of 72.3% were willing to pay the price of the influenza vaccine for their children, and 88% agreed to vaccinate their children if it was free of cost. After hearing that the influenza vaccine can protect against pH1N1, 93% of respondents would allow their children to receive the vaccine. Only 10.9% of participants vaccinated their children

**Table 2**  
Responses to attitude and practice questions.

Attitude questions (total score 10)	n (%)	Score
1 – Are you going to give your kids the influenza vaccine this season?		
Yes	362 (29.3)	2
No	493 (39.9)	0
Maybe	378 (30.6)	1
2 – Are you going to get the vaccine yourself?		
Yes	318 (25.8)	2
No	572 (46.3)	0
Maybe	345 (27.9)	1
3 – If you get enough information about the vaccine, are you going to give it to your children?		
Yes	855 (69.3)	2
No	111 (9)	0
Maybe	268 (21.7)	1
4 – If you are offered the vaccine for your children, would you give it to them?		
Yes	810 (66.1)	1
No	410 (33.5)	0
5 – If you have to pay the price of the influenza vaccine, are you going to give it to your children?		
Yes	891 (72.3)	1
No	341 (27.7)	0
6 – If you get the influenza vaccine for free, are you going to give it to your children?		
Yes	1088 (88.1)	1
No	147 (11.9)	0
7 – If you know that the vaccine protects your kids from pH1N1, are you going to give it to them?		
Yes	1141 (93)	1
No	86 (7)	0
<b>Practice questions (total score 4)</b>		
8 – Have you ever had the influenza vaccine?		
Last year	110 (9)	2
Before last year	126 (10.3)	1
Never	991 (80.8)	0
9 – Have you ever given it to your children?		
Last year	132 (10.9)	2
Before last year	100 (8.2)	1
Never	984 (80.9)	0

The total attitude and practice scores were 10 and 4, respectively.

during the last season (2015/2016), and 8.2% had received the vaccine at least once before the last season.

### 3.4. KAP score and influencing factors

The mean KAP score (SD) was 16.21 (4.6), with a median of 16 and a range of 1–29.

Respondents who resided in urban areas had a higher KAP score (16.44 (4.6)) than that of respondents who resided in rural areas (15.60 (4.3)) ( $P=0.003$ ). Healthcare workers had a higher KAP score (17.24 (5.4)) than that of non-healthcare workers ((16.01 (4.5)) ( $P<.0001$ ). Participants with monthly income (>600 JD) scored higher than participants with low income (<300 JD) ( $P=0.04$ ). Gender, the presence of insurance, level of education and having a child with a chronic illness did not affect the KAP score (columns 3 and 4 of Table 1).

### 3.5. Factors related to the attitudes and practices of parents concerning childhood influenza vaccination

A significant difference in the attitudes of parents toward vaccinating their children was found if the parents were required to pay the price of the influenza vaccine versus receiving the vaccine for free ( $P<.0001$ ). Specifically, 212 (62.2%) out of 341 people who refused the influenza vaccine for their children if they were paying full price would agree to vaccinate their children if they received the vaccine for free.

There was a significant relationship between parent and child vaccination ( $P<.0001$ ). A total of 848 (87.4%) of 970 people who never received the influenza vaccine themselves had also not vaccinated their children against the flu. On the other hand, 49 (44.6%) of 110 parents who received the influenza vaccine during the last season (2015/2016) obtained the vaccine for their children. Only 24 (18.8%) out of 128 children with a chronic disease received the influenza vaccine during the last season, and the majority of such children 83/128 (64.8%) had never received the vaccine last season or before. 108 (10%) of 1078 healthy children had received the vaccine during the last season (2015/2016). Low vaccination rate led to limiting the analysis of factors determining vaccination against influenza.

### 3.6. Source of information about the influenza vaccine

Participants heard about the vaccine from various sources: media (TV, radio, or newspaper),  $n=403$  (32.5%); health resources,  $n=358$  (28.9%); family and relatives,  $n=220$  (17.7%); friends and neighbors,  $n=119$  (9.6%); social media,  $n=85$  (6.9%); and independent searches,  $n=51$  (4.1%).

When comparing the influence of different sources of information about the influenza vaccine (health resources, social media, media (TV, radio, or newspaper), and family and relatives) on the practice of obtaining the influenza vaccine for children, health resources were most frequently reported by people who vaccinated their children during the last season (2015/2016) ( $n=63$  (48.5%)) (Chi-Square value: 40.1,  $P=.0004$ ).

When all participants were asked about their preferred source for hearing about influenza vaccine, the responses were doctors in hospitals and clinics (767 (61.8%)), health centers (412 (33.2%)), social media (149 (12%)), media (136 (10.9%)), awareness campaigns in public places (90 (7.3%)), pharmacies (88 (7%)), and independent searches (20 (1.6%)).

### 3.7. Reasons for accepting and declining influenza vaccination in children

The main reason (Fig. 1) for parents who decided to accept influenza vaccine for their children was the belief that vaccination could prevent flu illness ( $n=747/1240$ , 60.2%). People who refused influenza vaccination for their children claimed various reasons (Fig. 2); side effects of the vaccine ( $n=252/1241$ , 20.3%), lack of knowledge about the vaccine ( $n=209/1241$ , 16.8%) and the vaccine not being beneficial ( $n=141/1240$ , 11.4%) were the most frequently reported reasons (Fig. 2).

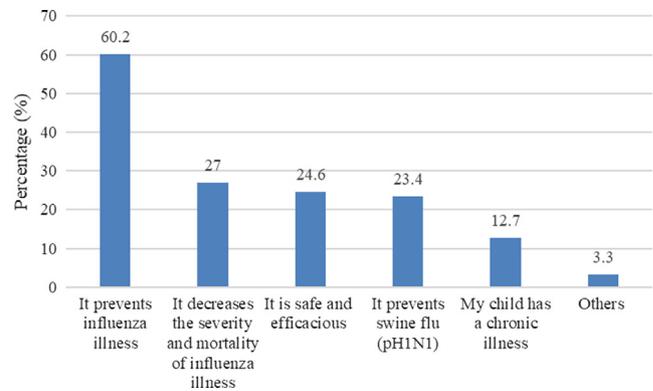


Fig. 1. Reasons for accepting the influenza vaccine in children.

### 3.8. Attitudes of parents toward influenza vaccination after the educational awareness campaign

Of parents who refused to give their children the influenza vaccine ( $n=493$ ) (Table 3), 184 (37.3%) had no intention to vaccinate their children, 166 (33.7%) may vaccinate their children, and 143 (29%) would give their children the influenza vaccine after participating in the face-to-face awareness campaign and receiving the educational pamphlets about influenza illness and vaccination ( $P<0.0001$ ).

## 4. Discussion

Our study is the first in Jordan to assess the KAP of parents related to influenza illness and vaccination in children. The influenza vaccine is cost effective, as it minimizes the influenza illness burden on the health sector by decreasing clinic visits and hospitalizations, in addition to preventing school abstinence and parental work leave [3,18]. Thus, increasing the coverage rate of the influenza vaccine in children is crucial in developing countries where resources are limited.

We demonstrated that parents' knowledge about influenza and influenza vaccination in children is insufficient in a sample of the Jordanian population. This lack of knowledge reflects the parents' lack of awareness about the seriousness of influenza illness, its possible complications and the protective role of the vaccine. However, the majority of parents in our study showed a positive attitude toward vaccinating their children against influenza if they had information about it. This finding highlights the need to increase efforts to spread awareness in the community about influenza illness and vaccination.

Sociodemographic characteristics were associated with KAP related to influenza vaccination in children. People in rural areas may have less access to healthcare facilities, and there could be limited availability of the influenza vaccine. Household income was a determinant factor for higher KAP scores. The average household income influenced influenza vaccine uptake, even in developed countries [19,20]. The average cost of influenza vaccine in Jordan is 12 JDs (17 US dollars), and this cost is not covered by health insurance. This situation puts an additional financial burden on parents when they decide to vaccinate their children against influenza, knowing that the minimum wage for Jordanians is 220 JD. However, approximately three-quarters of people were willing to pay the price of the vaccine when they understood its protective role and benefits, which means that the cost might not be a real obstacle to vaccination.

Healthcare workers had higher KAP scores, which was expected and can be explained by the fact that these workers have more sci-

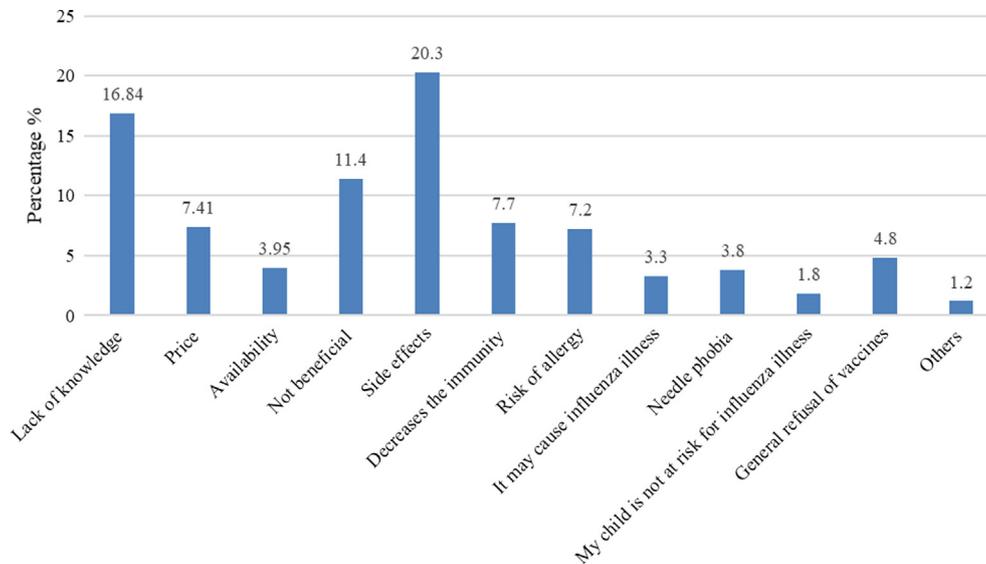


Fig. 2. Reasons for declining the influenza vaccine in children.

Table 3

Attitude of parents toward vaccinating their children against influenza.

Response before education	Response after education		
	No	May be	Yes
No	213 (17.3%)	368 (30%)	649 (52.8%)
493 (40.1%)	184/493 (37.3%)	166/493 (33.7%)	143/493 (29%)
May be	15/377 (4%)	143/377 (37.9%)	219/377 (58.1%)
377 (30.7%)	14/360 (3.9%)	59/360 (16.4%)	287/360 (79.7%)
Yes	360 (29.3%)		

Total patients: 1230 (missing = 11).

entific knowledge, higher awareness and easier access to the vaccine. However, misconceptions and concerns about influenza vaccine exist among healthcare personnel [21]. Level of education had no influence on parents' KAP related to vaccinating their children against influenza. A low influenza vaccination rate was reported among highly educated people in other countries [20]. Educated people are still hesitant about influenza vaccination. Schools and universities may not be making advances in educating people and spreading awareness about influenza illness and vaccination. In addition, there are other sources of information that could have more influence in this regard, such as health resources provided by doctors, medical health centers, hospitals, etc., in addition to media and peers.

The majority of parents had a positive attitude toward vaccination after learning that it could protect against pH1N1. The parents were aware of the threat associated with pH1N1, as 88% had heard about related cases of death.

Parents of chronically ill children might receive more counseling from their doctors since they are at higher risk for influenza complications, or such parents might search more for protective health practices for their children. However, the vaccination rate remains low in children with chronic illnesses. The vaccination rate in the high-risk group of children was reported to be low in other studies [22,23].

Health resources were the most commonly reported source of information among people who had given their children the influenza vaccine. In addition, physicians were the most preferred by participants for obtaining recommendations about influenza vac-

cine. Physician recommendations have played a vital role in encouraging influenza vaccination in children [14,24]. Missing recommendation from medical personnel was one of the most frequently reported barriers to the uptake of influenza vaccines in children [25]. Compared to media, posters and brochures in health centers and family members and friends, education received from medical staff proved to be the most effective tool for improving vaccination practices in Jordan [26]. A survey conducted in the USA showed healthcare provider recommendations to be a predictor of influenza vaccine uptake in children 9–13 years of age [27]. This finding points to the critical role of medical personnel in increasing the influenza vaccine coverage rate in the Jordanian community. Suboptimal knowledge of physicians about influenza vaccine recommendations was reported even in developed countries [28]. Consequently, educating doctors about the guidelines for influenza immunization and improving their knowledge should be considered by stakeholders.

Media was the most commonly reported source of information about the vaccine among all participants. Media can be utilized more effectively to spread awareness about influenza illness and vaccination. Media proved to be effective in increasing the vaccination rate in children [29].

Among the participants, fear of side effects of the vaccine was a barrier to childhood influenza vaccination. Many studies have found concerns about influenza vaccine safety to be a main reason for declining the vaccine [13,14,25].

Increasing knowledge and awareness is a crucial strategy for overcoming vaccine hesitancy [30]. Awareness campaigns in public places and distributing pamphlets/brochures about influenza and the influenza vaccine had positive effects on the attitudes of parents toward childhood vaccination and consequently could contribute to increase vaccination rate. In other studies, educational pamphlets helped increase influenza vaccine uptake [31,32].

## 5. Limitations

One limitation was possible sample selection bias, as the participants were interviewed in shopping malls and parks, which made it more likely to include participants who lived in urban areas than participants who lived in rural areas. Second, determining factors

of vaccine uptake among children was not possible due to low vaccination rate in the studied sample.

Third, the effect of awareness campaigns and educational pamphlets on influenza illness and vaccination is better studied via following the vaccination status of children after the intervention. This follow-up was difficult to perform due to the lack of medical records for influenza vaccination in the Jordanian health system.

## 6. Conclusions

Awareness about influenza illness and vaccination and the coverage rate of the influenza vaccine in children were insufficient in a sample of the Jordanian population. Implementing public health policies is necessary to spread knowledge about influenza illness and vaccination and to promote the practice of receiving the influenza vaccine in children. Physicians recommendations for the influenza vaccine need to be encouraged in health care centers, clinics and hospitals.

When counseling people about influenza vaccine, an emphasis should be made on stating the benefits and correcting false beliefs and misconceptions. Educational campaigns are helpful in changing the attitudes of parents toward vaccinating their children against the flu.

## 7. Authors' contributions

S. Awad contributed to the design of the study, interpretation of data and drafting and revising the article. N. Abdo contributed to the design of the study, analysis of data and drafting the article. D. Yusef contributed to the design of the study, interpretation of data and revising the article. A. Jawarneh, A. Babaa, D. Alwady, H. Al-Bawayeh, I. Kasrawi, M. Amaireh, M. Obeidat, N. Bany Amer and S. Alonze contributed to acquisition of data, interviewing participants and revising the article. All authors approved the final version of submitted manuscript.

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## Declarations of interest

None

## Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.vaccine.2019.04.083>.

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