

Exploring parents' knowledge and attitudes towards the influenza vaccine in a rural community of Saudi Arabia

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Abstract

Influenza is a highly transmissible respiratory virus. Public awareness about the nature of the disease and how to prevent it must be explored to effectively mitigate the adverse effects of the disease. This study aimed to assess the parents' knowledge and attitudes towards the influenza and the influenza vaccine in Al-Kharj Governate, Saudi Arabia. A cross-sectional study was performed, and an electronic questionnaire was distributed from December 2020 to the end of April 2021 to parents living in Al-Kharj, Saudi Arabia. Data were collected and analyzed using IBM SPSS version 21.

The study had 510 participants, of which 75.1% were mothers. Overall knowledge about the influenza disease was found to be low in 68.6% of participants. In addition, 55.7% of respondents displayed an inadequate level of knowledge of the influenza vaccine. Almost 75% of parents had chosen not to vaccinate their children in the past and of those, only 35.9% were willing to vaccinate their child this year. The most common reason for parents choosing not to vaccinate their children was that they believed the child to be in good health. This demographic studied in Al-Kharj, Saudi Arabia did not demonstrate sufficient knowledge about the influenza disease and vaccine. Study participants were hesitant to vaccinate their children. This should prompt healthcare workers and the Ministry of Health to lead a broad awareness campaign on influenza vaccination that extends to both urban and rural areas.

Introduction

Seasonal influenza is an acute viral infection that occurs most commonly during the fall and winter seasons.¹ It is a highly contagious disease that is caused by influenza viruses that circulate worldwide, with particularly high proportions of infec-

tions caused by influenza type B.^{1,2} In Saudi Arabia, a total of 17,094 confirmed influenza cases were reported in 2010.³ The severity of influenza may vary from mild to severe.¹ A patient with influenza usually experiences upper respiratory tract infection symptoms such as a runny nose, fever, cough, sore throat, and other symptoms like muscle pain, fatigue, and headache. However, some patients develop life-threatening complications.¹ Influenza is fatal, in particular to individuals belonging to high-risk groups.¹ The last revision of Global Mortality estimated an average of 290,000 to 650,000 deaths resulting from influenza.⁴ Hospital-based surveillance in Saudi Arabia reported 232 deaths associated with influenza in 2015, which is the highest figure ever recorded for the country.³ Among high-risk groups are children aged five years or younger.⁵ In an analysis of systematic reviews and reports from 1982 to 2012, an estimated average of 870,000 hospitalizations were observed in children aged five years or less and 374,000 hospitalizations of children less than one year of age.⁶ Fortunately, there is a vaccine against the influenza virus, and it is considered a highly effective method of preventing illness.⁷ One recent study carried out in the United States estimated that the influenza vaccine has a 38% effectiveness against influenza A and B viruses and was effective in preventing 41% of expected hospitalization among young children aged six months to four years between 2017 and 2018.⁸ The vaccine was also observed to decrease pediatric hospitalizations and ER visits associated with influenza by 40%-60% during the 2018-2019 season.⁹ Additionally, the Centers for Disease Control and Prevention (CDC) has reported that the vaccine has prevented 7.52 million people from contracting influenza in the United States during the 2019-2020 Season.¹⁰ A systematic review article published in 2016 found that public perception of the vaccine's efficacy, safety, and adverse consequences influence vaccine uptake and therefore its effectiveness.¹¹ Public awareness of the influenza vaccine is therefore essential in efforts to prevent the illness.

Parental awareness on the influenza vaccine may also affect their willingness to vaccinate their children.¹² Past research has focused on the awareness of parents in Saudi Arabia towards vaccination of their children and has showed that knowledge and awareness towards the influenza vaccine and vaccination, in general, were low and needed to be improved.^{13,14} The present study focuses on the public knowledge, practices, and attitudes towards influenza vaccination of Saudi parents in the Al-Kharj governate of Saudi Arabia.

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Materials and methods

Study design and setting

A cross-sectional study was conducted during the winter season, in the Al-Kharj governate of Saudi Arabia from December 2020 to the end of April 2021. Al-Kharj is one of the largest governate in central of Saudi Arabia, within an area of 19,790 km² and a population of 376,325 people.

Study population, inclusion, and exclusion criteria

Study participants exclusively included Saudi parents living in the Al-Kharj governate, having at least one child 6 months of age or older at the time of the study, and willing to participate in the study. Non-Saudi parents, those who is living outside Al-Kharj governate, and those who don't have a child, or have a child aged less than 6 months were excluded.

Sample size

The appropriate sample size was found to be 384 by using the formula ($n = z^2pq/d^2$) to obtain results at a 95% confidence level, a margin of error of 5%, and a population variance of 50%. However, more participants (n=510) were enrolled to secure more accurate results.

Data collection and analysis

A validated electronic questionnaire was distributed on social media platforms to the target population using the convenient random sampling method and parents were kindly asked to complete it. A questionnaire was developed and validated in multiple steps. First, three faculty physicians who have subject matter and research experience confirmed the content validity of the tool for our study. Second, pre-testing was conducted on 30 individuals who were excluded from the main study. Brief cognitive interviewing was then undertaken with these individuals to explore any problem areas in the formulation and order of questions, appropriateness of length, and relevant questionnaire processes. The questionnaire was first written in English then translated by a linguist into Arabic (the local language for target population), then translated back into English to ensure accurate usage of words and grammar. It covered four sections: socio-demographic characteristics of participants (7 items), parents' knowledge about influenza illness and influenza vaccine (18 items), parents' practice toward influenza vaccine (3 items), and parents' attitude toward influenza vaccine (2 items).

The questionnaire included a letter explaining the study's nature and purpose. Participation consent was taken prior to beginning the questionnaire. Confidentiality was maintained as the questionnaires did not include any names or numbers and the data were only accessible to the authors.

After data collection, the data were revised, coded, and inputted into statistical software IBM SPSS version 21. Graphical representations of the data were constructed using Microsoft Excel software. All statistical analysis were performed using two

tailed tests with an alpha error of 0.05. A P-value less than or equal to 0.05 was considered to be statistically significant. Participant knowledge was evaluated by granting a one-point score for each correct answer. The sum of discrete scores of different items in each domain were calculated to obtain the total score. The knowledge scores ranged from 0 to 18 and had been generated by using a cutoff point of 60% of the total score. Knowledge scores between 0 and 10 were classified as poor knowledge, while scores between 11 and 18 were classified as good knowledge. Descriptive statistics, including frequencies and percentages, were used to describe the frequency of each categorical variable item. The Chi-square test was used to determine if there was an association between parental sociodemographic characteristics, children's vaccination history, practices and attitudes towards the influenza vaccine, and participants' overall level of knowledge on influenza and on the vaccine.

Ethical approval

This study was ethically approved by Prince Sattam Bin Abdelaziz University's Scientific Research Ethics Committee. REF: PSAU/COM/RC/IRB/P/88.

Results

The study included 510 respondents, of whom 383 (75.1%) were mothers. The majority were between the ages of 36-45 years old, with a mean age of 38.6 ± 12.7 years. Exactly 52 (10.2%) participants were health care workers. Around 67.1% of the participants had a bachelor's degree. Additional details on sociodemographic data are presented in Table 1.

A round ninety six percent of parents reported that influenza is transmitted primarily through coughing and sneezing and 29.0% of respondents reported that influenza is a potentially severe disease (Table 2). In total, 31.4% of parents demonstrated "good" knowledge on influenza disease. For the seasonal influenza vaccine, 93.7% of parents reported having heard about the vaccine, 66.9% agreed that the influenza vaccine is effective in preventing influenza, and 38.8% reported that the influenza vaccine is necessary for children. Regarding the timing of vaccine administration, 63.3% of parents reported that the vaccine should be administered before the flu season starts and 28.2% of respondents did not agree that the vaccine should be administered at all. 56.9% of parents responded that the vaccine

Table 1. Sociodemographic characteristics of the participants.

Personal data		No	%
Respondent	Mother	383	75.1
	Father	127	24.9
Respondent age in years	18-25	22	4.3
	26-35	124	24.3
	36-45	259	50.8
	46-55	87	17.1
	>55	18	3.5
One of parents is health care worker	Yes	52	10.2
	No	458	89.8
Respondent education	Secondary / below	64	12.5
	Diploma	69	13.5
	Bachelor	342	67.1
	Postgraduate	35	6.9
Number of children	1-4	411	80.6
	5-7	76	14.9
	>7	23	4.5
Child's basic vaccination status	Not vaccinated at all	15	2.9
	Partially vaccinated for age	88	17.3
	Fully vaccinated for age	407	79.8
Do your child have any chronic diseases	None	443	86.9
	Asthma	43	8.4
	Thalassemia	1	0.2
	Difficult speech	1	0.2
	Thyroid disorder	4	0.8
	Psychological disorders	13	2.5
	Allergy	1	0.2
	GIT disorders	1	0.2
	DM	8	1.6
	Congenital heart disease	3	0.6
	Renal disorders	2	0.4
	Others	5	1.0

should be administered annually. Regarding adverse effects of the vaccine, most respondents reported fever as 64.1% being the most adverse effects. In total, 44.3% of the responding parents demonstrated a “good” level of knowledge regarding the seasonal influenza vaccine. Overall good knowledge level was detected among 41% of the parents. Regarding parental practices of the seasonal influenza vaccine for their children, 32.9% of the respondents themselves received the influenza vaccine and 26.1% had their children vaccinated. The main reasons for vaccinating children against influenza was advice from the Saudi Ministry of Health (56.4%), followed by advice from a medical practitioner (35.3%). On the other hand, 67.1% of parents did not receive the vaccine, and 73.9% of the children was not vaccinated. When asked about

their willingness to vaccinate their children in the future, 35.8% answered that they would. The most reported reasons for not having children vaccinated were that parents believed there was no need to vaccinate their children, as their children were healthy (50.4% of respondents) (Table 3).

In total, 87.3% of the parents trust the information about the influenza vaccine that they receive from the Saudi Ministry of Health, and 83.9% trust the information about the influenza vaccine that they receive from their doctor.

Table 4 demonstrates the distribution of parent’s knowledge level by their personal data, practice, and attitude regarding the influenza vaccine. A “good” level of knowledge was demonstrated by 41% of mothers compared to 40.9% of fathers, with no statistical significance between the two groups

($P=.993$). 54% of parents aged 26 to 35 years old demonstrated a “good” level of knowledge in comparison to 34.7% of those aged 36–45 years old, a trend with a reported statistical significance ($P=.010$). 67.3% of health care workers demonstrated a “good” level of knowledge compared to 38% of other individuals ($P=0.001$). A “good” level of knowledge was detected among 44.7% of parents with fully vaccinated children, while only 13.3% of parents of non-vaccinated children demonstrated the same ($P=.002$). In addition, 56% of parents who received the seasonal influenza vaccine, and 63.2% of those who vaccinated their children with the seasonal influenza vaccine, demonstrated a “good” level of knowledge ($P=.001$). 44.9% of parents who trust the information given to them by the Saudi Ministry of Health regarding the

Table 2. Parents’ knowledge regarding influenza disease and vaccine.

Domain	Questions	No	%
Influenza disease knowledge	Knowledge items		
	Do you think influenza is a potentially severe disease?	148*	29.0
	Do you believe that influenza carries more deaths than COVID-19” Coronavirus”?	170*	33.3
	Do you think Influenza can lead to serious complications e.g. hospitalization and death?	292*	57.3
	Do you think Influenza is a highly contagious disease?	327*	64.1
	Do you know Influenza is transmitted primarily by coughing and sneezing?	491*	96.3
	Knowledge level		
	Poor (0-3)	350	68.6
	Good (4-5)	160	31.4
Influenza vaccine knowledge	Do you think the influenza vaccine is effective in preventing the flu?	341*	66.9
	Do you think the influenza vaccine is safe?	362*	71.0
	Do you think influenza vaccine is necessary for children?	198*	38.8
	Do you know influenza vaccine is recommended for all children 6 months of age and older?	220*	43.1
	Do you think influenza vaccine is recommended to be given to children with chronic diseases?	336*	65.9
	When is the appropriate period to take influenza vaccine?		
	Before the flu season starts	323*	63.3
	During the flu season	37	7.3
	Immediately after flu season	6	1.2
	I don't believe that it should be taken	144	28.2
	How often do you think you need to take influenza vaccine?		
	Once in a life	39	7.6
	Every 6 month	23	4.5
	Every 1 year	290*	56.9
	Every 5 year	10	2.0
	Never	148	29.0
	How is the vaccine given?		
	Injection	417*	81.8
	Nasal spray	1	.2
	Mouth drop	3	.6
	I don't know	89	17.5
	What is the possible side effect of influenza vaccination?		
	Fever	327*	64.1
Muscle ache	214*	42.0	
Headache	152*	29.8	
Soreness and swelling at the injection site	209*	41.0	
Allergic reaction	192*	37.6	
Death	34	6.7	
Knowledge level			
	Poor (0-7)	284	55.7
	Good (8-13)	226	44.3
Overall knowledge	Poor (0-10)	301	59.0
	Good (11-18)	209	41.0

* Correct response.

influenza vaccine and 45.6% of those who trust the information about influenza vaccine given to them by their doctor demonstrated a “good” level of knowledge ($P=.001$). Additionally, 74.7% of mothers reported that they had never vaccinated

their child against the influenza vaccine, compared to 71.7% of fathers. 78.8% of parents between 36 to 45 years of age responded that their child had never received the influenza vaccine, compared to 63.6% of parents between 18 to 25 years of

age. Nearly half of all parents who were employed as health care workers responded that they had not had their children vaccinated, compared to approximately three-quarters of non-healthcare workers ($P=.002$). A majority (78.1%) of parents

Table 3. Parents' practice regarding seasonal influenza vaccination.

Parents practice	No	%
Did you receive influenza vaccine as a parent?		
Yes	168	32.9
No	342	67.1
Did your child receive influenza vaccine before?		
Yes	133	26.1
No	377	73.9
If yes what influence you to give your child influenza vaccine (n=133)		
My doctor	47	35.3
Saudi MOH told me it is important	75	56.4
It's available and free	18	13.5
With COVID-19 Pandemic I don't want my child to get flu	23	17.3
If No are you planning to give your child flu vaccine this year or in the future (n=377)		
Yes	135	35.8
No	242	64.2
If your answer is No, why not (n=242)		
I don't think my child need it as he/she is healthy	122	50.4
I think it doesn't have any positive effect or benefits	93	38.4
I think it is harmful/ it cause serious side effects	72	29.8
My friend advised me to reject it	23	9.5
Was not recommended by medical staff	22	9.1
I didn't hear about it before	15	6.2
I think it is painful	8	3.3
My child allergic to the flu vaccine	7	2.9
It is not available for my child	5	2.1

Table 4. Distribution of parents' knowledge level by their personal data, practice, and attitude regarding influenza vaccine.

Factors		Overall knowledge level				P-value
		Poor		Good		
		No	%	No	%	
Respondent	Mother	226	59.0	157	41.0	.993
	Father	75	59.1	52	40.9	
Respondent age in years	18-25	12	54.5	10	45.5	.010*
	26-35	57	46.0	67	54.0	
	36-45	169	65.3	90	34.7	
	46-55	53	60.9	34	39.1	
	> 55	10	55.6	8	44.4	
One of parents is health care worker	Yes	17	32.7	35	67.3	.001*
	No	284	62.0	174	38.0	
Respondent education	Secondary / below	37	57.8	27	42.2	.334
	Diploma	39	56.5	30	43.5	
	Bachelor	209	61.1	133	38.9	
	Postgraduate	16	45.7	19	54.3	
Child vaccination	Not vaccinated at all	13	86.7	2	13.3	.002*
	Partially vaccinated for age	63	71.6	25	28.4	
	Fully vaccinated for age	225	55.3	182	44.7	
Did you receive influenza vaccine as a parent?	Yes	74	44.0	94	56.0	.001*
	No	227	66.4	115	33.6	
Did your child receive influenza vaccine before?	Yes	49	36.8	84	63.2	.001*
	No	252	66.8	125	33.2	
Do you trust the information about influenza vaccine given to you by the Saudi ministry of health?	Yes	245	55.1	200	44.9	.001*
	No	56	86.2	9	13.8	
Do you trust the information about influenza vaccine given to you by your doctor?	Yes	233	54.4	195	45.6	.001*
	No	68	82.9	14	17.1	

P: Pearson χ^2 test; * $P < 0.05$ (significant).

who had secondary education or less had never vaccinated their children against influenza, compared to 54.3% of parents with a post-graduate level of education ($P=.047$).

Finally, 65.7% of mothers reported that they are not planning to vaccinate their children this year or in the future, compared to 59.3% of fathers. Of parents between 36 to 45 years of age, 67.6% reported that they are not planning to vaccinate their child against influenza this year or in the future, compared to 35.7% of parents aged 18 to 25 years old. 44.8% of parents who were health care workers reported that they were not planning to vaccinate their child against the flu this year or in the future, compared to 65.8% of non-healthcare workers ($P=.024$). 78.9% of parents who had received post-graduate education are not planning to vaccinate their children this year or in the future, compared to 48.0% of parents with secondary education or less ($P=.041$). Table 5 summarizes the findings.

Discussion

This study assessed the knowledge, practice, and attitudes toward the seasonal influenza vaccine among Saudi parents who have children 6 months of age or older at the time of the study in Al-Kharj governate of Saudi Arabia. Approximately 75% of

respondents were mothers, and almost half of them were between the ages of 36-45. In comparison to other studies, results from studies by Alolayan *et al.*¹³ and Low *et al.*¹⁵ displayed the same pattern, with some differences in the results of different age groups. In the study conducted in Pakistan, most respondents were male.¹⁶

The data from this study showed that the majority of parents (93.7%) had heard about the influenza vaccine and nearly 80% of respondents had fully vaccinated their children in accordance with the National Immunization Schedule. Data from Alolayan *et al.*¹³ and Awad S *et al.*¹⁷ regarding parental awareness about the influenza vaccine was 85.5% and 83%, respectively.

This study found that overall parental knowledge on influenza and its vaccine was inadequate. This lack of knowledge was demonstrated in multiple areas, such as in the severity of the disease and its complications. In contrast, respondents gave accurate responses in other domains, such as in their understanding of the safety and effectiveness of the vaccine. In Jordan, Awad *et al.*¹⁷ found similar results regarding the inadequate knowledge about the disease and the vaccine. Alolayan *et al.*¹³ also conducted their study in Saudi Arabia and found comparable results on overall knowledge of respondents on the influenza vaccine. The majority (56.9%) of parents did not know that the seasonal flu vaccine is recommend-

ed for all children six months of age and older. The results were also comparable to the study done in Australia by Tuckerman *et al.*¹⁸ which showed that only 32.8% of parents were aware that all children between the ages of six months and five years are recommended to receive the influenza vaccine.

This study showed a positive association between a participant's educational level and the vaccination rates of their children, a finding reflected in the results of similar literature.^{16,19} However, this study found parents with higher educational attainment and didn't vaccinate their children previously were not willing to vaccinate them in the future, in contrast to those with a secondary level of education or lower.

The most common reason for parents not vaccinating their children was that they did not think it was necessary, as their children were healthy. Other studies found the most common reason to be the parents believed influenza is not a serious illness.^{13,15} This finding could reflect the reported insufficient knowledge about influenza and its vaccine. Health campaigns that target public knowledge about influenza, the effectiveness and safety of the influenza vaccine are key to improving public health.

Table 5. Distribution of parents' willingness to vaccinate their children by parents' demographic data.

Demographic data	Did your child receive influenza vaccine before? n= 510					If No, are you planning to give your child flu vaccine this year or in the future? n= 377				
	Yes		No		P-value	Yes		No		P-value
	No.	%	No.	%		No.	%	No.	%	
Respondent										
Mother	97	25.3	286	74.7	.502	98	34.3	188	65.7	.268
Father	36	28.3	91	71.7		37	40.7	54	59.3	
Respondent age in years										
18-25	8	36.4	14	63.6		9	64.3	5	35.7	
26-35	39	31.5	85	68.5		33	38.8	52	61.2	.102
36-45	55	21.2	204	78.8	.113	66	32.4	138	67.6	
46-55	27	31.0	60	69.0		20	33.3	40	66.7	
> 55	4	22.2	14	77.8		7	50.0	7	50.0	
Parent is health care worker										
Yes	23	44.2	29	55.8		16	55.2	13	44.8	
No	110	24.0	348	76.0	.002*	119	34.2	229	65.8	.024*
Respondent education										
Secondary/ below	14	21.9	50	78.1		26	52.0	24	48.0	
Diploma	16	23.2	53	76.8	.047*	20	37.7	33	62.3	.041*
Bachelor	87	25.4	255	74.6		85	33.3	170	66.7	
Postgraduate	16	45.7	19	54.3		4	21.1	15	78.9	
Number of children										
1-4	102	24.8	309	75.2		111	35.9	198	64.1	
5-7	23	30.3	53	69.7		20	37.7	33	62.3	
> 7	8	34.8	15	65.2	.380	4	26.7	11	73.3	.729

P: Pearson χ^2 test; * $P < 0.05$ (significant).

Conclusions

Most respondents were aware of the seasonal influenza vaccine and their children were up to date with their basic vaccination according to the National Immunization Schedule. However, the main reason some parents did not vaccinate their children against seasonal influenza was inadequate knowledge about the disease and the vaccine. Health care workers and the Ministry of Health should therefore increase their efforts to improve public knowledge and perceptions about influenza and the vaccine.

Limitations

Study participants were chosen from one geographical area in Saudi Arabia, which may have introduced bias in the results due to possible associations between the tendencies of the region and parental willingness to vaccinate their children. However, this study included many participants in order to counteract this potential bias, and the results were similar to previous literature findings.

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