

Knowledge and practice toward seasonal influenza vaccine and its barriers at the community level in Riyadh, Saudi Arabia

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ABSTRACT

Background: The important role of vaccination and preventive health care has been shown in several studies conducted worldwide. Despite the annual high infection rate of influenza, there are still many people who opt not to get vaccinated and be protected. We conducted this study to explore the knowledge, practices, and barriers of a Saudi Arabian population toward influenza vaccination. **Methods:** We conducted a community-based cross-sectional study using a questionnaire that was distributed online through social media to adult males and females aged 18 years old and above in Riyadh, Saudi Arabia. **Results:** A total of 778 individuals responded to the survey, 193 (24.8%) males and 585 (75.2%) females. Male respondents tended to have a better knowledge of influenza and flu vaccine than females. However, there were more females who have been vaccinated. More males believed that they do not belong to the high-risk group compared to females ($P < 0.001$). The younger age group of respondents significantly had a better knowledge of flu vaccine and influenza ($P < 0.05$). On the other hand, the older age group of respondents (age 45–60 and age >60 years old) have more reasons and barriers to have the vaccine. **Conclusion:** Knowledge of influenza and flu vaccine is relatively high, but the translation of this knowledge into practice is poor. The paradigm shift should be focused not only on knowledge of vaccines and vaccination but to attitudes and practices that will address barriers to getting the vaccine.

Keywords: Adherence, barriers, influenza vaccine, knowledge, practice

Introduction

Influenza is the commonest infection that can be transmitted through airborne which affects around 5%–10% of the world's population leading to an annual mortality rate of 250 000–500 000.^[1,2] According to the World Health Organization (WHO), vaccination toward influenza is recommended for high-risk population such as children, hospitalized patients, pregnant women, and health care workers.^[3] Furthermore, the American Center for Disease Control and Prevention (ACDCP) recommend annual vaccination for people older than 6 months.^[4]

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Received: 15-11-2019

Revised: 05-02-2020

Accepted: 11-02-2020

Published: 26-03-2020

In Saudi Arabia, influenza vaccines are offered free of charge for all population.^[5]

The important role of vaccination and preventive health care has been shown in several studies conducted worldwide. Self-protection has been one of the most important reasons for vaccination compliance among health care workers in a German university hospital.^[6] Because of the advent of new influenza strains, many countries have initiated mass immunizations.^[7] Apart from the emergence of new strains, the annual epidemics of seasonal influenza pose a significant burden on the society including hospitalizations, absences at work, and even fear from the general population.^[8]

Despite the annual high infection rate of influenza, there are still many people who opt not to get vaccinated and be protected.

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How to cite this article: Aljamili AA. Knowledge and practice toward seasonal influenza vaccine and its barriers at the community level in Riyadh, Saudi Arabia. *J Family Med Prim Care* 2020;9:1331-9.

Access this article online

Quick Response Code:



Website:
www.jfmipc.com

DOI:
10.4103/jfmipc.jfmipc_1011_19

Several factors and reasons have come into play for people who do not get them vaccinated. For one is lack of knowledge and attitude toward the vaccine.^[9] In one study, half of the pregnant women were not aware of the recommendations for vaccination during pregnancy, and 80% believed that the vaccine can cause birth defects, whereas another study showed a very low 13.1% of pregnant women who were aware that they have to be vaccinated and safe to receive a vaccine for influenza.^[10,11] Among health care workers, the knowledge of influenza vaccine was reported to be low from 52% to 81%.^[12-14] Compared to individuals working in a health care facility or individuals who have some medical background, knowledge and awareness of the importance of vaccination for influenza among the general population is relatively low at 23.6%.^[15]

Another barrier for influenza vaccination is the lack of time. A study conducted in the Eastern Mediterranean countries showed that the lack of time to get vaccinated is the main factor for not receive the influenza vaccine among health care worker.^[16] A study in Saudi Arabia showed that health care workers avoid getting vaccinated for influenza because of their misconception that vaccine itself causes influenza and concept about efficiency.^[17] Other identified barriers for influenza vaccination include pain/discomfort,^[18] previous side effects,^[18] psychological factors,^[19] belief that they are not at risk,^[20] and misinformation or unawareness of the importance of vaccination from their doctors or health care workers.^[21-23]

Because of the compendium of factors and barriers toward influenza vaccination, our aim of this study was to explore the knowledge, practices, and barriers of a Saudi Arabian population toward influenza vaccination.

Method

We conducted a community-based cross-sectional study using a questionnaire in <http://surveyMonkey.com> that was distributed online through social media applications - Twitter, WhatsApp and Snapchat to individuals in Riyadh, Saudi Arabia. All adult males and females aged 18 years old and above were invited to participate in the study. Individuals less than 18 years old and non-residents of Riyadh city were excluded from the study.

The questionnaire consisted of three sections (demographic profile including age, gender, marital status, education, place of residence, employment, smoking and presence of chronic illness, 13 questions on knowledge of influenza vaccine, 3 questions on practice toward influenza vaccine, and 13 questions on barriers for not taking influenza vaccine). The questionnaire was developed using questions from the previous similar studies in English then translated to Arabic, and a pilot study was conducted on 20 volunteers to determine the validity and reliability of the questionnaire.^[5,24,25]

Sample size was calculated based on 95% confidence level, 3% margin of error, and a prevalence of 9.5% (based on the lowest

proportion of knowledge among Saudi population regarding safety of the vaccine in pregnant women according to Alqahtani *et al.*),^[5] and a non-response rate of 50%. The calculated target sample size was 734.

Data was entered into a computer using standardized entry codes. For all tests, statistical significance was set at $P < 0.05$. Descriptive statistics were used to present means and standard deviation (for continuous variables), and numbers and percentages (for categorical variables). Independent t-test and analysis of variation (ANOVA) were used to determine significant differences between continuous variables and chi-square tests to compare age groups and other categorical demographic variables. All analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 23.0 (SPSS, IBM, Armonk, New York, USA).

All participants were informed about the aim of the study in the first page of the electronic survey. To ensure confidentiality, responses were collected anonymously, with no personal information such as names, IDs, contact numbers, or e-mails required. The study was approved by an institutional review board of King Fahad Medical City, Riyadh, Saudi Arabia [IRB:H-01-R-012].

Results

The link was sent to 860 adults and 778 had responded to the survey with a response rate of 91% and 193 (24.8%) males and 585 (75.2%) females. There were 767 (98.6%) Saudi nationals, and 11 (1.4%) were of other nationalities. Table 1 shows the demographic characteristics of the respondents.

Table 2 shows the responses to the questions on the general knowledge about influenza vaccine. A larger number of respondents believe that flu is highly contagious (86.9%), that the infection can be serious that needs hospitalization of the patient (82.6%), flu vaccine is recommended for all individuals with chronic disease (60.0%), 61.8% said flu vaccine is the best way for protection and 58.0% mentioned that it will avoid complications against influenza, and that it is safe and effective (53.6%). However, 54.8% of respondents believe that flu vaccine weakens the immune system and can render anyone susceptible to infections. On the other hand, 44.2% respondents did not know that pregnant women should take the vaccine, 57.1% was unaware that it was recommended for children 6 months of age and above, and 48.1% for adults >65 years of age respectively. Less than half ($n = 325$, 41.8%) of the respondents are planning to have the vaccine this year, whereas 428 (55.0%) had already been vaccinated majority through Hajj permit requirement ($n = 121$, 15.6%) and through physician recommendation ($n = 120$, 15.4%). The most common reason/barrier for not having the flu vaccine was bad experience with the previous flu vaccination ($n = 618$, 79.4%), followed by the notion that they do not belong to the group of individuals that needs to have flu vaccination ($n = 410$, 52.7%), and fear of injections ($n = 402$, 51.7%).

Table 1: Demographic characteristics of 778 survey respondents

Demographic variables	n	%
Gender		
Male	193	24.8
Female	585	75.2
Nationality		
Saudi	767	98.6
Non-Saudi	11	1.4
Age groups, in years		
18-30	353	45.4
30-45	237	30.5
45-60	171	22.0
>60	17	2.2
Years as resident of Riyadh		
<1 year	38	4.9
1-5 years	51	6.6
>5 years	689	8.6
Marital status		
Single	291	37.4
Married	487	62.6
Education		
Primary	110	14.1
High level	112	14.4
University	556	71.5
Employment		
Employed	393	50.5
Unemployed	385	49.5
Presence of chronic disease		
None	668	85.9
Asthma	53	6.8
Heart disease	10	1.3
COPD	6	0.8
Diabetes Mellitus	41	5.3
Smoking		
Yes	69	8.9
No	709	91.1

Table 3 shows the percentage of responses to questions on knowledge, practice, and barriers according to gender and age groups. Males significantly believe that annual vaccination protects from flu (68.9% vs. 59.5%, $P = 0.019$), that vaccination prevents flu complications (65.3% vs. 55.3%, $P = 0.018$), that flu vaccine is given in winter (76.2% vs. 67.2%, $P = 0.019$). However, there were significantly more females who were vaccinated (60.5% vs. 49.2%, $P = 0.006$), and more females avoid medications (36.9% vs. 28.0%, $P = 0.024$), think that flu is a simple disease and no need to have vaccination (40.5% vs. 30.6%, $P = 0.014$), that flu vaccine increases the risk of acquiring flu (22.2% vs. 14.5%, $P = 0.021$), do not believe that flu vaccine is safe (48.5% vs. 33.7%, $P < 0.001$), that a flu shot makes them sick (29.7% vs. 11.4%, $P < 0.001$). On the other hand, there were more males who believe that they do not belong to the high-risk group compared to females (64.8% vs. 48.7%, $P < 0.001$). The younger age group of respondents significantly have a better knowledge of flu vaccine and influenza ($P < 0.05$), and planning to have the vaccine ($P = 0.007$). On the other hand, the older age group of respondents (age 45–60 and age >60 years old) have more reasons and barriers to have the vaccine.

Table 4 shows the percentage of responses to questions on knowledge, practice, and barriers according to marital status, level of education, and employment status. Single individuals, individuals with higher level of education (high school and college level/university), and those employed tend to have a better knowledge of influenza and flu vaccine ($P < 0.05$). 46.4% married respondents received the vaccine than 34.0% single individuals ($P = 0.001$) significantly more married individuals avoid medications, who thinks that flu is a simple disease, who thinks that flu shot makes them sick, had bad experiences with flu vaccine, and has fear of injections ($P < 0.05$). Respondents who have a lower level of education (primary level) tend to get vaccinated ($P = 0.004$); however, they think that flu is a simple disease and there is no need for vaccination ($P < 0.001$), risk of acquiring influenza is low ($P = 0.011$), that flu shot makes them sick ($P < 0.001$), and has fear of injections ($P = 0.002$).

Logistic regression showed that being employed was the most significant factor for knowledge (Beta = 0.180, $t = 4.647$, $P < 0.001$). Married women were the most significant factors to practice vaccination (Beta = 0.100, $t = 2.678$, $P = 0.008$, and Beta = 0.155, $t = 3.404$, $P = 0.001$). For barriers, male gender, unemployment, and being single were the most significant factors for not getting vaccinated (Beta = 0.122, $t = 3.257$, $P = 0.001$, Beta = -0.146, $t = -3.786$, $P < 0.001$, and Beta = -0.090, $t = -1.979$, $P = 0.048$).

Discussion

This study aimed to explore the knowledge, practices, and barriers of a Saudi Arabian population toward influenza vaccination. Considering that our respondents were taken from the general population, the knowledge of influenza and flu vaccination (with percentages above 50%) in most of the questions that were asked was encouraging which showed that a larger percentage of our respondents have a very good knowledge and understanding of flu vaccine and the importance of vaccination to prevent the disease. Our results are significantly higher than those reported from the previous studies in which knowledge ranged from 23.1% to 52%.^[12-15]

It was identified that 5 to 6 in ten respondents had flu vaccination because it is a requirement for Hajj pilgrimage, and only 1 to 2 of ten respondents had vaccination because of doctor's recommendation. This suggests that people in this region do get vaccinated because of their need to fulfill a requirement, but not because of their need to be protected from a contagious disease. In fact, more than half of the respondents believed that there is no need for them to have the vaccine because "they do not belong" to the group of individuals that needs to have flu vaccination. The statement that "getting flu vaccine will make you sick" has been mongered by a lot of individuals and this created the misconception toward vaccines in general. In fact, the US Center for Disease Control (CDC) has argued on this statement that "getting the flu vaccine is better than getting the flu."^[20]

Table 2: Responses to questions on knowledge, practice, and barriers to influenza vaccination among 778 respondents according to gender and age groups, n (%)

Questions on knowledge, practice, and barriers/reasons for influenza vaccination	Yes	No/Do not know
Knowledge		
Flu infection is highly contagious	676 (86.9)	102 (13.1)
Flu infection can sometimes be serious that a person must be admitted to the hospital	643 (82.6)	135 (17.4)
All pregnant women are advised to take the flu vaccine	292 (37.5)	486 (62.5)
Seasonal influenza vaccine is recommended to be given to all individuals with chronic disease	467 (60.0)	311 (40.0)
Annual vaccination is the best way to protect one from influenza	481 (61.8)	297 (38.2)
The best way to avoid the complications of influenza is by having seasonal vaccination	451 (58.0)	327 (42.0)
Influenza vaccine is safe and effective	417 (53.6)	361 (46.4)
Influenza vaccine is given during winter	540 (69.4)	238 (30.6)
Seasonal influenza vaccine is freely provided in every primary healthcare facility	270 (34.7)	508 (65.3)
Flu vaccine can cause influenza	131 (16.8)	647 (83.2)
Seasonal influenza vaccine weakens the immune system and renders one susceptible to infections	426 (54.8)	352 (44.2)
Influenza vaccine is recommended for children 6 months of age and above	231 (29.7)	547 (70.3)
Influenza vaccine is recommended for elderly individuals aged >65 years old	332 (42.7)	446 (57.3)
Practice		
I am planning to take influenza vaccine this year	325 (41.8)	453 (58.2)
I have been vaccinated with influenza vaccine	428 (55.0)	350 (45.0)
I have been vaccinated because:		
Recommended by a doctor	120 (15.4)	
Recommended by family/friend	70 (9.0)	
Job demand	77 (9.9)	
Hajj requirement	121 (15.6)	
Media campaign	40 (5.1)	
Barriers/Reasons		
Avoid medications	270 (34.7)	508 (65.3)
Thinks that flu is a simple disease and there is no need to prevent or vaccinate against it	296 (38.0)	482 (62.0)
Concerned about the side effects	259 (33.3)	519 (66.7)
Risk of acquiring the disease is low	158 (20.3)	620 (79.7)
Do not believe that the vaccine is effective	107 (13.8)	671 (86.2)
Do not believe that the vaccine is safe	349 (44.9)	429 (55.1)
The flu shot will make them sick	196 (25.2)	582 (74.8)
Do not know where to go and get vaccinated	333 (42.8)	445 (57.2)
Bad experience with the previous flu vaccine	618 (79.4)	160 (20.6)
Do not think that they belong to a group that is recommended to get vaccinated	410 (52.7)	368 (47.3)
Fear of injections	402 (51.7)	376 (48.3)
Forgot	333 (42.8)	445 (57.2)
The Ministry of Health had not made vaccination obligatory	315 (40.5)	463 (59.4)

Another peculiar finding in this study is why there are significantly more males who believe that flu vaccination protects one from influenza and its complications, but on the other hand, more females actually get vaccinated despite that some of them avoid vaccinations and several other barriers that prevent them from vaccination. In some countries, the increase in annual flu vaccination among men significantly increased because of the increase in Medicare coverage among men than women.^[27] On the other hand, in contrast to other reports, there are more women who have the intention to get vaccinated during pregnancy and even get their children vaccinated.^[28] Females may not have the intention to get vaccinated because they have a lower antibody response compared to males and cross-reactivity of antibodies might be higher among females than males, and local adverse reactions were reportedly high among females than males.^[29]

This study also showed that young adults have the tendency to acquire knowledge and learn about the vaccine and influenza compared to older people. The reason for this was that most of our respondents who have knowledge of influenza and flu vaccine were educated either in their higher levels of education or at university level. However, this did not translate to actually having the vaccine. Our results showed that among our respondents who actually planned to have the vaccine was significantly lower among age groups 18–30 and 30–45 (35.1% and 46.0%) compared to the older age groups 45–60 and >60 (49.1% and 47.1%).

The other hand, there were more males who believe that they do not belong to the high-risk group compared to females (64.8% vs. 48.7%, $P < 0.001$). The younger adults significantly have a better knowledge of flu vaccine and influenza ($P < 0.05$), planning to have the vaccine ($P = 0.007$). But the older adults (age 45–60 and

Table 3: Frequency distribution and association between gender and age groups with questions on knowledge, attitudes, and practices toward flu vaccination among 778 respondents

Questions	Gender		P	Age groups				P
	Male Yes/ No n (%)	Female Yes/ No n (%)		18-30 Yes/ No n (%)	30-45 Yes/ No n (%)	45-60 Yes/ No n (%)	>60 Yes/ No n (%)	
General knowledge								
Flu is highly contagious	168/25 (87.0/13.0)	508/168 (86.8/13.2)	0.941	306/47 (86.7/13.3)	209/28 (88.2/11.8)	147/24 (86.0/14.0)	14/3 (82.4/17.6)	0.850
Flu can be serious/patient admitted to hospital	158/35 (81.9/18.1)	485/100 (82.9/17.1)	0.741	302/51 (85.6/14.4)	192/45 (81.0/19.0)	139/32 (81.3/18.7)	10/7 (58.8/41.2)	0.024*
Pregnant women should take the vaccine	69/124 (35.8/64.2)	223/362 (38.1/61.9)	0.556	158/195 (4.8/55.2)	78/159 (32.9/67.1)	53/11 (31.0/69.0)	3/14 (17.6/82.4)	0.001*
Flu vaccine is recommended to people with chronic disease	109/84 (56.5/43.5)	358/227 (61.2/38.8)	0.246	203/150 (57.5/42.5)	140/97 (59.1/40.9)	114/57 (66.7/33.3)	10/7 (58.8/41.2)	0.243
Annual vaccination protects from flu	133/60 (68.9/31.1)	348/237 (59.5/40.5)	0.019*	235/18 (66.6/33.4)	132/105 (55.7/44.3)	103/68 (60.2/39.8)	11/6 (64.7/35.3)	0.061
Vaccination prevents flu complications	126/67 (65.3/34.7)	325/260 (55.6/44.4)	0.018*	227/126 (64.3/35.7)	120/117 (50.6/49.4)	95/76 (55.6/44.4)	9/8 (52.9/47.1)	0.009*
Flu vaccine is effective and safe	111/82 (57.5/42.5)	306/279 (52.3/47.7)	0.209	162/191 (45.9/54.1)	128/109 (54.0/46.0)	112/59 (65.5/34.5)	15/2 (88.2/11.8)	<0.001*
Flu vaccine is given in winter	147/46 (76.2/23.8)	393/192 (67.2/32.8)	0.019*	254/99 (72.0/28.0)	160/77 (67.5/32.5)	117/54 (68.4/31.6)	9/8 (52.9/47.1)	0.292
Flu vaccine is free	74/119 (38.3/61.7)	196/389 (33.5/66.5)	0.221	144/209 (40.8/59.2)	77/160 (32.5/67.5)	47/124 (27.5/72.5)	2/15 (11.8/88.2)	0.003*
Flu vaccine can cause influenza	27/166 (14.0/86.0)	104/481 (17.8/82.2)	0.223	51/302 (14.4/85.6)	48/189 (20.3/79.7)	31/140 (18.1/81.9)	1/16 (59/94.1)	0.166
Flu vaccine weakens the immune system	117/76 (60.6/39.4)	309/276 (52.8/47.2)	0.059	191/162 (54.1/45.9)	122/115 (51.5/48.5)	103/68 (60.2/39.8)	10/7 (58.8/41.2)	0.351
Flu vaccine is recommended for children 6 months of age and above	67/126 (34.7/65.3)	164/421 (28.0/72.0)	0.078	124/229 (35.1/64.9)	65/172 (27.4/72.6)	40/131 (23.4/76.6)	2/15 (11.8/88.2)	0.010*
Flu vaccine is recommended for elderly >65 years	83/110 (43.0/57.0)	249/336 (42.6/57.4)	0.914	141/212 (39.9/60.1)	94/143 (39.7/60.3)	89/82 (52.0/48.0)	8/9 (47.1/529)	0.042*
Practice								
Planning to have the vaccine this year	72/121 (37.3/62.7)	253/332 (43.2/56.8)	0.147	124/229 (35.1/64.9)	109/128 (46.0/54.0)	84/87 (49.1/50.9)	8/9 (47.1/52.9)	0.007*
Have been vaccinated	95/98 (49.2/50.8)	54/231 (60.5/39.5)	0.006*	175/178 (49.6/50.4)	160/77 (67.5/32.5)	107/64 (62.6/37.4)	7/10 (41.2/58.8)	<0.001*
Reasons/Barriers								
Avoid medications	54/139 (28.0/72.0)	216/369 (36.9/63.1)	0.024*	99/254 (28.0/72.0)	98/139 (41.4/58.6)	67/104 (39.2/60.8)	6/11 (35.3/64.7)	0.005*
Thinks flu is a simple disease/no need for vaccine	59/134 (30.6/69.4)	237/348 (40.5/59.5)	0.014*	90/263 (25.5/74.5)	122/115 (51.5/48.5)	77/94 (45.0/55.0)	7/10 (41.22/58.8)	<0.001*
Concerned with side effects	54/139 (28.0/72.0)	205/380 (35.0/65.0)	0.071					
Risk of acquiring influenza is low	28/165 (14.5/85.5)	130/455 (22.2/77.8)	0.021*	94/259 (26.6/73.4)	101/136 (42.6/57.4)	59/112 (34.5/65.5)	5/12 (29.4/70.6)	0.001*
Do not believe vaccine is effective	28/165 (14.5/85.5)	79/506 (13.5/86.5)	0.726	78/275 (22.1/77.9)	52/185 (21.9/78.1)	25/146 (14.6/85.4)	3/14 (17.6/82.4)	0.205
Do not believe that vaccine is safe	65/128 (33.7/66.3)	284/301 (48.5/51.5)	<0.001*	54/299 (15.3/84.7)	35/202 (14.8/85.2)	15/156 (8.8/91.2)	3/14 (17.6/82.4)	0.194
Flu shot makes them sick	22/171 (11.4/88.6)	174/411 (29.7/70.3)	<0.001*	140/213 (39.7/60.3)	118/119 (49.8/50.2)	85/86 (49.7/50.3)	6/11 (35.3/64.7)	0.038*
Do not know where to go	82/111 (42.5/57.5)	251/334 (42.9/57.1)	0.919	74/279 (21.0/79.0)	73/164 (30.8/69.2)	48/123 (28.1/71.9)	1/16 (5.9/94.1)	0.010*
Bad experience with the previous vaccine	151/42 (78.2/21.8)	467/118 (79.8/20.2)	0.635	174/179 (49.3/50.7)	90/147 (38.0/62.0)	60/111 (35.1/64.9)	9/8 (52.9/47.1)	0.004*
Do not think they do not belong to the high-risk group	125/68 (64.8/35.2)	285/300 (48.7/51.3)	<0.001*	256/97 (72.5/27.5)	202/35 (85.22/14.8)	145/26 (84.8/15.2)	15/2 (88.2/11.8)	<0.001*
Fear of injections	89/104 (46.1/53.9)	313/272 (53.5/46.5)	0.075	202/151 (57.2/42.8)	108/129 (45.6/54.4)	89/82 (52.0/48.0)	11/6 (64.7/35.3)	0.033*

Contd...

Table 3: Contd...

Questions	Gender		P	Age groups				P
	Male Yes/ No n (%)	Female Yes/ No n (%)		18-30 Yes/ No n (%)	30-45 Yes/ No n (%)	45-60 Yes/ No n (%)	>60 Yes/ No n (%)	
Forgot to get vaccinated	83/110 (43.0/57.0)	250/335 (42.7/57.3)	0.876	154/199 (43.6/56.4)	134/103 (56.5/43.5)	104/67 (60.8/39.2)	10/7 (58.8/41.2)	0.001*
The MoH have not made vaccination obligatory	103/90 (53.4/46.6)	212/373 (36.2/63.8)	<0.001*	160/193 (45.3/54.7)	83/154 (35.0/65.0)	63/108 (36.8/63.2)	9/8 (52.9/47.1)	0.038*

*Significant

Table 4: Frequency distribution and association between marital status, level of education, and employment with questions on knowledge, attitudes, and practices toward flu vaccination among 778 respondents

Questions	Marital status		P	Level of education			P	Employment		P
	Single Yes/No n (%)	Married Yes/No n (%)		Primary Yes/No n (%)	Higher school Yes/ No n (%)	College/ Univ Yes/ No n (%)		Employed Yes/No n (%)	Unemployed Yes/No n (%)	
General knowledge										
Flu is highly contagious	257/34 (88.3/11.7)	419/68 (86.0/14.0)	0.362	87/23 (79.1/20.9)	106/6 (94.6/5.4)	483/73 (86.9/13.1)	0.003*	326/59 (84.7/15.3)	350/43 (89.1/10.9)	0.070
Flu can be serious/patient admitted to hospital	248/43 (85.2/14.8)	395/92 (81.1/18.9)	0.143	78/32 (70.9/29.1)	102/10 (91.1/8.9)	463/93 (83.3/16.7)	<0.001*	319/66 (82.9/17.1)	324/69 (82.4/17.6)	0.879
Pregnant women should take the vaccine	130/11 (44.7/55.3)	162/325 (33.3/66.7)	0.001*	29/81 (26.4/73.6)	52/50 (55.4/44.6)	201/355 (36.2/63.8)	<0.001*	130/255 (33.8/66.2)	162/231 (41.2/58.8)	0.032*
Flu vaccine is recommended to people with chronic disease	164/127 (56.4/43.6)	303/184 (62.2/37.8)	0.106	55/55 (50/50)	87/25 (77.7/22.3)	325/231 (58.5/41.5)	<0.001*	211/174 (54.8/45.2)	256/137 (65.1/34.9)	0.003*
Annual vaccination protects from flu	193/98 (66.3/33.7)	288/199 (59.1/40.9)	0.046*	56/54 (50.9/49.1)	81/31 (72.3/27.7)	344/212 (61.9/38.1)	0.005*	232/153 (60.3/39.7)	249/144 (63.4/36.6)	0.374
Vaccination prevents flu complications	189/102 (64.9/35.1)	262/225 (53.8/46.2)	0.002*	50/60 (45.5/54.5)	84/28 (75.0/25.0)	317/239 (57.0/43.0)	<0.001*	207/178 (53.8/46.2)	244/149 (62.1/37.9)	0.019*
Flu vaccine is effective and safe	129/162 (44.3/55.7)	288/199 (59.1/40.9)	<0.001*	64/46 (58.2/41.8)	72/40 (64.3/35.7)	281/275 (50.5/49.5)	0.017*	178/207 (46.2/53.8)	239/154 (60.8/39.2)	<0.001*
Flu vaccine is given in winter	201/90 (69.1/30.9)	339/148 (69.6/30.4)	0.875	69/41 (62.7/37.3)	84/28 (75.0/25.0)	387/169 (69.6/30.4)	0.137	256/129 (66.5/33.5)	284/109 (72.3/27.7)	0.081
Flu vaccine is free	122/169 (41.9/58.1)	148/339 (30.4/69.6)	0.001*	30/80 (27.3/72.7)	40/72 (35.7/64.3)	200/356 (36.0/64.0)	0.210	138/247 (35.8/64.2)	132/261 (33.6/66.4)	0.509
Flu vaccine can cause influenza	38/253 (13.1/86.9)	93/394 (19.1/80.9)	0.029*	24/86 (21.8/78.2)	8/104 (7.1/92.9)	99/457 (17.8/82.2)	0.007*	71/314 (18.4/81.6)	60/333 (15.3/84.7)	0.237
Flu vaccine weakens the immune system	157/134 (5.0/46.0)	269/218 (55.2/44.8)	0.728	52/58 (47.3/52.7)	73/39 (65.2/34.8)	301/255 (54.1/45.9)	0.024*	198/187 (51.4/48.6)	228/165 (58.0/42.0)	0.065
Flu vaccine is recommended for children 6 month of age and above	98/193 (33.7/66.3)	133/354 (27.3/72.7)	0.060	23/87 (20.9/79.1)	56/50 (50/50)	152/404 (27.3/72.7)	<0.001*	86/299 (22.3/77.7)	145/248 (36.9/63.1)	<0.001*
Flu vaccine is recommended for elderly >65 years	116/175 (39.9/60.1)	216/271 (44.4/55.6)	0.220	42/68 (38.2/61.8)	69/43 (61.6/38.4)	221/335 (39.7/60.3)	<0.001*	135/250 (35.1/64.9)	197/196 (50.1/49.9)	<0.001*
Practice										
Planning to have the vaccine this year	99/192 (34.0/66.0)	226/261 (46.4/53.6)	0.001*	65/45 (59.1/40.9)	30/82 (26.8/73.2)	230/326 (41.4/58.6)	<0.001*	169/216 (43.9/56.1)	156/237 (39.7/60.3)	0.235
Have been vaccinated	140/151 (48.1/51.9)	309/178 (63.4/36.6)	<0.001*	74/36 (67.3/32.7)	51/61 (45.5/54.5)	324/232 (58.3/41.7)	0.004*	227/158 (59.0/41.0)	222/171 (56.5/43.5)	0.485
Reasons/Barriers										
Avoid medications	80/211 (27.5/72.5)	190/297 (39.0/61.0)	0.001*	55/55 (50/50)	25/87 (22.3/77.7)	190/366 (34.2/65.8)	<0.001*	136/249 (35.3/64.7)	134/259 (34.1/65.9)	0.719
Thinks flu is a simple disease/no need for vaccine	73/218 (25.1/74.9)	223/264 (45.8/54.2)	<0.001*	62/48 (56.4/43.6)	25/87 (22.3/77.7)	209/347 (37.6/62.4)	<0.001*	144/241 (37.4/62.6)	152/241 (38.7/61.3)	0.714
Concerned with side effects	86/205 (29.6/70.4)	173/314 (35.5/64.5)	0.087	46/64 (41.8/58.2)	24/88 (21.4/78.6)	189/367 (34.0/66.0)	0.004*	129/256 (33.5/66.5)	130/263 (33.1/66.9)	0.899
Risk of acquiring influenza is low	71/220 (24.4/75.6)	87/400 (17.9/82.1)	0.028*	29/81 (26.4/73.6)	12/100 (10.7/89.3)	117/439 (21.0/79.0)	0.011*	97/288 (25.2/74.8)	61/332 (15.5/84.5)	0.001*

Contd...

Table 4: Contd...

Questions	Marital status		P	Level of education			P	Employment		P
	Single Yes/No n (%)	Married Yes/No n (%)		Primary Yes/No n (%)	Higher school Yes/ No n (%)	College/ Univ Yes/ No n (%)		Employed Yes/No n (%)	Unemployed Yes/No n (%)	
Do not believe vaccine is effective	47/244 (16.2/83.8)	60/427 (12.3/87.7)	0.133	13/97 (11.8/88.2)	9/103 (8.0/92.0)	85/471 (15.3/84.7)	0.103	51/334 (13.2/86.8)	56/337 (14.2/85.8)	0.685
Do not believe that vaccine is safe	118/173 (40.5/59.5)	231/256 (47.4/52.6)	0.062	53/57 (48.2/51.8)	39/73 (34.8/65.2)	257/299 (46.2/53.8)	0.065	183/202 (47.5/52.5)	166/227 (42.2/57.8)	0.138
Flu shot makes them sick	60/231 (20.6/79.4)	136/351 (27.9/72.1)	0.023*	41/69 (37.3/62.7)	11/101 (9.8/90.2)	144/412 (25.9/74.1)	<0.001*	118/267 (30.6/69.4)	78/315 (19.8/80.2)	0.001*
Do not know where to go	143/14 (49.1/50.9)	190/297 (39.0/61.0)	0.006*	49/61 (44.5/55.5)	43/69 (38.4/61.6)	241/315 (43.3/56.7)	0.579	189/196 (49.1/50.9)	144/249 (36.6/63.4)	<0.001*
Bad experience with previous vaccine	214/77 (73.5/26.5)	404/83 (83.0/17.0)	0.002*	85/25 (77.3/22.7)	92/20 (82.1/17.9)	441/115 (79.3/20.7)	0.663	309/76 (80.3/19.7)	309/84 (78.6/21.4)	0.573
Do not think they do not belong to the high-risk group	165/126 (56.7/43.3)	245/242 (50.3/49.7)	0.084	54/56 (49.1/50.9)	77/35 (68.8/31.2)	279/277 (50.2/49.8)	0.001*	182/203 (47.3/52.7)	228/165 (58.0/42.0)	0.003*
Fear of injections	128/163 (44.0/56.0)	274/213 (56.3/43.7)	0.001*	68/42 (61.8/38.2)	43/69 (38.4/61.6)	291/265 (52.3/47.7)	0.002*	213/172 (55.3/44.7)	189/204 (48.1/51.9)	0.044*
Forgot to get vaccinated	164/127 (56.4/43.6)	264/223 (54.2/45.8)	0.563	60/51 (53.6/46.4)	80/32 (71.4/28.6)	289/267 (52.0/48.0)	0.001*	187/198 (48.6/51.4)	241/152 (61.3/38.7)	<0.001*
The MoH have not made vaccination obligatory	128/163 (44.0/56.0)	187/300 (38.4/61.6)	0.124	41/69 (37.3/62.7)	58/54 (51.8/48.2)	216/340 (38.8/61.2)	0.030*	140/245 (36.4/63.6)	175/218 (44.5/55.5)	0.020*

*Statistical significance at 5% level

age >60 years old) had more reasons and barriers to take the vaccine. Young adults get vaccinated because they perceive the vaccine as effective, safe, and consider themselves as susceptible to the disease.^[30]

Barriers of vaccination correlated to the male gender, the unemployed, and being single. Surprisingly as mentioned earlier, our male respondents had good knowledge of the vaccine and influenza but in reality does not get themselves vaccinated. This may have something to do with the males' assumption of them not being at risk for influenza (64.8%). This is similar to the findings of Abalkhail *et al.*, where the assumption of not being at risk was a significant barrier toward vaccination. However, in contrast to our study, their study showed that males had lower knowledge scores and at the same time had lower vaccination rate than females.^[1] The unemployed and those with low level of education together with religious and cultural beliefs were found to be the most commonly cited obstacles to vaccination acceptance.^[31] Being single (unmarried) has been found to be a risk factor for lower immunization rates because single individuals are less likely to frequently utilize health care services, and they are most likely to live with their parents, brothers, and sister who are most likely to be vaccinated.^[32]

With regards to the implementation of vaccination programs and evade the low vaccine acceptance and utilization, there is a need to address the fears of people toward vaccines and increase awareness of their health status particularly among those who are at risk for severe influenza illness.^[33] A large-scale influenza vaccination promotion using text messaging was found to increase vaccination by 23.2%, although individuals responded more to messages that highlighted rewards to be received for obtaining a flu shot.^[34] Furthermore, primary care physicians should intensively promote vaccination because vaccination

recommendation by a physician and information dissemination regarding vaccines and vaccination to patients significantly increase vaccination rates.^[35]

The relevance of this prevalence study to primary care practice is that it gives us an idea and understanding on how the general population, particularly among Saudis, knows influenza vaccine and how they perceive the importance of vaccination and how many of individuals actually get themselves vaccinated. Furthermore, this study also helps primary care physicians to institute practice measures to deliver optimal care and prevention of communicable disease such as influenza, and also prevent complications brought about by the disease.

Conclusion

Knowledge of influenza and flu vaccine is relatively high, but the translation of this knowledge into practice is poor. The paradigm shift should be focused not only on knowledge of vaccines and vaccination but to attitudes and practices that will address barriers to getting the vaccine particularly among the unemployed, single individuals, and male members of the Saudi population. There is a need for health authorities and researchers to further investigate this disparity why Saudi population does not get vaccinated despite their knowledge of influenza and flu vaccine.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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