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## RESEARCH ARTICLE

# KNOWLEDGE AND ATTITUDE TO INFLUENZA VACCINATION IN FAMILY MEDICINE RESIDENTS IN MAKKAH CITY, SAUDI ARABIA

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### ABSTRACT

**Aim:** To assess the knowledge, attitude and believe regarding influenza vaccination in family medicine residents. **Material and Methods:** A cross-sectional study was carried out among family medicine residents at Makkah Al-Mokrramah joint program, Saudi Arabia. A questionnaire was administered by web based survey in September – November 2020. It composed of 5 sections; general information of participants, their awareness, knowledge, attitude and practices regarding influenza vaccine. **Results:** One hundred and sixty three (n=163) family medicine residents have included in the final report. More than half of them (51.5%) were females. Almost half of them (49.7%) were aware of the published guidelines Advisory Committee on Immunization Practices (ACIP), Scientific Committee for Influenza and Pneumococcal Vaccination (SCIPV) or CDC for influenza immunization; particularly among R4 residents, p=0.034. Male physicians were more likely than females to believe that administering the influenza vaccine should be part of their medical practice (91.1% vs. 78.6%), p=0.026. Most (76.1%) of the family medicine residents have taken routine vaccination against influenza. Among those who did not routinely vaccinated against influenza (n=39), the main reasons were believing that the vaccine will make them sick (43.6%), dislike needles (17.9%), no big deal as they had flu before (17.9%) and believing that the flue is not so serious (17.9%). The commonest reported barriers preventing family medicine physicians from giving influenza vaccine to some or all patients were concerns regarding vaccine safety for patients (54.0%), availability (42.3%) and concerns regarding vaccine safety for them (30.7%). **Discussion:** Knowledge level of family medicine residents in Makkah Al-Mokrramah regarding influenza vaccination is acceptable in many parts; however it is defective in some other parts. Their attitude is overall encouraging and coverage rate is acceptable, but can be improved.

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## INTRODUCTION

Influenza is an infectious, acute respiratory disease caused by influenza viruses, usually influenza A or B subtypes, according to the world health organization (WHO). Influenza can cause mild to severe illness, and may predispose to exacerbations of underlying disease or secondary bacterial infections. Many people are at risk for serious complications of the influenza, such as pregnant women, older people, young children, Immunization is the best intervention to prevent influenza virus infection (Gramegna et al., 2018). The lack of vaccination in healthcare workers should be considered a professional error. Educational programs should aim to remove misconceptions and attitudes that limit compliance with recommendations on influenza vaccination in PHC workers

rather than just increasing knowledge on influenza infection and the characteristics of the vaccine (Domínguez, 2014) 'Global health issues are a lot, one of them is the mass movement of pilgrims to and from Makkah city, Saudi Arabia every year which could lead to the spread of influenza, so family residents doctors are vulnerable to illness due to their roles in treating them. The aim of this study is to evaluate the awareness of family medicine residents about influenza vaccine and to verify the most significant variables that could influence the knowledge of residents and the tools needed to improve their practice.

## SUBJECTS AND METHODS

A cross-sectional study was conducted among all Family Medicine residents at Makkah Al-Mokrramah joint program, Saudi Arabia (n=163).

Makkah Al-Mokarramah is the holiest city for Muslims around the world; more than 2 million Muslim pilgrimages each year come to it for Hajj and Omrah. A validated questionnaire was designed based on scientific published research related to the study topic (Alshammari, 2019). Permission to use it was taken from the corresponding author via e-mail. The questionnaire was administered by web based survey in September – November 2020. It composed of 5 sections. The first section is related to general information of participant. In the second section, questions ask regarding their attitude towards vaccination. Their awareness was evaluating in the third section by several questions regarding vaccine effectiveness and current vaccination recommendations in Saudi Arabia as well as internationally such as the evocativeness of vaccine to prevent the flu. In the fourth section discussed questions related to family medicine resident practices, such as why the influenza vaccine are encourage for family medicine resident. In the final section, questions about vaccine awareness such as a new guidelines, the route of transmission, Infection signs and related risk, are included. Approval from the joint program of family medicine in Makkah was obtained as well as consent from the each participant was obtained through the sentence (You agree to participate in the study by answering the questions in this questionnaire). Data were categorical; therefore, they were described by frequency and percentage. Chi-square test was applied to test for the association between variables. Fischer Exact test was applied instead of chi-square test in case of small frequencies. Data entry and statistical analysis were performed using the Statistical Package for Social Sciences (SPSS), version 26. P –value < 0.05 was considered for statistical significance.

## RESULTS

One hundred and sixty three (n=163) family medicine residents have included in the final report. More than half of them (51.5%) were females. They were almost equally distributed on the four residency level. Almost half of the family medicine residents (49.7%) were aware the published guidelines Advisory Committee on Immunization Practices (ACIP), Scientific Committee for Influenza and Pneumococcal Vaccination (SCIPV) or CDC for influenza immunization as evident from Figure 1; with no significant difference between male and female residents. Awareness of the published guidelines Advisory Committee on Immunization Practices (ACIP), Scientific Committee for Influenza and Pneumococcal Vaccination (SCIPV) or CDC for influenza immunization was highest reported among R4 residents (68.3%) and lowest among R1 residents (37.5%), p=0.034. Table 1

**Knowledge about influenza vaccine:** Majority of the family medicine residents knew that influenza vaccine should be administered every year (95.1%) and could recognize the signs and symptoms of influenza (91.4%) and could knew correctly that influenza is transmitted primarily by coughing and sneezing (89.6%). On the other hand, less than half of them knew that people with influenza cannot transmit the infection only after their symptoms appear (46.6%), the flu shot contains live viruses that may not cause some people to get Influenza (36.8%), influenza vaccination work in some persons, even if the vaccine has the right mix of viruses (27.6%), influenza vaccination may not work if the vaccine contains the wrong mix of viruses (27.6%), and symptoms typically doesn't appear 8 to 10 days after a person is exposed to influenza (26.4%).

Female residents were more knowledgeable than males regarding the fact that influenza is transmitted primarily by coughing and sneezing (95.2% vs. 83.5%), p=0.015. Also, they were more knowledgeable than males regarding the fact that the statement of “influenza vaccination does not work in some persons, even if the vaccine has the right mix of viruses” is incorrect (35.7% vs. 19%), p=0.017. Table 3. Majority of R1 residents (92.5%) compared to 65.1% of R3 level residents knew that health care professionals (HCPs) are not less susceptible to influenza than other people, p=0.014. Similarly, more than half of R1 residents (57.5%) compared to only 26.8% of R4 residents could recognize that the flu shot contains live viruses that will not cause some people to get Influenza, p=0.015. On the other hand, 48.8% of R4 residents compared to only 5% of R1 residents knew that it is incorrect that symptoms of influenza typically appear 8 to 10 days after a person is exposed to influenza, Table 4.

**Attitude towards influenza vaccine:** Majority of the Family Medicine residents thought that the influenza vaccine is effective in preventing the flu (89%), administering the influenza vaccine should be part of their medical practice (84.7%) and 70.6% were interested in participating in training related to the influenza vaccine as shown in Table 5. Male physicians were more likely than females to believe that administering the influenza vaccine should be part of their medical practice (91.1% vs. 78.6%), p=0.026 (Table 6). There was no statistically significant difference between different residency levels regarding their attitude towards influenza.

**Practice related to influenza vaccine:** From Figure 2, it is shown that 76.1% of the family medicine residents have taken routine vaccination against influenza. Among those who did not routinely vaccinated against influenza (n=39), the main reasons were believing that the vaccine will make them thick (43.6%), dislike needles (17.9%), no big deal as they had flu before (17.9%) and believing that the flue is not so serious (17.9%). The commonest reported barriers preventing family medicine physicians from giving influenza vaccine to some or all patients were concerns regarding vaccine safety for patients (54.0%), availability (42.3%) and concerns regarding vaccine safety for them (30.7%). Almost two-thirds of the family medicine residents reported encouraging and offering influenza vaccine (62.6%) while 24.5% of them reported requiring and offering influenza vaccine. Most of the physicians mentioned that influenza vaccine for healthcare workers is encouraged because they can get exposed to the flu by sick patients (76.7%), and to minimize sick days and loss of productivity (57.1%). More than one-third (38.7%) of the family medicine residents participated in any training or continuing education related to the influenza vaccine in the past 12 months. Most of them (79.1%) have mentioned that their practice/center offered the influenza vaccine to their patients and 54.6% reported that their practice/center have standing orders regarding the influenza vaccine. The commonest way to communicate the importance of getting the influenza vaccine to patients was during office visits (91.4%) followed by poster/brochures (25.8%) and vaccination day (23.9). Table 7. There was no statistically significant difference between male and female family medicine residents regarding their influenza vaccination-related practice while almost two-thirds of R4 residents (63.4%) compared to 25.6% of R2 and R3 residents have participated in any training or continuing education related to the influenza vaccine in the past 12 months, p=0.001.

**Table 1. Comparison between female family medicine residents regarding their awareness of the published guidelines Advisory Committee on Immunization Practices (ACIP), Scientific Committee for Influenza and Pneumococcal Vaccination (SCIPV) or CDC for influenza immunization, according to their residency level**

Awareness of the published guidelines Advisory Committee on Immunization Practices (ACIP), Scientific Committee for Influenza and Pneumococcal Vaccination (SCIPV) or CDC for influenza immunization	R1 N=40 N (%)	R2 N=39 N (%)	R3 N=43 N (%)	R4 N=41 N (%)	p-value*
No (n=82)	25 (62.5)	22 (56.4)	22 (51.2)	13 (31.7)	0.034
Yes (n=81)	15 (37.5)	17 (43.6)	21 (48.8)	28 (68.3)	

\*Chi-square

**Table 2. Assessment of knowledge of the family medicine residents about influenza vaccine**

Knowledge statements	Right answer	
	Number	percentage
Health care professionals (HCPs) are less susceptible to influenza than other people (Incorrect)	122	74.8
Influenza is transmitted primarily by coughing and sneezing (Correct)	146	89.6
Influenza is more serious than a "common cold" (Correct)	122	74.8
The signs and symptoms of influenza include fever, headache, sore throat, cough, nasal congestion, and aches and pains (Correct)	149	91.4
HCPs can spread influenza even when they are feeling well (Correct)	109	66.9
People with influenza can transmit the infection only after their symptoms appear (Incorrect)	76	46.6
Influenza is transmitted primarily by contact with blood and body fluids (Incorrect)	117	71.8
Influenza vaccination may not work if the vaccine contains the wrong mix of viruses (Correct)	45	27.6
The flu shot contains live viruses that may cause some people to get Influenza (Incorrect)	60	36.8
Influenza vaccination does not work in some persons, even if the vaccine has the right mix of viruses (Incorrect)	45	27.6
Adults with influenza commonly experience nausea and vomiting or diarrhea (Incorrect)	84	51.5
Symptoms typically appear 8 to 10 days after a person is exposed to influenza (Incorrect)	43	26.4
How often do you think the flu vaccine should be administered? (Every year)	155	95.1

**Table 3. Comparison of the knowledge about influenza vaccine between male and female family medicine residents**

Knowledge statements	Males N=79 N (%)	Females N=84 N (%)	p-value*
Health care professionals (HCPs) are less susceptible to influenza than other people (Incorrect)	63 (79.7)	59 (70.2)	0.162
Influenza is transmitted primarily by coughing and sneezing (Correct)	66 (83.5)	80 (95.2)	0.015
Influenza is more serious than a "common cold" (Correct)	63 (79.7)	59 (70.2)	0.162
The signs and symptoms of influenza include fever, headache, sore throat, cough, nasal congestion, and aches and pains (Correct)	72 (91.1)	77 (91.7)	0.904
HCPs can spread influenza even when they are feeling well (Correct)	57 (72.2)	52 (61.9)	0.165
People with influenza can transmit the infection only after their symptoms appear (Incorrect)	32 (40.5)	44 (52.4)	0.129
Influenza is transmitted primarily by contact with blood and body fluids (Incorrect)	53 (67.1)	64 (76.2)	0.197
Influenza vaccination may not work if the vaccine contains the wrong mix of viruses (Correct)	21 (26.6)	24 (28.6)	0.776
The flu shot contains live viruses that may cause some people to get Influenza (Incorrect)	25 (31.6)	35 (41.7)	0.185
Influenza vaccination does not work in some persons, even if the vaccine has the right mix of viruses (Incorrect)	15 (19.0)	30 (35.7)	0.017
Adults with influenza commonly experience nausea and vomiting or diarrhea (Incorrect)	35 (44.3)	49 (58.3)	0.073
Symptoms typically appear 8 to 10 days after a person is exposed to influenza (Incorrect)	19 (24.1)	24 (28.6)	0.513
How often do you think the flu vaccine should be administered? (Every year)	77 (97.5)	78 (92.9)	0.156**
Do you believe that the Saudi Scientific Committee for Influenza and Pneumococcal Vaccination (SCIPV) recommends that health care workers receive the flu shot? (Yes)	68 (86.1)	66 (78.6)	0.211*

\*Chi-square test\*\*Fischer Exact test

**Table 4: Comparison of the knowledge about influenza vaccine among family medicine residents, according to their residency level**

Knowledge statements	R1 N=40 N (%)	R2 N=39 N (%)	R3 N=43 N (%)	R4 N=41 N (%)	p-value*
Health care professionals (HCPs) are less susceptible to influenza than other people (Incorrect)	37 (92.5)	30 (76.9)	26 (65.1)	27 (65.9)	0.014
Influenza is transmitted primarily by coughing and sneezing (Correct)	39 (97.5)	37 (94.9)	36 (83.7)	34 (82.9)	0.061
Influenza is more serious than a "common cold" (Correct)	31 (77.5)	31 (79.5)	34 (79.1)	26 (63.4)	0.278
The signs and symptoms of influenza include fever, headache, sore throat, cough, nasal congestion, and aches and pains (Correct)	39 (97.5)	38 (97.4)	36 (83.7)	36 (87.8)	0.055
HCPs can spread influenza even when they are feeling well (Correct)	32 (80.0)	27 (69.2)	23 (53.5)	27 (65.9)	0.082
People with influenza can transmit the infection only after their symptoms appear (Incorrect)	18 (45.0)	22 (56.4)	20 (46.5)	16 (39.0)	0.476
Influenza is transmitted primarily by contact with blood and body fluids (Incorrect)	28 (70.0)	29 (74.4)	29 (67.4)	31 (75.6)	0.829
Influenza vaccination may not work if the vaccine contains the wrong mix of viruses (Correct)	12 (30.0)	11 (28.2)	10 (23.3)	12 (29.3)	0.900
The flu shot contains live viruses that may cause some people to get Influenza (Incorrect)	23 (57.5)	11 (28.2)	15 (34.9)	11 (26.8)	0.015
Influenza vaccination does not work in some persons, even if the vaccine has the right mix of viruses (Incorrect)	14 (35.0)	5 (12.8)	10 (23.3)	16 (39.0)	0.038
Adults with influenza commonly experience nausea and vomiting or diarrhea (Incorrect)	18 (45.0)	20 (51.3)	29 (67.4)	17 (41.5)	0.082
Symptoms typically appear 8 to 10 days after a person is exposed to influenza (Incorrect)	2 (5.0)	11 (28.2)	10 (23.3)	20 (48.8)	<0.001
How often do you think the flu vaccine should be administered? (Every year)	39 (97.5)	37 (94.9)	43 (100)	36 (87.7)	0.061
Do you believe that the Saudi Scientific Committee for Influenza and Pneumococcal Vaccination (SCIPV) recommends that health care workers receive the flu shot? (Yes)	34 (85.0)	35 (89.7)	40 (93.0)	36 (87.7)	0.696

\*Chi-square test

**Table 5. Attitude of the Family Medicine residents towards influenza vaccine**

	Correct response		
	Answer	No.	%
Do you think the influenza vaccine is effective in preventing the flu?	Yes	145	89.0
Do you think administering the influenza vaccine should be part of your medical practice?	Yes	138	84.7
Would you or your staff be interested in participating in training related to the influenza vaccine?	Yes	115	70.6

**Table 6. Comparison between male and female Family Medicine residents regarding their attitude towards influenza vaccine**

	Males N=79 N (%)	Females N=84 N (%)	p-value*
Do you think the influenza vaccine is effective in preventing the flu?	74 (93.7)	71 (84.5)	0.063
Do you think administering the influenza vaccine should be part of your medical practice?	72 (91.1)	66 (78.6)	0.026
Would you or your staff be interested in participating in training related to the influenza vaccine?	57 (72.2)	58 (69.0)	0.664

\*Chi-square test

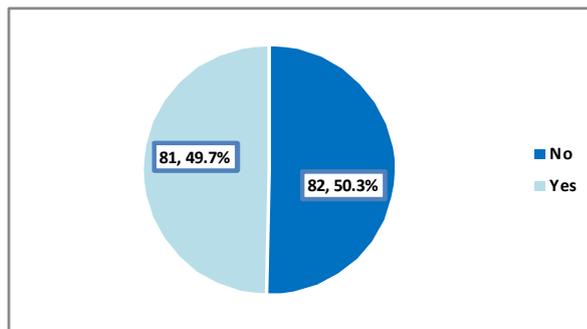
**Table 7. Family medicine physicians' practice related to influenza vaccine**

Practice-related questions	Frequency	Percentage
Which statement applies to your practice/center regarding influenza vaccine for office staff?		
We require and offer the influenza vaccine	40	24.5
We require, but do not offer the influenza vaccine	9	5.5
We encourage and offer the influenza vaccine	102	62.6
We encourage, but do not offer the influenza vaccine	6	3.7
None of the above	6	3.7
Why are flu vaccines for health care workers encouraged?*		
To minimize sick days and loss of productivity	93	57.1
Because sick patients are exposed to the flu by healthcare workers	65	39.9
Because healthcare workers can get exposed to the flu by sick patients	125	76.7
To set an example to other workers	26	16.0
Have you or your staff participated in any training or continuing education related to the influenza vaccine in the past 12 months?		
Yes	63	38.7
No	100	61.3
Does your practice/center offer the influenza vaccine to your patients?		
Yes	129	79.1
No	12	7.4
Don't know	22	13.5
Does your practice/center have standing orders regarding the influenza vaccine?		
Yes	89	54.6
No	17	10.4
Don't know	57	35.0
How do you communicate the importance of getting the influenza vaccine to your patients?*		
During office visits		
Telephone calls	149	91.4
Poster or Brochure	16	9.8
Vaccine reminders by e-mai	42	25.8
Vaccine reminders by text	8	4.9
Vaccination day	10	6.1
We do not communicate the importance of getting the influenza vaccine	39	23.9
	7	4.3

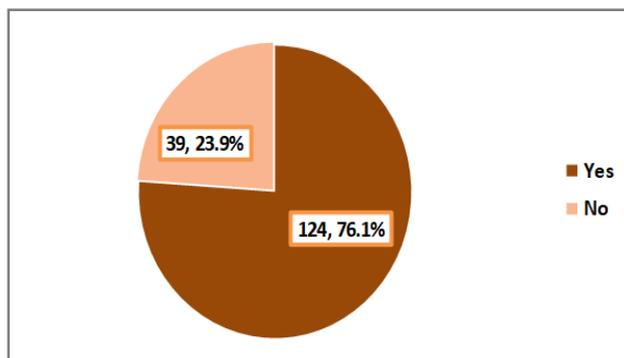
## DISCUSSION

Despite the Saudi Ministry of Health offers seasonal influenza vaccinations annually free of charge to the total population above the age of 6 months, rates of coverage among healthcare workers were suboptimal. It was 38% in 6 tertiary care hospitals in Hail and Riyadh,<sup>(3)</sup> 33.3% among Saudi and 37.1% among non-Saudi HCWs in Qassim.<sup>(4)</sup> The present study aims to assess the knowledge, attitude as well as coverage rate of influenza vaccination in family medicine residents in Makkah city as well as to identify factors associated with not being vaccinated among them. Knowledge of the physicians in the present study about influenza vaccine was excellent in some aspects as majority of them knew that influenza vaccine should be administered every year, could recognize the signs and symptoms of influenza and knew correctly that influenza is transmitted primarily by coughing and sneezing.

However, deficient knowledge has been observed in some other aspects such as recognizing that people with influenza can transmit the infection before appearance of symptoms, the flu shot doesn't contain live viruses, influenza vaccination may not work if the vaccine contains the wrong mix of viruses and symptoms typically appear before 8 to 10 days after a person is exposed to influenza. In similar Saudi studies carried out in Qassim (Alharbi, 2021) and Southwestern region, (Awadalla, 2019) knowledge of the physicians was described as good. In Italy, a considerable proportion of specialized physicians believed that vaccination can cause influenza (Domínguez, 2014) Comparison between the present study and others is not practical due to two main reasons; different demographic characteristics of the participants and using different tools to assess knowledge. Inadequate knowledge among physician regarding vaccine safety may lead to providing wrong information to patients, and accordingly failure of vaccination campaigns (Cozza, 2015).



**Figure 1. History of awareness of the published guidelines Advisory Committee on Immunization Practices (ACIP), Scientific Committee for Influenza and Pneumococcal Vaccination (SCIPV) or CDC for influenza immunization among Family Medicine Residents, Makkah**



**Figure 2. History of routine vaccination against influenza among the participants**

The present study revealed that female residents were more knowledgeable than males regarding some aspects such as influenza are transmitted primarily by coughing and sneezing and influenza vaccination should work in any person, if the vaccine has the right mix of viruses. Additionally, junior resident physicians were more aware that health care professionals (HCPs) are not less susceptible to influenza than other people and the flu shot doesn't contain live viruses that may cause some people to get Influenza. On the other hand, senior residents were more aware that symptoms of influenza typically appear before 8 to 10 days after a person is exposed to influenza. In another Saudi study, educational level of the physicians was significantly associated with their knowledge about influenza virus and vaccine. On the other hand, Awadalla *et al.* (2019) reported that non-Saudi physicians were more knowledgeable than Saudis; mostly because they are more experienced. Acceptance of seasonal influenza vaccine uptake is influenced by the knowledge and attitude about it.<sup>(8)</sup> In the current study, majority of the Family Medicine residents thought that the influenza vaccine is effective in preventing the flu (89%), administering the influenza vaccine should be part of their medical practice (84.7%) and 70.6% were interested in participating in training related to the influenza vaccine. This encouraging attitude may explain the relatively high up taking rate reported in this study. The positive attitude towards influenza vaccination was also reported in other Saudi studies conducted on HCWs (Alshammari, 2019; Alharbi, 2021).

In Italy, good knowledge regarding the indications for influenza vaccination was observed among physicians. However, negative concerns regarding vaccination safety was also observed, and this in turn affects the vaccination coverage

rate among them (Gramegna, 2018). In the present study, the coverage rate of seasonal influenza vaccine up taking was relatively high (76.1%), compared to those reported elsewhere in the Kingdom of Saudi Arabia, 67.6% in Hail and Riyadh, (Alshammari, 2019) 33.3% among Saudi HCWs and 37.1% among Non-Saudi nationals in Qassim, (Alharbi, 2021) 48.5% in another study carried out in Qassim (Alsuhaibani, 2019) and 66% in Riyadh (Alghamdi, 2020) In Italy, a low coverage rate of influenza vaccination was reported (12%),<sup>(1)</sup> and also in 11 countries across Europe (Blank, 2009) vaccination coverage rates seem to be very low; being lowest in Poland (6.4%) and highest in Poland to 26.3% in Czech Republic (26.3%). Important issue should be taken into consideration when comparing different aforementioned studies which is the fact that our population is younger as resident physicians whereas for example, the participants' age in Alharbi *et al.* study ranged between 18 and 60 years; with 42.8% aged thirty years or below. In Alsuhaibani's study, most participants aged between 30 and 39 years (40.0%) (Alsuhaibani, 2019). In the current study, the main reasons preventing some family medicine residents from being vaccinated against influenza were believing that the vaccine will make them thick, dislike needles, no big deal as they had flu before and believing that the flu is not so serious. Alharbi *et al.* (2021) also reported that many healthcare workers in Qassim region believed that influenza is not so serious and that taking influenza infection is safer than taking its vaccine (Alharbi, 2019) In another Saudi study, the most frequently reported reasons for being not vaccinated were belief that influenza is not a serious disease, fear of adverse reactions, and belief that the vaccine is not effective. Alghamdi MH, *et al.* (2021) reported that The main reasons for not receiving seasonal influenza vaccine annually were lack of time, and being away during the vaccination campaigns. In India, concern with safety and efficacy were the main reported barriers, (Bali, 2013) while in Pakistan, the availability, unfamiliarity with the vaccine, and cost were the main barriers (Ali, 2018). The generalizability of findings of the present study should be taken with cautions as the study was conducted among only family medicine residents. Also, the self-reporting nature of the study tool could influence the quality of collected information.

## Conclusion

Knowledge level of family medicine residents in Makkah regarding influenza vaccination is acceptable in many parts; however it is defective in some other parts, particularly issues concerning vaccine safety, efficacy and transmission of infections before appearance of symptoms. Their attitude is overall encouraging and coverage rate is acceptable, but can be improved. The main reasons preventing some family medicine residents from being vaccinated against influenza were the belief that the vaccine will make them thick, disliking needles, believing that there is no big deal as they had flu before and believing that the flu is not so serious. According to the present study's findings, the following are recommended: - Organizing comprehensive educational sessions for resident physicians as well as all healthcare staff to improve their knowledge about seasonal influenza vaccination and explore their negative perceptions and barriers to vaccination.

- These educational sessions are better to be conducted a short time before the date of initiation of influenza vaccination campaigns.

- Ensuring the availability of influenza vaccine in all health care centers
- Further study included other healthcare workers in different health care facilities in Jeddah are needed to cover the issue and find reliable solutions.

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