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Willingness of Healthcare Worker's to Recommend the Seasonal Influenza Vaccine to Diabetic Patients: A Cross - Sectional Survey in Al Ahsa, Saudi Arabia

Dr. Nouf AlSulaiman[1], Dr. Sara AlSa'ad[2], Dr. Rasmah AlHarajin[3], Dr. Mohammed Al Jamaan[4]

[1]Saudi Board Resident of Family Medicine at NGHA, MBBS, MD
Email: *AlsulaimanNo[at]NGHA.MED.SA*

[2]Saudi Board Resident of Family Medicine at NGHA, MBBS, MD
Email: *ALSAADSA4[at]NGHA.MED.SA*

[3]Associate Consultant Family medicine at KSAU - HS, NGHA, MBBS, MD, SBFM, ABFM
Email: *alharajinra[at]ngha.med.sa*

[4]Consultant Family medicine at NGHA, MBBS, MD, SBCM
Email: *aljamaanmo[at]ngha.med.sa*

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Abstract: ***Background: In Saudi Arabia, the acceptance of taking seasonal influenza vaccination among diabetic patients is relatively low. Studies in developed countries have shown that healthcare workers' (HCWs') recommendations promote seasonal influenza vaccination. That makes the measurement of the level of HCWs' recommendation willingness is indispensable. Methods: A cross - sectional study carried out on 379 HCWs in Al Ahsa city. Study distributed a validated self - administered online questionnaire using snowball convenience sampling technique. Result: The obtained result statistically analyzed and the data presented in the form of graphs and table. Conclusion: In conclusion, this study showed a good attitude and perception (with a score of 3.7/5) of recommending the influenza vaccine among HCW in Al Ahsa governorate. Different factors were found to influence the recommendation of the vaccine including education, specialty, and job experience. For that reason, educational programs should be aimed to enhance the attitude and perception of HCW***

Keywords: Seasonal influenza vaccine; diabetes; healthcare worker; Saudi Arabia

1. Introduction

Influenza is caused by influenza viruses which is a widespread acute infectious respiratory disease [1]. Influenza viruses can transmitted rapidly by inhalation of aerosols loaded with viruses, direct contact with infected individuals, or by contact with contaminated objects [1]. Spectrum of the influenza disease varies from asymptomatic infection to severe or even fatal illness [2]. Influenza virus infection places a heavy burden on economics and global health [2]. Influenza vaccination prevents the infection which is a highly infectious viral respiratory tract infection [3].

To reduce the risk of influenza virus spread and the number of influenza major complications, including hospitalization and death**, i**nfluenza vaccination plays an important role in keeping the high rate of coverage in the country, particularly among people of higher risk groups [4]. Updates on influenza vaccination publish annually by the World Health Organization (WHO). For the time being, the highest priority for vaccination are pregnant women, followed by aged 6–59 months children, seniors, people with chronic diseases, and healthcare professionals [5, 6].

In comparison to healthy people, patients with diabetes mellitus (DM) are more likely to be hospitalized or died as consequences of influenza [7 - 12]. The WHO has stated that the rate of DM in Saudi Arabia represents the second highest in the Middle East, and is seventh in the world [13]**.** Considering vaccination against influenza as the most effective control strategy and infection prevention**.** Thus, to decrease the disease burden of DM patients influenza vaccination is essential [9].

Annual vaccination against seasonal influenza, especially for those at high risk of severe influenza disease, including DM is recommended by the Ministry of Health (MOH) in Saudi Arabia [14]. In Saudi Arabia, the acceptance of taking seasonal influenza vaccination among diabetic patients is relatively low [15]. Accepting seasonal influenza vaccinations related to several factors have been established in different studies, which include awareness of influenza and its vaccine and the prevalence of chronic disease. Because the fear vaccine's side effects and a lack of faith in the vaccine's effectiveness, patient reject the vaccine [16]. In Saudi Arabia, the influenza vaccine is provided free of charge in all primary Health Care (PHC) centers [17].

Multiple studies in developed countries have shown that HCWs' recommendations promote seasonal influenza vaccination [18 - 20]. The chances for recommendation of

influenza vaccine more by HCWs due to the fact they have frequent interaction with diabetic patients [21]. In China, multiple studies have been conducted to find out how to increase the seasonal influenza vaccination and the studies showed one of the effective ways to increase seasonal influenza vaccine uptake is HCWs' recommendations [22 - 25]. Media advertising and training programs about influenza vaccination in recent years have been made to improve HCWs' recommendation of influenza vaccine [21].

According to our search in the literature, there is no study done in Saudi Arabia regarding this topic and for the importance of influenza vaccine for diabetic patients. This study will be used as starting point to improve the overall quality and to reach the maximum patient benefit.

This study is aiming to determine the level of healthcare workers' (HCWs') recommendation willingness of influenza vaccine among diabetic patients in in Al Ahsa, and to assess the knowledge of HCW about the importance, safety and effectiveness of influenza vaccine among patients with DM for further future improvement.

2. Materials and Methods

A cross - sectional study conducted among HCWs with direct contacting patients are "Physicians, Nurses, Pharmacists and applied medical clinical specialists "in Al Ahsa city, Saudi Arabia, between 1st November 2021 and 31st December 2021

The Sample size for the study was determined using Raosoft software program. Aged above 20 years, with the assumption that the recommendation of influenza vaccination by HCWs for diabetic patients is 50%, study power 80% and degree of precision 5% at 95% level of significance. Total HCWs size of eastern region is estimated as 25, 139 [26]. This resulted is an estimated sample of 379 HCWs

Those who were 20 years, or older, HCWs who are direct contacting patients "Physicians, Nurses, Pharmacists and applied medical clinical specialists" were eligible for inclusion in the study

Study used a convenience sampling technique through snowball recruiting of HCWs. All participants had read study title and objectives in addition to confirm inclusion criteria before answering the questionnaire. After sending the answers, last page included the following statement; "Thank you for participation, if you" recognize HCWs, please send the questionnaire's link to them

A structured, self - administered online questionnaire with close ended questions using google drive. It distributed through WhatsApp mobile application among HCWs. Study prepared and modified a questionnaire according to study objectives after reviewing the literature [21]. It is an English language with average time needed predicted to be 10 minutes. It consisted of two sections: first section discusses the socio - demographic data including: age, gender, Educations, Occupation status, Job experiences, Type of (employment and the place of HCW (in Al Ahsa / outside Al Ahsa

Second section discussed attitudes and perceptions of HCWs toward influenza vaccination in the terms of disease priority, effectiveness of influenza vaccine, factors associated with recommendation of influenza vaccine to diabetic patients and safety of influenza vaccine. A final score for the agreement rate calculated and scaled from one to five scales

Considering scale "1" as totally disagree, scale "2" disagree, scale "3" natural, scale " 4" agree and scale "5" as fully agree. For yes/no questions, we gave a score of "0" for the wrong answer and "1" for the right answer. Agree, disagree, I don't know questions, we gave a score of "1" to agree and "0" for both disagree and I don't know. Finally, the total score calculated to identify the mean value. Participant below mean (considered (inadequate perception) and those above the mean line considered (adequate perception

Study assessed validity of questionnaire's contents and structure by some experts and modified accordingly. Furthermore, a pilot study had been done to assess the validity in addition to reliability of Likert scale questions

Data were entered into a personal computer and analyzed using Statistical Package for the Social Sciences (SPSS) version17. Data described as percentage for categorical variables or mean +/ - SD for continuous variables. A probability value (P - value) of less than 0.05 accepted to be statistically significant in inferential statistics. Informed consent of all participants was obtained. The study was approved by the ethics and research committee of Family Medicine Residency Training Program

3. Results

A total of 380 participants who fulfilled the requirements of this study were included. Female participants were more than male participants with 60.3% compared to only 39.7%. Most participants had bachelor's degrees with 58.9% followed by higher studies with 30.3%. About two - thirds of the participants (68.7%) are working in hospitals, while the rest (31.3%) are working in PHC. According to Figure 1, about half of the participants (49.2%) had 0 - 4 years' experience, while 5 - 9 years of experience accounted for 30.8%. Almost half of the participants are physicians (47.6%) followed by both nurses and pharmacists with 19.7% and 14.2%, respectively as demonstrated in Figure 2.

Figure 1: Distribution of participants according to their job experience

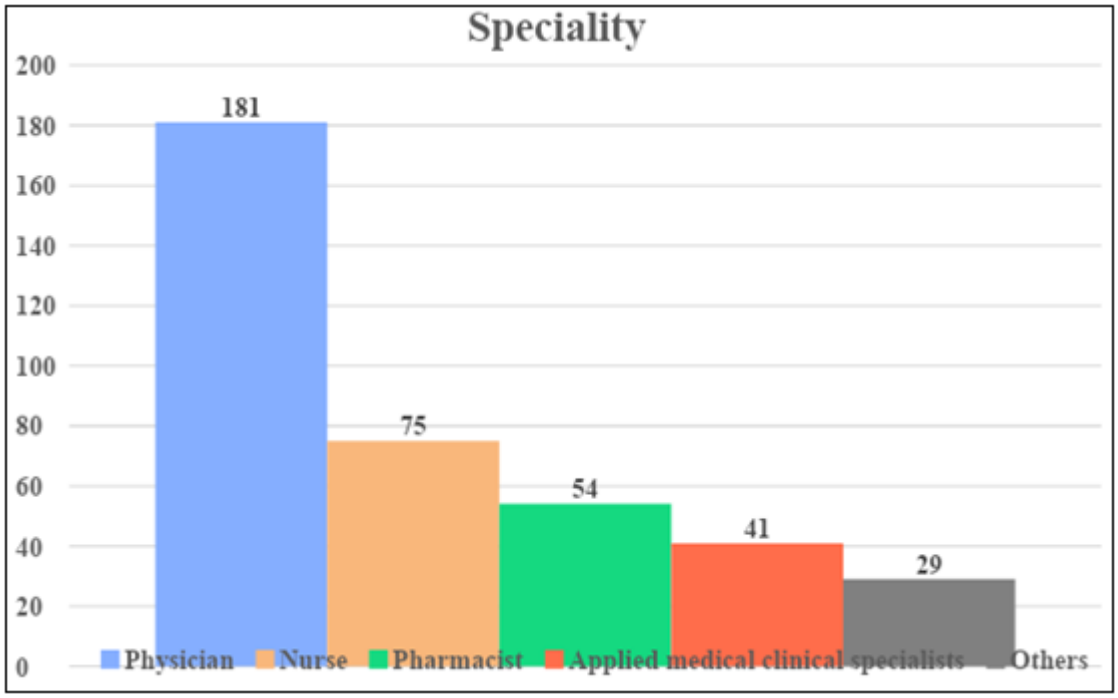

Figure 2: Distribution of participants according to their specialty

Table 1 showed the participants' responses to attitude questions to recommend seasonal influenza vaccines to diabetic patients. About four - fifths of the participants agreed that influenza would be a serious illness, especially for diabetic patients, influenza would increase the risks of hospital admissions and deaths in diabetic patients, and all diabetic patients have to receive influenza vaccine annually. Almost half of the participants (46.6%) agreed that side effects post influenza vaccines are common especially for diabetic patients, while 45% of the participants disagreed that the influenza vaccine is not recommended for children with type one DM. Also, 53.9% of the participants disagreed that the influenza vaccine is not recommended for pregnant women with GDM

Table 1: The participants responses to the different attitude questions to recommend seasonal influenza vaccines to diabetic patients

Attitude questions	Agree (%) *N*	Disagree (%) *N*	I don't know (%) *N*
Influenza would be a serious illness especially for diabetic patients	(83.9%) 319	(9.5%) 36	(6.6%) 25
Influenza would increase risks of hospital admissions and deaths in diabetic patients	(81.6%) 310	(8.2%) 31	(10.3%) 39
All diabetic patients have to receive influenza vaccine annually	(80.5%) 306	(5.3%) 20	(14.2%) 54
Side effects post influenza vaccines are common especially for diabetic patients	(46.6%) 177	(24.2%) 92	(29.2%) 111
Influenza vaccine is not recommended for children with type one DM	(24.5%) 93	(45%) 171	(30.5%) 116
Influenza vaccine is not recommended for pregnant women with GDM	(21.6%) 82	(53.9%) 205	(24.5%) 93

According to Table 2, the majority of the participants (59.2 - 63.7%) either agreed or strongly agreed about the participants also educational materials about the influenza vaccine are available in PHC canters, and physicians practice health education about influenza for all diabetic patients. Also, about half of the participants (49.8%) either agreed or strongly agreed about diabetic patients on insulin are more satisfied to receive the influenza vaccine. Similarly, about 70% of the participants either agreed or strongly agreed about the influenza vaccine is usually available in PHC canters, and the influenza vaccine is easily accessible for diabetic patients

Table 2: The participants responses to the different perception questions to recommend seasonal influenza vaccines to diabetic patients

Perception questions	Agree (%) *N*	Disagree (%) *N*	Natural (%) *N*
Physicians practice health education about influenza for all diabetic patients	(32.9%) 125	(8.9%) 34	(22.1%) 84
Diabetic patients on insulin are more satisfied to receive influenza vaccine	(26.6%) 101	(10.5%) 40	(35.8%) 136
Influenza vaccine is usually available in PHC centres	(26.1%) 99	(5.3%) 20	(15.8%) 60
Influenza vaccine is easily accessible for diabetic patients	(23.2%) 88	(6.6%) 25	(17.1%) 65
Educational materials about influenza vaccine are available in PHC centres	(23.7%) 90	(8.4%) 32	(27.6%) 105

The most common reason for not including the flu vaccine in the management of diabetic patients as chosen by participants is that physicians focus on the medications only with 49.7% followed by physicians who are not aware of the updated guidelines with 20% as shown in Table 3. On the other hand, the most common reason of refuse receiving the influenza vaccine among diabetic patients as selected by the participants is no health education for receiving flu vaccine with 37.9% followed by both fear of its side effects and previous bad experience with the vaccine with 31.8% and 21.8%, respectively

Table 3: The participants responses to the different questions about their opinions regarding: seasonal influenza vaccines to diabetic patients

Variables	Frequency	Percentage
The most common reason of not including flu		
Vaccine in management of diabetic patient is		
Physician is not aware with the updated		
Guidelines	76	20
Unavailability of vaccine		
Physician focus on the medications only	60	15.8
Patient flow for requesting flu vaccine is not	189	49.7
Clear for the physician	55	14.5
The most common reason of refuse receiving		
Influenza vaccine among diabetic patient is		
No health education for receiving flu vaccine	144	37.9
Fearing from its side effects	121	31.8
Previous bad experience with the vaccine	83	21.8
Bad attitude toward flu vaccine	32	8.4

The relationship between attitude and perception scores of participants and their different socio - demographic characteristics are summarized in Table 4. The different gender and occupations did not show any significant relationship (p>0.05) with participants' scores. On the other hand, different educational levels showed a significant relationship (p<0.001) with participants' scores as participants with higher education got higher scores. Also, a significant relationship (p=0.004) was found between job experience and participants' scores. In addition, the specialty of the participants showed to have a significant relationship (p<0.001) with participants' scores

Table 4: Distribution of participants attitudes and perceptions scores toward influenza: vaccination to diabetic patients

Variables	**Score**		
	Mean	Standard deviation	*p* value
Gender			
Female	3.71	1.51	0.757
Male	3.66	1.55	
Education			
Health diploma	2.68	1.37	0.001>
Bachelor degree	3.62	1.49	
Higher studies	4.19	1.46	
Place of employment			
PHC	3.83	1.55	0.228
Hospital	3.63	1.51	
Job experiences			
Years 0 - 4	3.91	1.52	0.004
Years 5 - 9	3.65	1.51	
More than 10 years	3.22	1.48	
Specialty			
Physician	4.33	1.39	0.001>
Nurse	3.33	1.42	
Pharmacist	3.09	1.48	
Applied medical clinical	2.95	1.34	
specialists			
Others	2.83	1.39	

4. Discussion

This study aimed to evaluate the willingness of HCW to

recommend the seasonal influenza vaccine to diabetic patients in Al Ahsa governorate. The influenza virus is transmitted via inhalation or contact with infected objects and might cause serious complications. For that reason, vaccination is the safest and most effective way to protect individuals, especially who are at high risk such as diabetic patients from the complication of influenza.

The mean score of attitude and perceptions of the participants in this study is 3.7 out of 5 (74%). About four - fifths of the participants (83.9%) agreed that influenza would be a serious illness, especially for diabetic patients, and 81.6% also agreed that influenza would increase the risks of hospital admissions and deaths in diabetic patients. A Chinese study aimed to measure the willingness of healthcare workers to recommend the influenza vaccine to diabetic patients showed similar results as about 91% of the participants agreed that influenza would be a serious illness especially for diabetic patients and that influenza would increase the risks of hospital admissions and deaths in diabetic patients [21]. Even though four - fifths of the participants 80.5% agreed that all diabetic patients have to receive influenza vaccine annually, 46.6% of participants agreed that side effects post influenza vaccines are common especially for diabetic patients. The majority of the participants disagreed that the influenza vaccine is not recommended for children with type one DM (45%) and influenza vaccine is not recommended for pregnant women with GDM (53.9%).

Educational programs should be aimed to correct the wrong information of healthcare workers as these can be obstacles in recommending the vaccine to diabetic patients.

No significant difference ($p>0.05$) was found between participants of different gender and place of employment and their scores. Similarly, the China study showed no significant difference ($p>0.05$) between participants' genders and their willingness to recommend the influenza vaccine to diabetic patients [21]. On the other hand, significant differences ($p<0.05$) were found between participants' different education, job experience, and specialty with their scores. Higher studies showed the highest level of attitude and perception toward recommending the vaccine as they have better education and have better information about the influenza vaccine. On the other hand, it is unclear why HCW with lower job experience showed better attitude and perception than HCW with more experience. It might be that new employments had fresh information about the vaccine and for that reason, they had the joy to recommend it to the patients. Physicians are the closest HCW to the patients and it makes sense that they have the highest level of attitude and perception followed by nurses. Other HCWs have limited interaction with patients and for that reason, they had a low level of attitude and perception. A study conducted in South Africa to measure the attitude, knowledge, and practice of diabetic patients toward the influenza vaccine found that only 28.8% of participants had the influenza vaccine [27]. Advice from doctors was the highest influencing factor to encourage vaccination [27]. Also, healthcare professionals' advice was the top source of vaccine - related information with 73.9% [28]. The China study showed a similar trend to this study as significant differences were found between participants' education, place of employment, and job experience with their willingness to recommend the influenza vaccine to diabetic patients [21].

It was noted in an earlier study conducted in Ireland that free access to the vaccine can increase its uptake [29]. The influenza vaccine is free of charge in Saudi, however, only 47.8% of participants in a Saudi study conducted in Riyadh had the influenza vaccine [17]. The study found participants who are old, unmarried, live with chronic diseases, and had low education levels are in the lower vaccination groups [17]. Also, the availability of the influenza vaccine free of charge was found to be the third - highest influencing factor to encourage receiving the vaccine in the South Africa study [27]. Another study conducted in Saudi to measure the willingness of participants to receive the influenza vaccine found that only 31.7% of participants were willing to receive the vaccine, and only 19.5% of participants received the vaccine previously [28]. Similarly, a study in China found that only 19.55% of diabetic patients were willing to receive the influenza vaccine [30]. The vaccination rate in the world is very low as shown in another study conducted in Hungary which showed that only 12% of the participants got vaccination against influenza [31].

This study showed that higher studies workers, physicians, and job experience of 0 - 4 years showed higher attitudes and perceptions toward recommending the influenza vaccine to diabetic patients. Even though the influenza vaccine is free, people still are afraid of getting it. Educational programs should be provided to all healthcare workers to increase their attitude and perception to recommend the influenza vaccine. Also, educational tools should be provided to the community to show the benefits of the influenza vaccine via workshops, educational campaigns, and informational brochures. In addition, healthcare workers should be advised regularly to promote the influenza vaccine to all patients, especially diabetic patients.

5. Conclusion

In conclusion, this study showed a good attitude and perception (with a score of 3.7/5) of recommending the influenza vaccine among HCW in Al - Ahsa governorate. Different factors were found to influence the recommendation of the vaccine including education, specialty, and job experience. For that reason, educational programs should be aimed to enhance the attitude and perception of HCW. In addition, educational tools should be available to the community to educate them about the influenza vaccine using workshops, educational campaigns, and informational brochures.

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