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Research Article

**KNOWLEDGE AND BARRIERS OF TYPE 2 DIABETIC
PATIENTS TOWARD THE UPTAKE OF PNEUMOCOCCAL
AND INFLUENZA VACCINES IN PRIMARY HEALTH CARE
CENTERS, AL-AHSA, SAUDI ARABIA, 2019 – 2020**¹Abdulla H Almubarak, ²Salman J Alshehab, ³Yaser M Alhejji, ⁴Mohammed M Alismail**Article Received:** October 2020 **Accepted:** November 2020 **Published:** December 2020**Abstract:**

Introduction: People with diabetes are more prone to death or hospital admission as a complication of influenza than healthy individuals. Several studies about the effectiveness of the influenza vaccine in diabetes patients found that vaccination decreased diabetes-related hospital admissions during epidemics and that influenza-related mortality decreased.

Methodology: A Cross-sectional study to assess the knowledge and awareness about influenza and pneumococcal vaccination. The study was conducted on primary health care centers in Al-Ahsa governorate, Eastern Province, Saudi Arabia including Type 2 diabetic patients following up at the chronic disease clinic in PHCs from November 2019 to August 2020.

Results: (51.3%) of the participants who do not know the recommended vaccines for diabetics, most respondents were aware of the Influenza vaccine (76.3%). The prevalence of influenza vaccination among participants was 53.8% with 168 participants being vaccinated and 42.3% of them used it one to two times.

On the other hand, only (10.3%) of the participants knew about the pneumococcal vaccine, (6.4%) used the pneumococcal vaccine, while (89.7%) of participants did not know about it.

Conclusion: knowledge and awareness about influenza and pneumococcal vaccination among T2DM patients attending PHCCs in Al-Ahsa, Saudi Arabia is suboptimal.

Keywords: Influenza vaccine, pneumococcal vaccine, T2DM, Saudi Arabia

Corresponding author:

Abdulla H Almubarak,

QR code



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INTRODUCTION:

Diabetes mellitus was outlined by the World Health Organization as “a disorder of varied etiology, characterized by chronic hyperglycemia with disturbances of sugar, fat and protein metabolism ensuing from defects in pancreatic insulin secretion, hypoglycemic agent action, or each [1].

The consequences of DM produce long-run injury, dysfunction, and failure of varied organs [2]. Thus, the metabolic abnormalities of DM result from inadequate hypoglycemic agent action on target tissues, because of deficient hormone secretion or insensitiveness to insulin action, or a mixture of each [3].

There are 2 main kinds of diabetes: type 1 (requiring the insulin hormone for survival) type 2 (may or might not need insulin hormone for metabolic control)[4].

Diabetes mellitus type 2 (T2DM) is a metabolic disorder that progresses from excess caloric intake over energy expenditure. It is characterized by a progressive insulin defect because of insulin resistance, which will increase the body's demand for insulin. If the pancreatic duct gland fails to secrete enough hormone to catch up on increasing insulin demand, the blood glucose level is going to be elevated step by step [5]. This will be associated with long-run injury, pathology, and failure of various organs, particularly the eyes, kidneys, nerves, heart, and blood vessels resulting in increasing levels of morbidity and mortality [6]. Diabetes mellitus or type-2 polygenic disorder is one of the most important non-communicable and wildest growing public health difficulties within the world, it could be a condition tough to cure and expensive to manage [7].

Influenza virus spreads worldwide and can affect individuals in any age group. Depending on the local weather, seasonal influenza epidemics appear mostly during the winter while in the tropical areas seasonality is less obvious and can happen at any time of the year. Even though most people will recover completely without any sequelae, influenza can cause some serious complications, ineffectiveness, and even death [8]. Severe illness and influenza-related problems classically happen in pregnant women, children <59 months of life, individuals with chronic medical conditions (such as chronic cardiac, pulmonary, renal, metabolic, neuro-developmental, liver or hematologic diseases), immunocompromised persons and older adults (aged 65 years) [9].

Leonard Thompson was the first patient who received

insulin for the treatment of diabetes, he died in 1935 from staphylococcal pneumonia that complicated an episode of presumed influenza. Before the use of insulin and antibiotics, the infection was often precipitated by diabetic ketoacidosis and other acute metabolic complications and was accountable for significant morbidity and mortality in people with diabetes [10].

People with diabetes are more prone to death or hospital admission as a complication of influenza than healthy individuals [11,12]. Several studies about the effectiveness of the influenza vaccine in diabetes patients [13,14] found that vaccination decreased diabetes-related hospital admissions during epidemics and that influenza-related mortality decreased [15,16]. Annual influenza vaccination of people with T2DM is recommended by the World Health Organization, the Centers for Disease Control and Prevention, the European Union, and the main diabetes associations [17].

Several studies were done across Saudi Arabia to assess the awareness of influenza and pneumococcal vaccines intake among diabetic patients; this study aimed to determine the prevalence of influenza and pneumococcal vaccination uptake among a population of type 2 diabetic patients in Al-Ahsa, Saudi Arabia and determine the factors associated with vaccine uptake and refusal factors.

METHODOLOGY:**Study design:**

This study was A Cross-sectional study conducted on primary health care centers in Al-Ahsa governorate, Eastern Province, Saudi Arabia including Type 2 diabetic patients following up at chronic disease clinic in PHCs from November 2019 to August 2020.

Inclusion criteria:

Type 2 diabetic patients who are following in PHCs.

Exclusion criteria:

- Type 1 diabetic patients
- Conditions where taking consent is difficult e.g., hearing impairment, or cognitive impairment
- Patient with gestational diabetes
- Patients who have an allergy to influenza and pneumococcal vaccine

Dependent variable:

Type 2 diabetic patients who are following in PHCs in Al-Ahsa.

Independent variables:

- Demographic characters of the patients

- Duration of diabetes
- Smoking
- History of immunosuppressive diseases

Data collection and analysis:

A questionnaire was used for obtaining information from patients by self-reporting. The questionnaire included three sections. The first section aimed to gather demographic data about the population. The second and third sections assessed the vaccine uptake status and patients' opinions and beliefs about influenza and pneumococcal vaccines. Data obtained was analyzed using the SPSS software version 21.

Ethical consideration:

Verbal and written consent was obtained from all participants with an Explanation of the main purpose of the study to them. Also, permission from Al- Ahsa Health Affairs Directorate was taken.

RESULTS:

Sociodemographic characters of participants:

The present study included a total of 312 individuals with mean± SD age was 54.66 ± 12.02 years. (64.7%) of participants were male, and (35.3%) were females. The educational level of participants was as follows; (19.9%) were uneducated, (53.3%) were pre-university students, (24.4%) were graduated and (1.9%) were postgraduate. The majority of participants (87.2%) were married, and (76.3%) of the participants were non-smokers. (20.5%) of the participants had increased blood cholesterol levels. (64.1%) of the participants used oral medications for the treatment of diabetes (*Table 1*).

Knowledge and awareness about vaccination among participants:

Table 2 show the Knowledge and awareness about vaccination among participants;

(51.3%) of the participants who do not know the recommended vaccines for diabetics, most respondents were aware of the Influenza vaccine (76.3%). The prevalence of influenza vaccination among participants was 53.8% with 168 participants being vaccinated and 42.3% of them used it one to two times.

On the other hand, only (10.3%) of the participants knew about the pneumococcal vaccine, (6.4%) used the pneumococcal vaccine, while (89.7%) of participants did not know about it.

(29.5%) and (19.9%) of the participants stated that

they have been advised by a general practitioner to take Influenza and pneumococcal vaccine respectively, however, 39.1% of the participants thought it is important for diabetic patients to take the influenza vaccine while only 10.3% thought it is important for diabetic patients to take the pneumococcal vaccine. On the other hand, (51.9%) of the participants agreed that the Influenza vaccine is effective in preventing the flu while Only (9%) of the participants believed that the vaccine works effectively in preventing pneumococcal infections.

Barriers against vaccination:

Regarding barriers toward vaccination, Only (14.1%) of the participants had apologized for using the influenza vaccine when it was offered to them, and (3.2%) apologized for using the pneumococcal vaccine when it was offered. The most significant factor for refusal of both influenza and pneumococcal vaccines was worries about side effects 32.7% and 46.8% respectively and feeling that the vaccine is useless 32.7% and 40.4% for influenza and pneumococcal vaccines respectively (*Table 3*).

The relation between knowledge and sociodemographic characters of participants

Table 4 shows that female participants had more knowledge about the pneumococcal vaccine than male participants ($p=0.011$). Besides, postgraduate participants have more knowledge about the pneumococcal vaccine than other educational levels ($p= 0.009$), and they had more knowledge about vaccines in general than other participants ($p=0.034$). However, there was no significant difference in knowledge according to marital status and smoking status.

The relation between barriers and sociodemographic characters of participants:

Table (5) shows that females have some worries about the side effects associated with the pneumococcal vaccine ($p=0.01$), As well as females have more worries about the pain associated with the injection ($p=0.01$).

Regarding educational level; postgraduate participants did not have enough time to take the influenza vaccine ($p=0.015$), or the pneumococcal vaccine ($p= 0.014$), also they had some worries about what the vaccine may cause pain due to injection ($p=0.017$). Also, postgraduate participants had some worries due to the side effects that might be associated with the pneumococcal vaccine ($p= 0.026$), divorced participants had a bad experience as a result of using the flu vaccine ($p=0.003$), and

they had some worries about what the vaccine may cause from pain due to injection($p=0.002$).

DISCUSSION:

The current study was done to assess the knowledge and barriers towards influenza and pneumococcal vaccination uptake among a population of type 2 diabetic patients in Al-Ahsa, Saudi Arabia and determine the factors associated with vaccine uptake and refusal factors.

The present study found that, Although (51.3%) of the participants do not know the recommended vaccines for diabetes, The prevalence of influenza vaccination among participants was 53.8%, On the other hand, only (10.3%) of the participants knew about the pneumococcal vaccine, and only (6.4%) used it.

Influenza vaccination coverage was lower than the prevalence of influenza vaccination in type 2 DM in southwestern, Saudi Arabia (61%) [18] and close to the coverage rate of vaccination among Korean diabetic patients which was 57.7% [19] and higher than that in Spain (40%) [20] and France (33.7%) [21]. the highest reported vaccination coverage was in the Netherlands, where an observational longitudinal study based on electronic medical records found that influenza vaccination coverage in persons with diabetes decreased significantly from 85.1% in the 2008 season to 74.7% in the 2013 season [22].

Our study results were also higher than a similar study done in Riyadh, Saudi Arabia in which the prevalence of influenza and pneumococcal vaccination was 47.8% and 2.8%, respectively [23].

(32.7%) of the participants have some worries about the potential side effects of the influenza vaccine. Also, the most significant barrier toward taking the pneumococcal vaccine in (46.8%) of participants was the side effects of the vaccine. This was in accordance with the previous study done in southwestern, Saudi Arabia [18]

The current study showed that a higher educational level is significantly associated with higher awareness about vaccination, Also female participants had higher awareness than male participants. this was also in accordance with the previous study done in southwestern, Saudi Arabia [18].

Study limitations:

The present study had some limitations as it includes only patients of PHCs. Also, This Study focuses on

type 2 diabetic patients and neglect type 1 diabetics.

CONCLUSION:

The current study concluded that; knowledge and awareness about influenza and pneumococcal vaccination among T2DM patients attending PHCCs in Al-Ahsa, Saudi Arabia is suboptimal. There is also, lack of knowledge toward the importance of the pneumococcal vaccine. The most important barrier was the fear of the side effects of the vaccines. General Practitioner play an important role in health education about vaccination importance.

Recommendation

This study findings suggest that efforts should be made to increase the uptake of both influenza and pneumococcal vaccines among type 2 diabetes in Saudi Arabia especially among the elderly, and lower education patients.

The establishment and development of Health educational programs in PHCC is a must to increase the level of awareness about the importance of vaccines.

REFERENCES

- 1- World Health Organization. Definition, diagnosis and classification of diabetes mellitus and its complications: report of a WHO consultation. Part 1, Diagnosis and classification of diabetes mellitus. World Health Organization; 1999.
- 2- WHO Study Group on Prevention of Diabetes Mellitus. Prevention of diabetes mellitus: report of a WHO study group. World Health Organization; 1994.
- 3- Boyd CM, Darer J, Boulton C, Fried LP, Boulton L, Wu AW. Clinical practice guidelines and quality of care for older patients with multiple comorbid diseases: implications for pay for performance. *Jama*. 2005 Aug 10;294(6):716-24.
- 4- World Health Organization. Guidelines for the prevention, management and care of diabetes mellitus. 2006.
- 5- Biswas A, Das S, Seth S, Maulik SK, Bhargava B, Rao VR. Role of modifying genes on the severity of rare mutation of MYH7 gene in hypertrophic obstructive cardiomyopathy. *Journal of Clinical & Experimental Cardiology*. 2012;3(12):Article-ID.
- 6- Asif M. The prevention and control the type-2 diabetes by changing lifestyle and dietary pattern. *Journal of education and health promotion*. 2014;3.
- 7- Joy SM, Little E, Maruthur NM, Purnell TS, Bridges JF. Patient preferences for the treatment

- of type 2 diabetes: a scoping review. *Pharmacoeconomics*. 2013 Oct 1;31(10):877-92.
- 8- Grohskopf LA, Sokolow LZ, Broder KR, et al. Prevention and Control of Seasonal Influenza with Vaccines: recommendations of the Advisory Committee on Immunization Practices—United States, 2017–18 Influenza Season. *MMWR Recomm Reports* 2017;66:1–20.
 - 9- Centers for Disease Control and Prevention (CDC). Prevention and control of seasonal influenza with vaccines. Recommendations of the Advisory Committee on Immunization Practices—United States, 2013-2014. *MMWR Recomm Rep* 2013;62:1–43.
 - 10- Smith SA, Poland GA. Use of influenza and pneumococcal vaccines in people with diabetes. *Clinical Diabetology*. 2000;1(1):13-32.
 - 11- American Diabetes Association. Standards of Medical Care in Diabetes-2015. *Diabetes Care* 2015;38:S41–8.
 - 12- Valdez R, Narayan KM, Geiss LS, Engelgau MM. Impact of diabetes mellitus on mortality associated with pneumonia and influenza among non-Hispanic black and white US adults. *Am J Public Health* 1999;89:1715–21.
 - 13- Looijmans-Van den Akker I, Verheij T, Buskens E, Nichol KL, Rutten G, Hak E. Clinical effectiveness of first and repeat influenza vaccination in adult and elderly diabetic patients. *Diabetes Care* 2006;29:1771–6.
 - 14- Lau D, Eurich DT, Majumdar SR, Katz A, Johnson JA. Effectiveness of influenza vaccination in working-age adults with diabetes: a population-based cohort study. *Thorax* 2013;68:658–63.
 - 15- Heymann AD, Shapiro Y, Chodick G, Shalev V, Kokia E, Kramer E, et al. Reduced hospitalizations and death associated with influenza vaccination among patients with and without diabetes. *Diabetes Care* 2004;27:2581–4.
 - 16- den Akker I, Verheij TJ, Buskens E, Nichol KL, Rutten GE, Hak E. Clinical effectiveness of first and repeat influenza vaccination in adult and elderly diabetic patients. *Diabetes Care* 2006;29:1771–6.
 - 17- EU. Council of the European Union. Council recommendation of 22 December 2009 on seasonal influenza vaccination (2009/1019/EU). *Off J Eur Union* 2009;348:71e2.
 - 18- Alnaheelah IM, Awadalla NJ, Al-Musa KM, Alsabaani AA, Mahfouz AA. Influenza vaccination in type 2 diabetes patients: coverage status and its determinants in southwestern Saudi Arabia. *International journal of environmental research and public health*. 2018 Jul;15(7):1381.
 - 19- Alvarez, C.E.; Clichici, L.; Patricia Guzmán-Libreros, A.; Navarro-Francés, M.; Ena, J. Survey of vaccination practices in patients with diabetes: A report examining patient and provider perceptions and barriers. *J. Clin. Transl. Endocrinol*. 2017, 9, 15–17.
 - 20- Verger, P.; Cortaredona, S.; Pulcini, C.; Casanova, L.; Peretti-Watel, P.; Launay, O. Characteristics of patients and physicians correlated with regular influenza vaccination in patients treated for type 2 diabetes: A follow-up study from 2008 to 2011 in southeastern France. *Clin. Microbiol. Infect*. 2015, 21, 930.e1–930.e9.
 - 21- Maslow, J.N. Vaccine development for emerging virulent infectious diseases. *Vaccine* 2017, 35, 5437–5443.
 - 22- J Tacken MA, Jansen B, Mulder J, Campbell SM, Braspenning JC. Dutch influenza vaccination rate drops for fifth consecutive year. *Vaccine* 2015;33:4886–91.
 - 23- Almusalam YA, Ghorab MK, Alanezi SL. Prevalence of influenza and pneumococcal vaccine uptake in Saudi type 2 diabetic individuals. *Journal of Family Medicine and Primary Care*. 2019 Jun;8(6):2112.

Table 1: sociodemographic characters of participants

		n	%
Gender	Male	202	64.7
	Female	110	35.3
Edu. Level	Uneducated	62	19.9
	pre-university	168	53.8
	University	76	24.4
	postgraduate	6	1.9
marital status	Single	16	5.1
	Married	272	87.2
	Divorced	2	0.6
	Widow	22	7.1
Smoking status	non-smoker	238	76.3
	ex-smoker	32	10.3
	Smoker	42	13.5
Duration of DM	less than 5 years	112	35.9
	5-10 years	98	31.4
	greater than 10 years	102	32.7
Associated medical conditions	None of the above	210	67.3
	increased blood cholesterol	64	20.5
	sickle cell anemia	6	1.9
	chronic kidney disease	8	2.6
	chronic heart disease	12	3.8
	immune diseases	4	1.3
	Chronic liver disease	2	0.6
	Spleen removal	2	0.6
DM treatment	Chronic lung disease	4	1.3
	Oral tablet for Diabetes	200	64.1
	Oral tablet for Diabetes and insulin injections	72	23.1
	insulin injection only	28	9
	Do not use any medications currently	12	3.8

Table 2: knowledge and awareness toward DM

		Influenza vaccine		Pneumococcal vaccine	
		Frequency	Percent	Frequency	Percent
recommended vaccines for diabetics	Seasonal flu vaccine	114	36.5	32	10.3
	Both vaccines above	38	12.2	280	89.7
using flu vaccine through the past twelve months or pneumococcal vaccine ever	not known	160	51.3	20	6.4
	No	104	33.3	116	37.2
	Total	272	87.2	136	43.6
	Missing	40	12.8	176	56.4
Number of vaccinations	once to twice	132	42.3	12	3.8
	three to four times	34	10.9	6	1.9
	no knowledge	20	6.4	18	5.8
	five times	16	5.1	294	94.2
	Absolutely	68	21.8	312	100
	Total	270	86.5	12	3.8
	Missing	42	13.5	6	1.9
advised about vaccine	General practitioner	92	29.5	62	19.9
	hospital doctor	28	9	6	1.9
	Audio or visual media	26	8.3	22	7.1
	nurse	52	16.7	90	28.8
	social media/ Friends	8	2.6	222	71.2
	Diabetes nurse/ health educator	4	1.3	312	100
	Family	46	14.7	62	19.9

	Total	256	82.1	6	1.9
	Missing	56	17.9	22	7.1
	Total	312	100	90	28.8
	Yes	122	39.1	28	9
	No	30	9.6	10	3.2
	i dont know	116	37.2	92	29.5
	Total	268	85.9	130	41.7
	Missing	44	14.1	180	57.7
	Total	312	100	312	100
vaccine is effective in protecting against disease	Yes	162	51.9	28	9
	No	38	12.2	10	3.2
	i dont know	68	21.8	92	29.5
	Total	268	85.9	130	41.7
	Missing	44	14.1	182	58.3
	Total	312	100	312	100

Table 3: Barriers against vaccination

		Influenza vaccine		Pneumococcal vaccine	
		Frequency	Percent	Frequency	Percent
refusal of vaccine when offered	Yes	44	14.1	10	3.2
	No	204	65.4	120	38.5
	I was not offered the vaccine use	64	20.5	182	58.3
Which of the following factors do you consider to have a significant impact on your ability to make the decision not to use the vaccine?	Side effects of the vaccine	102	32.7	146	46.8
	Feeling the need for vaccination due to its uselessness	102	32.7	126	40.4
	the tingling pain that accompanies the use of the vaccine	56	17.9	122	39.1
	Allergy to vaccine	30	9.6	108	34.6
	Advice from other people not to use the vaccine	22	7.1	48	15.4
	Total	312	100	28	9

Table 4: relation between knowledge and sociodemographic characters

gender		N	Mean	Std. Deviation	Std. Error Mean	t	p value
Knowledge about influenza	male	202	1.6238	1.19039	0.11845	-0.722	0.471
	female	110	1.7636	1.08804	0.14671		
Knowledge about influenza	male	202	0.1683	0.64914	0.06459	-2.584	0.011
	female	110	0.5273	1.08619	0.14646		
Total knowledge	male	202	1.7921	1.51866	0.15111	-1.82	0.071
	female	110	2.2909	1.83255	0.2471		
Educational level		N	Mean	Std. Deviation	Std. Error	F	p value
Total knowledge about influenza vaccine	uneducated	62	1.8065	1.16674	0.20955	2.009	0.115
	pre-university	168	1.4762	1.09188	0.11913		
	university	76	2	1.20808	0.19598		
	post graduate	6	1.6667	1.52753	0.88192		
	Total	312	1.6731	1.15375	0.09237		
Total knowledge about pneumococcal vaccine	uneducated	62	0.6774	1.27507	0.22901	3.961	0.009
	pre-university	168	0.1429	0.58377	0.06369		
	university	76	0.2632	0.72351	0.11737		
	post graduate	6	1	1.73205	1		
	Total	312	0.2949	0.84409	0.06758		
Total knowledge	uneducated	62	2.4839	2.15825	0.38763	2.963	0.034
	pre-university	168	1.619	1.34348	0.14659		
	university	76	2.2632	1.55414	0.25212		
	post graduate	6	2.6667	3.05505	1.76383		
	Total	312	1.9679	1.64775	0.13193		

marital status		N	Mean	Std. Deviation	Std. Error	F	p value
Total knowledge about influenza vaccine	single	16	2.25	0.88641	0.31339	1.462	0.227
	married	272	1.6838	1.17191	0.10049		
	divorced	2	1				
	widow	22	1.1818	0.98165	0.29598		
	Total	312	1.6731	1.15375	0.09237		
Total knowledge about pneumococcal vaccine	single	16	0	0	0	0.883	0.451
	married	272	0.2868	0.83363	0.07148		
	divorced	2	1				
	widow	22	0.5455	1.21356	0.3659		
	Total	312	0.2949	0.84409	0.06758		
Total knowledge	single	16	2.25	0.88641	0.31339	0.154	0.927
	married	272	1.9706	1.65077	0.14155		
	divorced	2	2				
	widow	22	1.7273	2.149	0.64795		
	Total	312	1.9679	1.64775	0.13193		
Smoking status							
Total knowledge about influenza vaccine	non-smoker	238	1.7227	1.15659	0.10602	0.592	0.554
	ex-smoker	32	1.625	1.25831	0.31458		
	smoker	42	1.4286	1.07571	0.23474		
	Total	312	1.6731	1.15375	0.09237		
Total knowledge about pneumococcal vaccine	non-smoker	238	0.3445	0.90607	0.08306	1.233	0.294
	ex-smoker	32	0	0	0		
	smoker	42	0.2381	0.76842	0.16768		
	Total	312	0.2949	0.84409	0.06758		
Total knowledge	non-smoker	238	2.0672	1.7011	0.15594	0.913	0.404
	ex-smoker	32	1.625	1.25831	0.31458		
	smoker	42	1.6667	1.59164	0.34733		
	Total	312	1.9679	1.64775	0.13193		

Table 5: the relation between barriers and sociodemographic characters

	Chi-square	p-value	in favor of
Gender			
worries about side effects that might be associated with the vaccine	9.301	0.010	female
worries about pain due to injection	13.292	0.001	female
Educational level			
no enough time to take the influenza vaccine	15.829	0.015	post graduate
Refusal of vaccine when offered	32.177	0.000	post graduate
No enough time to take the pneumococcal vaccine	16.023	0.014	post graduate
worries about side effects of pneumococcal vaccine	14.33	0.026	post graduate
worries from pain due to injection of pneumococcal vaccine	15.389	0.017	post graduate
Marital status			
had a bad experience on using the flu vaccine	13.613	0.003	divorced
worries about pain due to injection	20.974	0.002	divorced