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Seasonal Influenza Vaccination among Patients with Chronic Diseases: Prevalence, Acceptability, and Hesitation

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Abstract

Background: Seasonal influenza vaccination (SIV) is an essential public health measure for preventing the spread of influenza viruses and mitigating the adverse health effects associated with them. Vaccination is particularly crucial for individuals with Chronic diseases (CDs), as they are at a higher risk of developing complications from the influenza virus.

Aim of Study: This study aimed to determine the prevalence of influenza vaccine (IV) uptake among CD patients, the factors influencing it, and what the main reasons were for those who chose to receive the IV and those who did not.

Material and Methods: A secondary analysis was conducted on 241 participants with CDs who were aged 18 years or older based on a previous cross-sectional study.

Results: A total of 43.2% of the participants received the IV during flu sessions in 2023. SIV was significantly associated with the source of information regarding vaccination. There was a higher probability (OR=1.49) of people not taking the IV when they received information from an untrusted source. Patients with immune diseases were more likely not to choose to take the vaccine (OR=3.04), while patients with diabetes were less likely to not take it (OR=0.64). Participants with CDs were more likely to choose to take the influenza vaccine due to encouragement from their healthcare providers than to their current health. In contrast, many CD patients refused vaccination without an apparent reason.

Conclusion: Patients with CDs had low influenza immunization rates. Primary healthcare practitioners should implement new and more effective methods of educating susceptible populations to increase influenza vaccination rates.

Key Words: Chronic disease – Seasonal influenza vaccination – Vaccination uptake – COVID-19 – high risk – Immunization rate – Complication – Hesitancy – Prevalence.

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Introduction

CHRONIC diseases (CDs) are long-term health conditions that affect individuals for an extended period. These diseases cannot be cured, but they can be managed with proper medical care, lifestyle modifications, and the support of a healthcare professional. CDs can be categorized into different types, each with its own set of symptoms and severity. Some examples of CDs include cardiovascular diseases (CVD), chronic respiratory diseases, diabetes mellitus (DM), autoimmune diseases, neurological disorders, rheumatic diseases, and endocrine disorders. By implementing management strategies and seeking support from healthcare professionals, individuals can still live well with CDs and maintain a higher quality of life *[1]*.

Individuals with CDs do not respond as well to infectious diseases as healthy individuals. Their immune systems are weak, so they cannot effectively fight viruses *[2]*. Vaccination can protect these individuals from severe complications and the worsening of their underlying conditions. Adults with CDs can benefit from vaccinations in several ways, including a reduction inthe severity of infectious diseases, reduction of hospitalization and death risks, minimization of the need for additional medications, improvement of quality of life, alleviation of discomfort and symptoms associated with infectious diseases, and reduction of the need for additional medication *[3]*. As a result, these individuals must prioritize vaccinations every year as a matter of paramount importance. Seasonal influenza vaccination (SIV) is especially crucial for adults with CDs.

Seasonal influenza, commonly known as the flu, is one of the most common infectious diseases worldwide. It is caused by influenza viruses that spread primarily through respiratory droplets when an infected person coughs, sneezes, or talks. The virus can infect the nose, throat, and lungs, leading to symptoms such as fever, body aches, headache, cough, and congestion. In some cases, the flu can

also lead to serious complications, such as pneumonia, bronchitis, and even death. The World Health Organization (WHO) reports that yearly influenza epidemics can cause five million severe cases of influenza, particularly in high-risk populations, and that 650,000 of those cases may end in respiratory complication-related deaths [4].

Vaccination remains the most effective method for preventing seasonal influenza. The Centers for Disease Control and Prevention (CDC) recommends that individuals obtain avaccination by the end of October, before the flu season begins. This timing helps protect individuals during the peak flu season when the virus is most prevalent [5].

In several countries, influenza vaccination programs have already been implemented to encourage high-risk individuals. However, the vaccination rate for vulnerable populations, including individuals with CDs, remains below WHO-recommended levels [6].

Vaccine uptake is negatively affected by vaccine hesitancy, which is defined as adelay in accepting or refusing vaccinations, regardless of their availability. The doctor-patient relationship, vaccine efficacy concerns, and the media landscape have been identified in previous researchas factors contributing to vaccine hesitancy [7].

The flu vaccination rate should always be kept uptodate. Having accurate information about flu vaccination rates allows for better planning and decision-making in public health interventions. By identifying areas with low vaccination rates, healthcare professionals can develop strategies for improving vaccination coverage. There is still a concern about the prevalence of flu vaccination among adults with CDs.

In the Kingdom of Saudi Arabia (KSA), chronic illnesses cause approximately 83,100 deaths every year, which is 73% of all deaths in thenation. CDs, including DM, respiratory diseases, cardiovascular disorders, cancer, and hypertension, are more common among the KSA's population [8]. Thus, CDs are on the rise in the KSA; this is linked to a rise in disability and a decline in quality of life and represents a substantial healthcare challenge in the country, accounting for an important portion of its medical costs and contributing to high rates of morbidity and mortality [9].

A total of 1,637 cases of influenza were found overall during the analytical period of week 27, 2022, and week 8, 2023, out of the 13,209 tested cases from Saudi Arabia, according to the most current monthly influenza reports of the East Mediterranean region [10].

A previous study, conducted by the same researcher (H.M.A), focused on SIV after the end of the COVID-19 pandemic and aimed to study the prevalence of seasonal influenzas and associated factors of the uptake of SIV among individuals living in Riyadh, Saudi Arabia. The findings from this previous research provided insights into the prevalence of SIV among citizens of Riyadh City in general and studied whether the presence of CDs was associated with the uptake of the vaccine.

In the context of the current study, the researcher aimed to extend upon previous research by analyzing only the data collected from individuals with CDs in the aforementioned study. This second study addresses the following research questions: What is the prevalence of uptake of SIV among individuals with CDs? What are the factors associated with the uptake of SIV? Among individuals who choose to receive the SIV and among individuals who choose not to take the SIV, what are the most common reasons for not taking it?

By analyzing the previously collected data, the researcher aimed to assess the prevalence of seasonal flu vaccination among individuals with CDs, identify factors influencing their vaccination rates, and explore the reasons for vaccine acceptancy or hesitancy among patients with CDs.

The results of this study can provide health care providers with the knowledge they need to develop targeted interventions and awareness campaigns that resonate with specific populations. To reduce the influenza burden and to vaccinate patients with CDs, this personalized approach is essential.

An influenza infection, commonly referred to as the flu, is a highly contagious respiratory illness caused by the influenza virus. The influenza season can pose significant health risks to patients with certain CDs.

The Arab Gulf Cooperation Council (GCC), which includes Saudi Arabia, Kuwait, Bahrain, Oman, Qatar, and the United Arab Emirates, is one of the regions with the highest prevalence of DM [11]. Saudi Arabia was identified as one of the top ten countries with the highest prevalence of Type 2 DM (T2DM), and the prevalence of DMin the Middle East and North Africa region was estimated at 18.1%, the highest in the world [12]. In Saudi Arabia, CDs represent a substantial healthcare challenge, consuming a substantial portion of the healthcare budget and leading to high rates of morbidity and mortality [9]. Every year, over 83,100 people pass away from CDs, making up 73% of all deaths in the nation. Saudi Arabia's population is at greater risk for CDs, such as DM, respiratory conditions, cardiovascular disorders, cancer, and hypertension [8]. Non-communicable diseases (or CDs) are responsible for 78% of all deaths in the KSA, with 46% being CVD related. The increasing trend in non-communicable diseases in the KSA is associated with an increase in disability and a negative impact on quality of life [13].

Several countries have already put programs in place to encourage high-risk individuals, particularly those in older populations, to receive vaccinations against influenza [6]. Even in wealthy nations, the uptake of vaccines for elderly populations is still below WHO-recommended levels [14]. It has been discovered that vaccine hesitancy, which is defined as adelay in accepting or refusing a vaccination regardless of its availability [15], negatively affects vaccine uptake [16]. Research has identified some characteristics that contribute to vaccine hesitancy, including worries about vaccine efficacy and safety, the doctor-patient relationship, and the media landscape [17]. The uptake of the vaccine among the general population has been reported to be affected by several determinants. Furthermore, though with limited evidence, the uptake of the vaccine among high-risk groups in Saudi Arabia appears to be suboptimal. Nonetheless, a gap in knowledge exists concerning the uptake rates of the vaccine among patients diagnosed with different CDs, such as patients diagnosed with metabolic diseases, cancer, and blood disorders [18].

The prevalence of flu vaccinations among CDs is an essential factor in reducing the burden of flu-related complications in these vulnerable populations. However, there is a lack of information regarding vaccination uptake rates among individuals with various chronic illnesses, including those with blood problems, cancer, and metabolic diseases. The purpose of this study was to estimate the rates of influenza vaccine uptake among a sample of patients from Riyad City, which included those who were healthy and those representing a range of CDs. It also aimed to identify the factors that facilitate and hinder the choice to receivethe vaccine among these patients. This article focuses on the prevalence of flu vaccination among individuals with CDs and identifies factors influencing their vaccination rates.

Material and Methods

Study design and settings:

This study applied a quantitative analysis of secondary data. The original study was cross-sectional and used an online survey to test the prevalence and associated factors of vaccination uptake and seasonal influenza among individuals living in Riyadh, Saudi Arabia. The primary data werecollected by the same researcher. In the current study, only responses from individuals with CDs were used for further analysis to answer a different research question.

The link to the survey was distributed via common social communication platforms. Only one response was accepted for each individual. Participation involved completion of the questionnaire between September and November 2023 and was voluntary. The original study received ethical approval from the Scientific Research Ethics Review Board of KSU (Approval Number: KSU-HE-23-644).

Participants:

Convenience samplingwas used to obtain responses from people living in Riyadh, aged 18 years old or above, of both sexes, with at least one chronic disease. A total of 241 participants were eligible for the secondary analysis. Based on the G*Power analysis for *t*-test (correlations), the sample size was sufficient to find significance with a power of .98, conventional medium effect size of 0.3 (based on Cohen's d), and significance level of .05.

Instrument:

The primary data were collected using a validated online self-administered questionnaire. The questionnaire consisted of three parts: The first part related to the demographic and clinical characteristics, the second part related to the flu vaccination history, and the last part related to the reasons for choosing to takeor not take the SIV.

Statistical analysis:

An Excel spreadsheet was created from the responses, which was then imported into a statistical analysis program. In this study, data analysis was performed using IBM SPSS Statistics version 29 for Windows (IBM Corp., Armonk, NY, USA). Descriptive statistics in terms of frequencies and percentages were used to detect the prevalence of seasonal influenza vaccinations (SIV) among individuals with CDs, describe the participants' demographic and clinical characteristics (age group, gender, marital status, educational level, previous IV, types of CD, and number of CDs), and the reasons for choosing to take or not take the flu vaccination.

A Pearson chi-square test was used to examine the associations of SIV uptake with demographic characteristics, source of information, and clinical characteristics. Association strength was assessed using the phi coefficient (φ). The association coefficient was interpreted as follows: 0, no association; 0 to .05, very weak; .06 to .10, weak; .11 to .15, moderate; .16 to .25, strong; and >.25, very strong [1].

Results

Participants:

A total of 241 participants aged 18 years or older (179; 74% female) reported having at least one chronic disease and were included in the study. The majority of respondents had the following characteristics: Over 40 years old, 136 (56.4%); married, 150 (62.2%); employed, 139 (57.7%); and had a bachelor's degree, 150 (62.2%). The CDs that were represented the most within the sample were DM (70;29%), followed by asthma (68;28.2%), hypertension (56;23.2%), and obesity (44;18.3%). The characteristics of the participants are summarized in Table (1).

Influenza vaccine uptake rates and associated factors:

During the 2023 flu season (current season), 104 (43.2%) participants took the influenza vaccine (or intended to take it), and only 26 (10.8%) reported receiving the vaccine at least one time during the COVID-19 pandemic (during the 2020-2022 flu seasons).

Association of influenza vaccine uptake with demographic characteristics:

Participants aged 18-40 years old, male, and single were more likely to not receive the vaccine (OR=1.10, 1.16, and 1.11, respectively). However, no significant associations were observed between SIV and age, gender, marital status, educational level, or employment status (p>.05).

Moreover, SIV had a significant strong association (φ=.21) with the source for receiving information regarding the vaccination. People who received information from an untrusted source were more likely (OR=1.49) not to receive the SIV. Table (2) summarizes the relationships between seasonal influenza vaccine uptake and demographic characteristics and sources of information.

Associations of influenza vaccine uptake with clinical characteristics and vaccination history:

There was a significant weak association of SIV with both immunodeficiency diseases and diabetes (φ=.14 and .13, respectively). Individuals with immunodeficiency diseases were more likely not to take the vaccine (OR=3.04), while patients with diabetes were less likely to not take the vaccine (OR=0.64).

SIV uptake during 2023 and during the pandemic were very strongly associated (φ=.34); individuals who did not take the SIV during the pandemic were more likely not to take SIV during 2032 (OR= 1.18), while those who did take the SIV during the pandemic were less likely to not take the SIV during 2023 (OR=0.23). The relationships between SIV uptake and clinical characteristics are summarized in Table (3).

Reasons for choosing to take or not take the SIV:

The most prevalent reason for participants with CDs to choose to take the SIV was encouragement from their healthcare providers (31;29.8%); this was indicated morethan their current state of health (21; 20.2%). However, arelatively large percentage of patients with chronic diseases refused vaccination due to a lack of comfort for no particular reason (48;35.0%). Furthermore, some refused the vaccination because they believedit did not protect against seasonal influenza (40; 29.2%), they did not receive adequate information (34;24.8%), and they thought that they did not need it (31;22.4%). Other reasons for uptake and non-uptake are listed in Table (4).

Table (1): Demographic and clinical characteristics of participants (n=241).

Demographic characteristics	Category	Frequency (n)	Percentage (%)
Age (years)	18–40	105	43.6
	Over 40	136	56.4
Gender	Male	62	25.7
	Female	179	74.3
Marital status	Single	91	37.8
	Married	150	62.2
Educational level	High school or lower	32	13.3
	Bachelor	150	62.2
	Postgraduate	59	24.5
Employment Status	Not Employed	61	25.3
	Student	41	17.0
	Employed	139	57.7
Clinical characteristics	Category	Frequency (n)	Percentage (%)
Chronic disease conditions	Immunodeficiency	20	8.3
	Cancer	7	2.9
	Respiratory system disease	7	2.9
	Cardiovascular disease	11	4.6
	Obesity	44	18.3
	Diabetes	70	29.0
	Asthma	68	28.2
	Hypertension	56	23.2
	Other disease	73	30.3
Number of chronic diseases	1	163	67.6
	2	50	20.7
	3 or more	28	11.6

Table (2): Associations between seasonal influenza vaccine uptake and demographic characteristics and sources of information (N=241).

Demographic characteristics	SIV taken N (%)	SIV not taken N (%)	X^2	df	*p*	OR	95% Confidence interval	
							Lower	Upper
Age (years):								
18–40	43	62	0.37	1	.54	1.10	0.82	1.47
	41.0%	59.0%						
Over 40	61	75				0.93	0.75	1.17
	44.9%	55.1%						
Gender:								
Male	33	29	3.45	1	.06	0.67	0.44	1.02
	53.2%	46.8%						
Female	71	108				1.16	0.99	1.35
	39.7%	60.3%						
Marital status:								
Single	37	54	0.37	1	.54	1.11	0.80	1.54
	40.7%	59.3%						
Married	67	83				0.94	0.77	1.15
	44.7%	55.3%						
Educational level:								
High school or lower	14	18	0.04	2	.98	NA	NA	NA
	43.8%	56.3%						
Bachelor’s	64	86				NA	NA	NA
	42.7%	57.3%						
Postgraduate	26	33				NA	NA	NA
	44.1%	55.9%						
Employment status:								
Not employed	30	31	3.12	2	.21	NA	NA	NA
	49.2%	50.8%						
Student	13	31.7%				NA	NA	NA
Employed	61	78				NA	NA	NA
	43.9%	56.1%				.		
Source of information:								
Trusted	58	47	11.08	1	<.001*	615	.461	.821
	55.2%	44.8%						
Not trusted	46	90				1.49	1.160	1.902
	33.8%	66.2%						

SIV = Seasonal influenza vaccine.
N = Number of participants.
X2 = Pearson’s chi-squared test.
df = Degrees of freedom.
**p* = Level of significance, α< .05.

Table (3): Association of SIV uptake with clinical characteristics and vaccine history (n=241).

Clinical characteristics	SIV taken N (%)	SIV not taken N (%)	X^2	df	p	OR	95% Confidence interval	
							Lower	Upper
Chronic disease conditions					.			
Immunodeficiency:								
No	*100*	*121*	*4.77*	*1*	*03*a*	*.92*	*.86*	*.99*
	45.2%	*54.8%*						
Yes	*4*	*16*				*3.04*	*1.05*	*8.81*
	20.0%	*80.0%*						
Cancer:								
No	*102*	*132*	*0.63*	*1*	*.70a*	*.982*	*.94*	*1.03*
	43.6%	*56.4%*						
Yes	*2*	*5*				*1.898*	*.38*	*9.59*
	28.6%	*71.4%*						
Respiratory system diseases:								
No	*102a*	*132*	*0.63*	*1*	*.70a*	*.982*	*.94*	*1.03*
	43.6%	*56.4%*						
Yes	*2*	*5*				*1.898*	*.38*	*9.59*
	28.6%	*71.4%*						
Cardiovascular disease:								
No	*99a*	*131*	*0.03*	*1*	*.88*	*1.004*	*.95*	*1.06*
	43.0%	*57.0%*						
Yes	*5*	*6*				*.91*	*.29*	*2.90*
	45.5%	*54.5%*						
Obesity:								
No	*82a*	*115a*	*1.03*	*1*	*.31*	*1.065*	*.94*	*1.21*
	41.6%	*58.4%*						
Yes	*22*	*22*				*0.76*	*.45*	*1.29*
	50.0%	*50.0%*						
Diabetes:								
No	*66a*	*105a*	*4.99*	*1*	*.02**	*1.21*	*1.02*	*1.44*
	38.6%	*61.4%*						
Yes	*38*	*32*				*0.64*	*.43*	*.94*
	54.3%	*45.7%*						
Asthma:								
No	*76*	*97*	*0.15*	*1*	*.70*	*0.97*	*.83*	*1.14*
	43.9%	*56.1%*						
Yes	*28*	*40*				*1.09*	*.72*	*1.64*
	41.2%	*58.8%*						
Hypertension:								
No	*79*	*106*	*0.07*	*1*	*.80*	*1.02*	*.89*	*1.17*
	42.7%	*57.3%*						
Yes	*25*	*31*				*0.94*	*.60*	*1.49*
	44.6%	*55.4%*						
Number of Chronic Diseases:								
1	*70*	*93*	*0.02*	*2*	*.99*	*NA*	*NA*	*NA*
	42.9%	*57.1%*						
2	*22*	*28*				*NA*	*NA*	*NA*
	44.0%	*56.0%*						
3 or more	*12*	*16*				*NA*	*NA*	*NA*
	42.9%	*57.1%*						
IV history:								
During COVID-19 pandemic:								
No	*84*	*131*	*13.548a*	*1*	*<.001**	*1.18*	*1.07*	*1.31*
	39.1%	*60.9%*						
Yes	*20*	*6*				*.23*	*.095*	*.55*
	76.9%	*23.1%*						

SIV = Seasonal influenza vaccine.
N = Number of participants.
X2 = Pearson's chi-squared test.
df = degrees of freedom.
**p = Level of significance, α< .05.*
aFisher's exact test (exact sig.) was used if more than 20% of the cells had an expected count of less than 5.

Table (4): Reasons for seasonal flu vaccination uptake and non-uptake.

Reasons for uptake of the vaccine (n=104)	N	%
Health provider encouragement	31	29.8
Vaccinations are easily accessible	11	10.6
Influence of the media	9	8.7
Being prone to recurrent respiratory infections or colds	16	15.4
Status of health	21	20.2
Exposure to crowded places on a regular basis	3	2.9
A colleague's or relative's encouragement	6	5.8
Efficacy of corona vaccine in preventing infection or reducing the severity of symptoms	7	6.7
Reasons for non-uptake of the vaccine (n=137)	N	%
Don't have adequateinformation about the importance of the seasonal influenza vaccine.	34	24.8
Nearby vaccination centers are not available	3	2.2
There is no evidence that the vaccine protects against seasonal influenza	40	29.2
Not directly exposed to seasonal influenza	8	5.8
Uncomfortable for no particular reason	48	35.0
Previous severe side effects experience after corona vaccine	11	8.0
Fear of side effects associated with vaccines in general	31	22.6
No need for seasonal flu vaccine	33	24.1
Fear of needle pricks	3	2.2

Note: Participants were allowed to choose more than one reason.

Discussion

We found that 43.2% of participants with CDs received the seasonal influenza vaccine (SIV), but only 10.8% received the vaccine at least once during the COVID-19 pandemic (2020-2022 flu seasons). There were no significant associations between SIV and the demographic characteristics. However, this study found that SIV vaccination was significantly associated with individuals who had immune diseases or diabetes. Individuals with immune diseases were less likely to take the vaccine, while those with diabetes were more likely to take it. In addition, the encouragement of health providers, individual health status, and recurrent respiratory infections or colds were the main motivators for choosing to receive the SIV.

In line with previous studies conducted in Saudi Arabia to measure influenza vaccine uptake during previous influenza seasons and among different vulnerable populations, the rate of vaccination was relatively low. Gosadi et al. *[18]* found that only 41.4% of patients with CDs ever received the influenza vaccine, and only 17.3% received the vaccine on an annual basis in the Jazan region. Another study conducted in Riyadh revealed that 45% of patients with CDs received SIV within one year prior to the data collection period (February 2020 to June 2021) *[19]*. Additionally, in research performed in 2019, 44% of participants in Riyadh reported having receivedan-SIV in the past (those with CDs represented 20% of the sample) *[20]*. In contrast, in Al-Madinah City, in 2019, the rate of vaccination was higher than the current study; they found that 60% of patients with CDs received the vaccine *[21]*.However, it was unclear if this rate was related to a specific season and the types of CDs were not indicated. The fact that this city is recognized as a holy place and that many visitors come from all over the world can explain why people there would be more receptive to receiving the vaccine. In addition, in contrast with the current study, the samples were collected from medical centers, which could certainly affect the vaccine information received.

The KSA has placedgreat attention on the healthcare sector as its Ministry of Health (MoH) has conducted vaccination campaigns for different types of diseases, with one of the most important being seasonal influenza. Saudi Arabia's MoH offers free influenza doses every year, assists in making vaccinations available, and promotes vaccination in advance of predicted wintertime outbreaks. Moreover, the MoH strongly advisesa yearly influenza vaccine for those who are highly susceptible to serious influenza complications, such as the elderly and individuals with CDs *[22]*.

The findings of the current study were similar to international investigations indicating suboptimal vaccination rates among patients with CDs, such as in Tunisia (19.4%) *[23]*, Greece (34.8%) *[24]*, and South Korea (41.3%) *[25]*.

We found that willingness to receive the influenza vaccine among the participants was not influenced by demographic factors. Our current study did not detect any statistically significant differences based on gender or age group. However, those who were single, male, or between the ages of 18 and 40 had higher odds of not obtaining the vaccine. Additionally, no significant correlations were found between SIV and employment status, level of education, or marital status. These results were similar to other studies conducted in the Jazan region *[18]*. The results might indicate that older Saudi Arabians are less likely than younger Saudis to have received the vaccination. Their rate of vaccination (44.9%) was below that found in a previous study that assessed influenza vaccine uptake in people ≥65 years in central Saudi Arabia. In that study, there were 496 Saudi participants, of whom 47.8% had been vacci-

nated against influenza at least once. Of unvaccinated individuals, 46% believed that the vaccine was unnecessary [26]. However, in another Saudi study, out of 790 participants, just 100 (12.65%) reported receiving the influenza vaccine on a yearly basis; most of the participants (87%) were under 33 years old, with the highest proportion (57%) being those under 24 years old [27].

In contrast, data from a study in Greece showed that individuals in the age range 60-79 years are more likely to get vaccinated than younger or older individuals; in addition, there was no difference invaccination preference among the different sexes [24].

In South Korea, the vaccination uptake rates for individuals aged 50-54, 55-59, and 60-64 years were 26.7%, 31.0%, and 41.1%, respectively [25]. Individuals aged 60-64 years reported a significantly higher vaccination rate than those in the 50-54-year age group. In addition, according to the data from the study, individuals with more education reported having lower vaccination rates.

The SIV uptake in the current study was significantly associated with the source of information regarding vaccination. People who received the information from an untrusted source were more likely to choose not to take the SIV. This finding was compatible with Bonner et al.'s study [28], which found that messages from trusted resources had a strong correlation with vaccine willingness.

The current study showed that only 20% of patients with immune diseases received an SIV, but that having this type of disease was associated with the choice to take an SIV. This wasin contrast to a previous study, which showed that 59% of patients with immune diseases received an SIV and had a better understanding of their conditions [29].

The reason for this could be that individuals with immune diseases are concerned about potential adverse effects or their weakened immunity, which leads them to delay or refuse vaccinations because of these concerns.

In the current study, compared to persons with other diseases, individuals with diabetes were more willing to be vaccinated (54.3% of patients with diabetes), which is consistent with three previous studies that found persons with diabetes were more likely to be vaccinated. In previous Saudi research evaluating influenza vaccination among individuals with Type 2 diabetes, Abha observed a 61% vaccination uptake rate [30], 47.8% in Riyadh [31], and 43.5% in Taif [32].These findings were considerable when compared tonational levels and those of other Gulf countries [12].

One of the regions with the highest incidence rates of individuals with DMs can be defined by the member states of the Arab Gulf Cooperation Council (GCC), which includes Saudi Arabia, Kuwait, Bahrain, Oman, Qatar, and the United Arab Emirates [11]. The Middle East and North Africa region has the highest estimated DM prevalence in the world, at 18.1%, and Saudi Arabia is among the top ten countries in the world inT2DM prevalence. The findings of the current research conducted in Saudi Arabia reflect some of the same issues that these other countries face regarding these same health issues.

In all, 241 participants (179 or 74% of whom were female) who were at least 18 years old and had at least one chronic condition were included in the study. Diabetes was the most prevalent CD (70; 29%), followed by asthma (68; 28.2%), hypertension (56; 23.2%), and obesity (44;18.3%). According to a prior study, patients with diabetes responded optimally to the influenza vaccination, suggesting that the vaccine offers a legitimate defense against influenza [33].

Moreover, published data indicate that influenza vaccinations may benefit individuals with diabetes by lowering the number of hospitalizations and winter mortality. It may also help prevent community-acquired lower respiratory tract infections, heart failure, acute myocardial infarction, and stroke [34]. Further more, a survey was completed by a sample of 1,914 patients with diabetes who were part of a Chinese study [35]. Of the participants, 46.13% stated that they intended to be vaccinated against influenza, and only 7.84% actually received the shot. Therefore, the patients with diabetes did not have strong intentions to become vaccinated against influenza.

In an online survey conducted recently, 1,539 Saudi Arabian citizens were asked to rate their readiness to receive the COVID-19 and influenza vaccines [16]. Of these, almost 60% of the participants were eager to receive the COVID-19 vaccine, but only 31.7% were willing to receive the influenza vaccine.

However, our research revealed a very strong correlation between the reception of the SIV in 2023 and getting the SIV during the pandemic; individuals who did not take the SIV during the pandemic had a higher likelihood of not taking the SIV in 2032, whereas those who took the SIV during the pandemic had a lower likelihood of not taking the SIV in 2023. In Gosadi et al.'s [18] study, participants were asked if they thought the COVID-19 pandemic affected their decision to receive the influenza vaccination. Of the sample, 34% said they thought they were more committed to receivingthe vaccination prior to the pandemic, and 25.7% said they thought it was harder to receive the vaccine after the pandemic. Approximately 25% of the participants expressed their conviction that the COVID-19 vaccination couldeither supplant or contradict the

influenza vaccination. According to our research, the main motivating reasons for receiving the SIV, which had higher influenza vaccination rates, were health provider encouragement (31%), individual health status (21%), and recurrent respiratory infections or colds (16%), all of which were associated with higher influenza vaccination rates. These results are consistent with a study by Jang et al. [25] that found that those with greater influenza vaccination rates knew about the possible severity of influenza, the value and safety of vaccination, and had experienced influenza after receiving a healthcare recommendation or vaccine. Similar hurdles have been seen in Jordan, where the primary barrier to immunization abstention was that patients with CDs received substandard vaccines, and thus the vaccine was considered unnecessary, according to a recent survey [36]. According to Kharroubi et al. [23], a doctor's recommendation is the primary factor that may lead to vaccine acceptance (41.1%), whereas worries about side effects (71.5%) and the conviction that the vaccine is ineffective at preventing influenza illness (33.9%) are the primary factors that may lead to vaccine refusal. When it came to information about the influenza vaccine, doctors were the most reliable source (91.5%). In a previous study in Saudi Arabia, ananalysis was performed to assess the receipt of the vaccine according to being diagnosed with a CD [18]. The main motivations for the vaccination were an understanding of the disease's seriousness and ramifications, as well as the vaccine's critical role in preventing infection and the risk of complications. The primary obstacles to vaccination among the participants were fear of adverse effects, inadequate information concerning the vaccine, and a lack of motivation from their doctors toward receiving the vaccination.

Bödeker et al. [37] reported that the belief that influenza was not a severe disease and a general suspicion of vaccinations were each expressed by more than 20% of interviewees and were the main causes of Germany's poor influenza vaccination coverage rate. In addition, about half of those surveyed who were 60 years of age or older or who had a chronic illness firmly felt that influenza was caused by the vaccination. According to the researchers, future communication initiatives should address these views.

Similar hurdles have been observed in many other parts of the world. For example, in the United States, a survey indicated that the most often mentioned reasons for vaccination refusal were concerns about the efficacy and safety of the influenza vaccine [38].

Further investigation uncovered arguments against vaccination rejection, such as worries about vaccine-related diseases, questions regarding the vaccine's efficacy, and the belief that the vaccination was unnecessary. Earlier research in the UK had similar results, with competent nurses' main barriers to receiving the vaccination being fear of side effects and safety concerns [39]. A successful immunization program is largely the result of five factors: (1) Astrong belief in the benefits of vaccination, (2) Awareness of the burden and severity of disease, (3) Healthcare professional accountability and engagement, (4) Facilitated access to vaccination, and (5) Accountability of the health authority.

Conclusion:

Our results show that there is an important gap in immunization coverage. The perception that avaccine might not be safe or effective, the relatively mild nature of the flu, the belief that one does not belong to a high-risk group, a general mistrust of vaccination, a sense of toxicity from some vaccine components or excipients, and an overall fear of adverse reactions were reported factors contributing to non-vaccination in high-risk groups. The results of this study indicated that people with CDs had low immunization rates against influenza. Those aged 18-40 years, male, and single were more prone to not receiving the vaccine. Furthermore, there was no variation in vaccination preferences across sexes, while individuals with diabetes were less likely to not receive the vaccination. There were comparatively few people in the sample who had received vaccinations, even though medical professionals had repeatedly advised those with CDs to do so. Patients in high-risk groups require more thorough and appropriate information on SIV. To increase the SIV rate, primary healthcare practitioners should employ newand more potent methods of educating susceptible populations about influenza. Better programming is typically needed to apply new and more effective tactics in primary medical clinics (PMCs). In addition, there is a need for national initiatives to promote vaccinations for patients in high-risk groups, especially individuals suffering from CDs.

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Author contribution:

The author confirms sole responsibility for the following: Study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

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The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

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The author declares no conflicts of interest.

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التطعيم ضد الأنفلونزا الموسمية بين المرضى المصابين بالأمراض المزمنة: نسبة الانتشار ومدى التقبل او التردد عن التطعيم

تمهيد: يعد التطعيم ضد الأنفلونزا الموسمية أحد تدابير الصحة العامة الأساسية لمنع انتشار فيروسات الأنفلونزا خصوصاً للأفراد الذين يعانون من أمراض مزمنة، حيث أنهم أكثر عرضة للإصابة بمضاعفات فيروس الأنفلونزا. لذلك هدفت هذه الدراسة إلى تحديد نسبة انتشار التطعيم ضد الأنفلونزا بين المصابين بالأمراض المزمنة، والعوامل المؤثرة عليها، والأسباب الرئيسية لتقبل او التردد عن اخذ اللقاح.

طرق البحث: تم إجراء تحليل إحصائى ثانوى على بيانات ٢٤١ مشاركًا فى دراسة مقطعية، من الافراد اللذين يعانون من أمراض مزمنة وأعمارهم ١٨ عاماً أو أكثر.

النتائج: أظهرت النتائج ان ٤٣,٢٪ من المشاركين تم تلقيهم لقاح الأنفلونزا فى موسم عام ٢٠٢٣. وارتبط بشكل كبير بمصدر المعلومات المتعلقة بالتطعيم. حيث كان هناك احتمال أكبر لأخذ اللقاح لمن تلقى المعلومات من مصدر موثوق (نسبة الأرجحية = ١,٤٩) للأشخاص الذين لا يأخذون لقاح الأنفلونزا عندما تلقوا معلومات من مصدر غير موثوق به. كان المرضى الذين يعانون من أمراض مناعية أكثر عرضة لعدم أخذ اللقاح (نسبة الأرجحية = ٣,٠٤)، بينما كان المرضى الذين يعانون من مرض السكرى أقل احتمالية لعدم اخذ اللقاح (نسبة الأرجحية = ٠,٦٤). واظهر ان تشجيع مقدمى الرعاية الصحية والوضع الصحى من أكثر الأسباب لتقبل اللقاح بينما تردد اغلبية المرضى عن اخذ اللقاح بدون أسباب واضحة.

الخلاصة: كان لدى المرضى الذين يعانون من الأمراض المزمنةنسبة تحصين منخفضة ضد الأنفلونزا. لذلك يجب على ممارسى الرعاية الصحية الحرص على تشجيع المرضى على اخذ لقاح الأنفلونزا وتوضيح مدى اهميته.