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Knowledge, Attitude, Practice and Barriers Associated with Influenza Vaccination among Health Care Providers, Southern-Eastern Governorates of Yemen, 2023-2024

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Abstract

Introduction: Data on knowledge, attitude, and practice on influenza vaccination among health care providers (HCPs) in Yemen remain limited. This study aimed to assess the knowledge, attitude, practice, and barriers related to influenza vaccination among HCPs in Yemen.

Methods: A descriptive cross-sectional knowledge, attitudes and practice study was conducted among HCPs in public and private healthcare sectors located in the Southern-Eastern part of Yemen 2023-2024. Sample size was calculated using Raosoft software, and convenience sampling was employed. A self-structured questionnaire, adapted from earlier studies in Yemen and neighboring countries regarding influenza vaccines, was used. Ethical approval was obtained from the University of Aden and World health organization ethical committee. Descriptive and inferential statistics were used to analyze the data.

Results: A total of 415 HCPs participated in the study. The mean age ±standard deviation of participants was 37 ±10.7 years, with most participants being young adults aged 20-35 years (50.6%), out of them, 37.8% were females. Poor knowledge of influenza vaccines was found in 64.1%. Moreover, 373 (89.9%) of the respondents had never been vaccinated against influenza. The main reasons cited for non-vaccination were a lack of knowledge about the disease and the vaccine (205, 49.4%) and a lack of trust in the health system (128, 30.8%). HCPs were identified as the main source of information about influenza vaccination by 246(40.7%) of the respondents. The sentiment that influenza vaccine is important and should be administered annually was shown by 62.2% of participants. Additionally, the highest percentage of participants (279, 67%) expressed a positive attitude toward influenza vaccination.

Conclusion: This study shows favorable acceptance of influenza vaccination among HCPs in Yemen and stresses the urgent need for enhanced awareness initiatives. The results of this research can contribute to the formulation of an effective immunization policy for HCPs in Yemen.

Keywords: Influenza Vaccine, KAP study, Health Care Providers, Yemen

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المعرفة والمواقف والممارسات والعوائق المرتبطة بالتطعيم ضد الإنفلونزا بين مقدمي الرعاية الصحية في المحافظات الجنوبية والشرقية، اليمن، 2023-2024

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ملخص الدراسة

المقدمة : تظل البيانات حول المعرفة والمواقف والممارسات المتعلقة بالتطعيم ضد الإنفلونزا بين مقدمي الرعاية الصحية في اليمن محدودة. هدفت هذه الدراسة إلى تقييم المعرفة والمواقف والممارسات والعوائق المتعلقة بالتطعيم ضد الإنفلونزا بين مقدمي الرعاية الصحية في المحافظات الجنوبية والشرقية في اليمن.

المنهجية: تم إجراء دراسة وصفية مقطعية للمعرفة والمواقف والممارسات (KAP) بين مقدمي الرعاية الصحية في القطاعين العام والخاص في الجزء الجنوبي الشرقي من اليمن. تم حساب حجم العينة باستخدام برنامج Raosoft وضم المبحوثين للدراسة من خلال العينة المريحة. استخدمت الدراسة استبيان ذاتي البنية، مستمد من دراسات سابقة في اليمن والدول المجاورة بشأن لقاحات الإنفلونزا. تم الحصول على الموافقة الأخلاقية من جامعة عدن ولجنة الأخلاقيات التابعة لمنظمة الصحة العالمية. وقد تم استخدام الإحصاء الوصفي والاستدلالي لتحليل البيانات.

النتائج: شارك ما مجموعه 415 من مقدمي الرعاية الصحية في الدراسة. كان متوسط العمر ± الانحراف المعياري للمشاركين 37 ± 10.7 سنة، حيث كان معظم المشاركين من الشباب الذين تتراوح أعمارهم بين 20-35 سنة (50.6%)، منهم 37.8% من الإناث .أظهر نسبة64.1%، معرفة ضعيفة بلقاحات الإنفلونزا. علاوة على ذلك، لم يتم تطعيم 373 (89.9%) من المستجيبين ضد الإنفلونزا. .كانت الأسباب الرئيسة لعدم التطعيم هي نقص المعرفة حول المرض واللقاح (205، 49.4%) ونقص الثقة في النظام الصحي (128، 30.8%). تم تحديد مقدمي الرعاية الصحية كمصدر رئيس للمعلومات حول التطعيم ضد الإنفلونزا من قبل 246 (40.7%) من المستجيبين .ترى نسبة كبيرة من المشاركين (62.2%) أن لقاح الإنفلونزا مهم ويجب إعطاؤه سنويًا. بالإضافة إلى ذلك، أعربت غالبية المشاركين (279، 67%) عن موقف إيجابي تجاه التطعيم ضد الإنفلونزا.

الخلاصة: تُظهر هذه الدراسة إقبالاً على لقاح الإنفلونزا بين العاملين في مجال الرعاية الصحية في اليمن، وتُشدد على الحاجة المُلحة لتعزيز مبادرات التوعية. ويمكن أن تُسهم نتائج هذا البحث في صياغة سياسة تحصين فعّالة للعاملين في مجال الرعاية الصحية في اليمن

كلمات مفتاحية: لقاح الإنفلونزا، دراسة KAP، مقدمو الرعاية الصحية، اليمن

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Introduction

Seasonal influenza is a contagious respiratory infection caused by influenza viruses, circulating globally [1]. It affects people of all ages, with annual estimates suggesting 5-10% of adults and 20-30% of children worldwide experience illness, hospitalization, or death [2]. Influenza vaccines are a cornerstone of prevention, offering safety and efficacy. Inactivated influenza vaccines, available since the 1940s, are recommended for high-risk individuals. The World Health Organization's (WHO) Advisory Group of Experts on Immunization (SAGE) strongly recommends influenza vaccination for pregnant women, healthcare workers, young children, the elderly, and individuals with chronic conditions [3,7].

Yemen's ongoing conflict has worsened a severe humanitarian crisis, characterized by food insecurity, displacement, and a collapsed healthcare system [4]. The COVID-19 pandemic further strained the limited health infrastructure, highlighting the need for robust public health measures, including influenza surveillance and vaccination [5,6]. Influenza surveillance in Yemen began in 2010 with two sentinel sites in Sanaa and Aden, expanding to include Taiz, Hodiedah, and Mukalla in later years. The surveillance system aims to: Detect influenza outbreaks and emerging strains, Estimate the proportion of influenza-like illness (ILI) cases, provide viral isolates for antigenic analysis, and inform national vaccine policy. Influenza seasons in Yemen typically occur from October to March, peaking in January-February. ILI affects 14-20% of the population seeking healthcare, while severe acute respiratory illness (SARI) affects 5-6% of hospitalizations [5,6].

Healthcare providers (HCPs) are at an increased risk of influenza infection, both in the community and healthcare settings. They can also transmit the virus to patients and colleagues, disrupting healthcare services. Despite the risks and recommendations, many HCPs continue to work while ill [8-12].

Currently, no specific guidelines exist for influenza vaccination in Yemen. Moreover, there is a dearth of data on HCPs knowledge, attitudes, and practices on influenza vaccination. This study aims to fill this gap and contribute to the development of influenza vaccination policies and strategies to improve coverage among HCPs and reduce influenza-related morbidity and mortality.

This survey is the first of its kind in the Southern-Eastern part of Yemen, encompassing Taiz, Aden, Lahj, Abyan, Al-Dhalea, Hadramout/Mukalla, Shabwa, Hadramout/Sayoun, Al-Mahara, Marib, and Socotra governorates. While health authorities in these governorates have no objections to influenza vaccination, as showed by their use of COVID-19 vaccines, the situation in the northern part of Yemen stays complex due to ongoing conflict and related health challenges. Thus, this study aimed to assess the knowledge, attitude, practice (KAP), and barriers related to influenza vaccination among HCPs in the study areas.

Methods

Study Design

A descriptive cross-sectional study.

Study Participants and Sampling

The total population of the Southern-Eastern part of Yemen is estimated at 13,000,000 people, with an estimated 20,000 HCPs working in 5,533 Health Facilities (HFs), of which 54% are fully functional and 40% are partially functional [13].

Inclusion Criteria

- HCPs aged 18 years or older.
- HCPs practicing in the southern and eastern governorates of Yemen, specifically: Taiz, Aden, Lahj, Abyan, Al-Dhalea, Shabwa, Hadramout (Mukalla and Sayoun), Al-Mahara, Marib, and Socotra.
- HCPs working in both public and private healthcare sectors.
- HCPs present during the period of data collection and questionnaire distribution.

Sample size was calculated using Raosoft software [11]. Assuming a 50% knowledge level among HCPs, a margin of error of ±5%, and a 95% confidence interval, the required sample size was determined to be 415, with an additional 10% added to account for incomplete responses. A convenience sampling method was utilized to obtain a geographically diverse representation. This non-probability sampling technique involved the selection of HCPs readily accessible at designated locations or identified within medical record databases. Data collection proceeded until the predetermined sample size was achieved.

Study Tool

A self-administered structured questionnaire, adapted from earlier studies on COVID-19 and influenza vaccines in Yemen and neighboring countries [7,16-20], was used. The questionnaire was modified and culturally adapted by the Ministry of Public Health and Population (MOPH&P) research committee and cleared by the WHO ethical committee.

A pretesting of the questionnaire was conducted involving twenty individuals of various ages and occupations in Aden city to assess the questionnaire's ease of administration and clarity. Necessary modifications were made to the final 26-question questionnaire, which assesses KAP towards influenza vaccination

The questionnaire included four main sections:

1. Socio-demographic information: sex, age, residence, education level, and occupation.
2. Knowledge of the influenza vaccine (12 questions).
3. Attitudes toward the influenza vaccine (8 questions).
4. Practice of influenza vaccination (6 questions).

Data Analysis

To ensure data accuracy, two researchers independently entered data from completed questionnaires into SPSS version 21. After verification, data were analyzed using descriptive and inferential statistics. Frequencies and percentages were used for categorical variables, while

means and standard deviations were used for continuous quantitative variables. Chi-square and Fisher's exact tests were employed to compare categorical outcomes. The 12 knowledge items were combined into a dichotomous variable: "well-informed" (≥ 60% correct answers) and "poorly informed" (<60% correct answers). Attitude items were also combined into a dichotomous variable: "positive attitude" and "negative attitude." Individuals with unclear attitudes (≥ 50% "cannot answer") were excluded from the analysis. The vaccination status was categorized as "not willing/not vaccinated" or "vaccinated/willing to be vaccinated."

Operational definitions

- Health Care providers (HCP): A provider, otherwise known as a healthcare provider, is a person or organization that delivers a healthcare service. Hospitals, doctors, nurses, physician assistants, and lab techs are all types of healthcare providers [14].
- Knowledge: In the context of this study, "knowledge" refers to the HCPs' cognitive understanding of influenza, influenza vaccination, and related concepts. This includes information about the virus, its transmission, the efficacy and safety of vaccines, and vaccination guidelines [15].
- Attitudes: represent the HCPs' feelings, beliefs, and predispositions towards influenza vaccination. This encompasses their perceived benefits and risks of vaccination, their level of confidence in vaccine safety, and their overall opinions about vaccination recommendations [15].
- Practice: refers to the observable behaviors of HCPs related to influenza vaccination. This includes their personal vaccination status, their adherence to vaccination protocols, and their actions in recommending or administering vaccines to patients or colleagues [15].
- Barriers to non-vaccination: barriers are the reasons why a person chooses not to get vaccinated [15].

Ethical Considerations:

Technical approval has been obtained from the Ethics Research Committee of the Faculty of Medicine and Health Sciences University of Aden, and the WHO Regional Ethics Committee. Trained healthcare professionals who collected data were instructed on participant recruitment and study objectives. Participants provided verbally informed consent after a clear explanation of the study and assurance of anonymity.

Results

A total of 415 HCPs participated in the study, achieving a 100% response rate. The mean age of participants was 37 years (SD=10.7), with the most frequent age group being 20-35 years (50.6%), out of them 37.8% were females. Detailed demographic characteristics are presented in Table 1.

Table 1: Participants' Sociodemographic Information (n=415)

Variable	No.	%
Age (years)	**Mean 37.0±10.7**	
20-35	210	50.6
36-51	150	36.1
>51	55	13.3
Sex		
Male	258	62.2
Female	157	37.8
Marital Status		
Married	309	74.5
Unmarried	98	23.6
Widow	8	1.9
Governorate		
Aden	60	14.5
Hadramout Alsahel	60	14.5
Lahj	42	10.1
Taiz	41	9.9
Mareb	40	9.6
Aldhalea	40	9.6
Hadramout Alwadi	40	9.6
Shabwa	40	9.6
Abayn	33	8.0
Alhudaida	19	4.6
Current Occupation		
Nurse	128	30.8
Physician	72	17.3
Laboratory technician	70	16.9
Pharmacist	32	7.7
Midwife	19	4.6
Medical student	2	0.5
Others	92	22.2
Level of education		
Diploma	206	49.6
Graduated (Bachelor)	149	35.9
Post-graduation (master & doctorate)	38	9.2
Uder graduation (student)	11	2.7
Others	11	2.7

In regards to seasonal influenza knowledge, Table 2 illustrates that most participants correctly identified the viral cause (95.7%). Eighty one percent recognized that individuals with chronic diseases were at higher risk for severe flu symptoms, while 78.8% differentiated flu from the common cold. The most often reported influenza symptoms were runny nose (95.9%), sneezing (95.2%), headache (92%), fatigue (88.4%), fever (88%), and sore throat (81.9%). Regarding influenza vaccination knowledge, 44.8% of participants had not heard of the influenza vaccine whereas 42.9% said that they heard vaccine could prevent flu. When answering the question "Who advised you not to get the

vaccine," many responders mentioned family members (86, 20.7%) and healthcare workers (60, 14.5%) respectively. A greater proportion of respondents cited healthcare providers (246, 40.7%) as the primary source of information about influenza vaccination, followed by SMS/social media (143,34.5%) and newspapers/ billboards (126,30.4%) respectively. A few respondents cited community members, family, and religious leaders as sources of information.

Table 2: Health Care Providers' Knowledge about Influenza Vaccination, Southern and Eastern Yemen, 2024 (n=415)

Question	Yes		No	
	No.	%	No.	%
What do you know about seasonal influenza?				
It is caused by virus	397	95.7	18	4.3
It can spread from one person to the other	388	93.5	27	6.5
It could cause serious complication specially among people with chronic diseases	339	81.7	76	18.3
Flu symptoms are worse among people with chronic diseases	336	81.0	79	19.0
It is occurred at a certain period of the year	331	79.8	84	20.2
It is the same as common cold	327	78.8	88	21.2
It can be prevented	271	65.3	144	34.7
What are the common symptoms of flu that you know?				
Running nose	398	95.9	17	4.1
Sneezing	395	95.2	20	4.8
Headache	382	92.0	33	8.0
Fatigue	367	88.4	48	11.6
Fever	365	88.0	50	12.0
Sore throat	340	81.9	75	18.1
Cough	336	81.0	79	19
Muscle ache	327	78.8	88	21.2
Have you ever heard of the vaccine against influenza?	229	55.2	186	44.8
Have you ever heard of that a vaccine could prevent flu?	178	42.9	237	57.1
Which one is the MOST trusted source of information you rely on about COVID-19 vaccination and prevention?				
Health workers and health facilities	246	40.7	169	59.3
SMS/social media	143	34.5	272	65.5
Print media posters/flyers/ newspapers/billboards	126	30.4	289	69.6
TV	122	29.4	293	70.6
Government	101	24.3	314	75.7
Non-governmental and community-based organizations	93	22.4	322	77.6
Family and Friends	51	12.3	364	87.7
Religious and Community leaders	20	4.8	395	95.2
Will you get the seasonal influenza vaccine if it is available to you?	309	74.5	106	25.5

Has anyone recommended you receive seasonal influenza vaccine?	272	65.5	143	34.5
Has anyone discouraged you from receiving influenza vaccine?	113	27.2	302	72.8
Who advise you do not get the vaccine?				
Family member	86	20.7		
Health care providers	60	14.5		
Community member	48	11.6		
No one	37	8.9		
Religious leader	32	7.7		
Local NGO or volunteer	8	1.9		
Others	144	34.7		

In contrast to the inadequate knowledge of influenza vaccine, most participants had high recognition of the effects and safety of the influenza vaccine. Most participants (340, 81.9%) believed that influenza vaccination prevents complications associated with seasonal flu, and 258 (62.2%) believed that the influenza vaccine is important and should be taken yearly. Only 69 (16.6%) of participants mentioned that the influenza vaccine has serious side effects and should therefore not be taken. Thirty-two percent of the participants considered that the influenza vaccine can make someone sick with influenza, and 27.2% believed they don't need the flu vaccine because they have lifelong immunity against the flu as presented in Table 3.

Table 3: Health Care Providers' Attitudes toward Influenza Vaccination, Southern and Eastern Yemen, 2024 (n=415)

Question	Yes		No	
	No.	%	No.	%
Influenza vaccination prevents complications associated with seasonal flu	340	81.9	75	18.1
Influenza vaccine is important and should be taken yearly	258	62.2	157	37.8
All people should take the influenza vaccine	257	61.9	158	38.1
Influenza is not causing a lot of illnesses in this country	167	40.2	248	59.8
Flu is a mild illness and therefore vaccination is not necessary	147	35.4	268	64.6
influenza vaccine can make someone sick with influenza	133	32.0	282	68.0
I don't need the flu vaccine because I have life immunity against the flu	113	27.2	302	72.8
Influenza vaccine has a serious side effect, therefore should not be taken	69	16.6	346	83.4

For the overall flu vaccine knowledge, the knowledge responses were well-informed (n=149, 35.9%) and poorly informed (n=266, 64.1%) as shown in Figure 1. When combining the answers to the attitude items into one attitude variable, the sample was divided into two groups: responders with a generally positive attitude (n= 261, 62.9%) and responders with a negative attitude (n= 154, 37.1%), Figure 1.

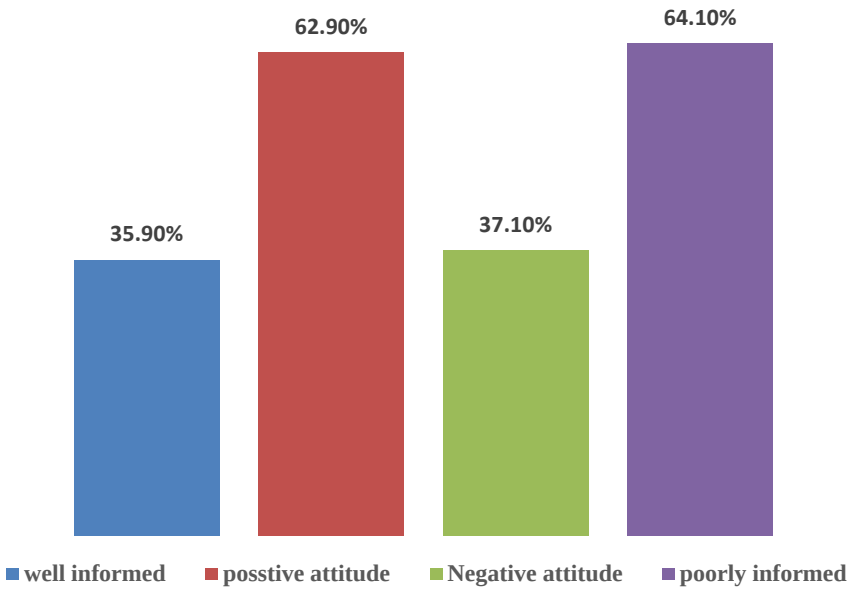

Figure 1 : Over All Flu Vaccine Knowledge & Attidues

Table 4 shows that most of the responders (373, 89.9%) had never been vaccinated. The vaccination status did not differ significantly by sex, education, occupation, residence, or age of the responders ($p > 0.05$).

The main reasons for not vaccinating were varied such as lack of knowledge about the disease and the vaccine, lacking trust in the health system and distance to the health facility or inaccessibility as reasons for not being vaccinated (49.4% 30.8%, and 5.8% respectively). Only 46 (11.1%) felt they were not at risk. Three hundred and eleven (74.9%) would accept the vaccine if it is recommended and provided for free. On the other hand, 59.8% of participants were willing to take time off from work to receive the influenza vaccine. When asked about their preferred service accessibility, 71.6% of participants preferred to get a seasonal influenza vaccine if available in hospitals, followed by health centers or clinics and workplaces (22.2% and 1.4%, respectively). Only 0.2% preferred to get the vaccine in community centers/meeting halls/or local venues. The non-confidence in vaccines did not significantly depend on the age, sex, education, occupation, or residence of the responders ($p > 0.05$).

Table 4: Health Care Providers Practices about Influenza Vaccination, Southern and Eastern Yemen, 2024 (n=415)

Question	Yes		No	
	No.	%	No.	%
Have you ever received the influenza vaccine before?	42	10.1	373	89.9
if seasonal influenza is recommended for you and provided for free, would you accept to receive the vaccine.	311	74.9	104	25.1
Are you willing to take time off from work to make sure you receive the influenza vaccine	248	59.8	167	40.2
What are the reasons for not taking the influenza vaccination				
Lack of knowledge about the disease and the vaccine	205	49.4	210	50.6
Lack of trust in the health system	128	30.8	287	69.2
Distance to the health facility or not easily accessible	24	5.8	391	94.2
Lack of time	17	4.1	398	95.9
Have existing health conditions and concerned it is not safe	22	5.3	393	94.7
Don't know	62	14.9	353	85.1
Feel that I am not at risk	46	11.1	369	88.9
Problems with previous vaccinations	29	7.0	386	93.0
Offered vaccine brand that I don't want	6	1.4	409	98.6
Where would you prefer to get a seasonal influenza vaccine if available?				
Hospital	297	71.6		
Health center / clinic	92	22.2		
Workplace	6	1.4		
Pharmacy	4	1.0		
Community center/ meeting hall/ or local venue	1	0.2		
Others	15	3.6		

Discussion

Seasonal influenza is a contagious acute respiratory infection caused by influenza viruses, which circulate in all parts of the world [1]. It is one of the most common vaccine-preventable diseases affecting people of all age groups worldwide. HCPs are exposed to the influenza virus both in the community and at healthcare facilities. HCPs have also been implicated as a key factor in the transmission of influenza to patients and colleagues, causing disruption in the healthcare system due to illness and absenteeism. While others stop working, a considerable proportion of HCPs continue to work despite illness, even when encouraged to stay home [8-12].

In Yemen, there is currently no specific/published guideline for

influenza vaccination. In addition, to available data KAP on influenza vaccination among HCPs in Yemen has not yet been studied. This study was conducted to assess the knowledge, attitude, practice, and barriers on influenza vaccination among HCPs in Yemen.

Socio-demographic factors such as age, gender, marital status, occupation, and education level have been found to be associated with influenza vaccination KAP in a study conducted in the region [23]. However, such association was not proved in the present study. It is well understood that knowledge and attitude can have an impact on individual practices [19].

Studies show that vaccinating HCPs against influenza is an effective intervention for preventing infections, reducing transmission to patients and colleagues, and lowering mortality and morbidity among vulnerable groups. Vaccination so reduces absenteeism and improves HCP health [21]. The current study found that 95.7% of participants believed that flu was caused by a virus, and 81% believed that flu symptoms are worse among people with chronic diseases. The major symptoms of influenza reported most often were running nose (95.9%), sneezing (95.2%), headache (92%), fatigue (88.4%), fever (88%), and sore throat (81.9%). Comparable results were found in a study conducted in Saudi Arabia. Despite this encouraging result, the participants reported poor knowledge about influenza vaccines as 44.8% had not heard of the influenza vaccine, and only 42.9% believed that a vaccine could prevent flu. This contrasts with results found in studies conducted in Saudi Arabia (81.7%) [27], and Pakistan (85.5%) [26].

In addition, most of the respondents in this study (89.9%) had never been vaccinated, and only 10.1% had been vaccinated. This finding is likely the lowest compared to the available literature from different regions of the world, namely Kuwait (67.2%) [1], Oman (46.6%) [1], The Kingdom of Saudi Arabia (KSA) (38.0%) [27], France (30.6%) [24 , and The United Arab Emirates (UAE) (24.7%) [30]. The low rate of influenza vaccination among HCPs in Yemen might be related to the unfamiliarity of influenza vaccine availability and some concerns related to beliefs about influenza vaccination.

On the other hand, a study conducted in KSA [25] found that HCP channels were a strong source of information for community education on the benefits of influenza vaccination. Similarly, the present study found that the main source of information was HCPs (40.7%),

The WHO model of health promotion concludes that high knowledge would translate to a positive attitude, which will lead to good behavior [30]. In fact, the present study compared distributions of respondents by composite knowledge and attitude and found that only 35.9% had good vaccine knowledge on the KAP score, while 64.1% had poor vaccine knowledge. About 62.9% had positive attitudes on the KAP score, while 37.1% had negative attitudes.

These salient gaps in knowledge about the vaccine's benefits and beliefs about seasonal influenza led to lower vaccination rates among HCPs in Yemen and so, lower vaccine

demand among the community in Yemen. These findings highlight the need to increase efforts and awareness within the community, including HCPs, about influenza illness and vaccination to reduce seasonal influenza morbidity and mortality and consequently the economic and social burden.

The most common barrier to vaccination in the present study was lack of knowledge about the disease and the vaccine (49.4%) followed by lacking trust in the health system (30.8%). However, this finding is slightly lower than the result found in studies conducted in the UAE (53.2%) [29] and Palestine (53.4%) [31]. A possible explanation could be that the gap in knowledge in our study might be attributable to the fact that the HCPs may have gained false or insufficient information about the vaccines from anti-vaccination groups through news, social media, and TV, as many rumors about vaccines have been published. Another factor that might have contributed to this difference in knowledge may be due to the current war situation, political instability, and collapsing health system in Yemen, which has led to a population distrusting the health system. Despite these barriers, a major predictor of vaccination in this study includes a good attitude towards vaccination. Sixty-seven percent of HCPs declared their positive acceptance, and 74.5% claimed that they would get the seasonal influenza vaccine if it were available. Furthermore, 74.9% of participants will receive and accept the vaccine if it will be recommended and provided for free. In addition, 71.6% preferred to get a seasonal influenza vaccine if available in the hospital. Therefore, vaccinating HCPs is a cost-effective strategy and a strong source of information to educate patients on the benefits of influenza vaccination.

Study Limitations

This study was geographically limited to the Southern and Eastern parts of Yemen, specifically Taiz, Aden, Lahj, Abyan, Al-Dhalea, Shabwa, Hadramout/Mukalla, Hadramout/ Sayoun, Al-Mahara, Marib, and Socotra governorates.

Conclusion

This study shows favorable acceptance of influenza vaccination among HCPs in Yemen and stresses the urgent need for enhanced awareness initiatives. The results of this research can contribute to the formulation of an effective immunization policy for HCPs in Yemen.

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Author contributions

Ali A. Al-Waleedi: conceptualized, reviewed and edited all stages of the research and obtained official approval. Ahmed A. Thabet: managed all stages of research from proposal conceptualization to study design, method, trained data collectors, supervised fieldwork, formal analysis, and data

interpretation and wrote first and final drafts of report. Nasreen bin Azoon: prepared questionnaires, trained data collectors, and data analysis, supervised field work and reviewed final report. All authors approve the final version for publication.

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Conflict of Interest Statement

The authors declare that they have no competing interests.

Data availability statement

We certify that all data are available and kept in MOPH&P, the Influenza program. The data could be shared under request for any review or audit.

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