ORIGINAL ARTICLE

A Cross-sectional Survey Assessing Knowledge and Attitudes Concerning Seasonal Influenza and Influenza Vaccination among Population in Aseer, Saudi Arabia

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Abstract

Background: Seasonal influenza is a widespread and highly contagious illness that can impact both the upper and lower respiratory tracts in individuals of all ages, predominantly during the winter months. The aim of this study was to evaluate public knowledge, attitudes, and practices relating to influenza and its influenza vaccination. **Materials and Methods:** A descriptive online cross-sectional survey was conducted over a 1-month, from September to October 2023. The survey targeted the population living in the Aseer region, Saudi Arabia, using convenience and snowballing sampling methods. **Results:** The table presents demographic and health-related data of the studied population. More than half of the participants (52.2%, 70 respondents) aged 25–34 years, 88% (n = 117) were male, 83.5% (n = 111) had university-level education (83.5%, n = 111), with post-graduate education at 3.8% (n = 5), 81.2% (n = 108) were city residents, and 53.4% had monthly income of 50,000–10,000 SAR. Large sector of the surveyed population (80.0%) had good knowledge about influenza while mall sector had poor knowledge 12%. Among the studied population, 63.91% had good attitude about seasonal influenza and its vaccine while 11.28% had bad attitude. Females exhibit a lower vaccination rate (25.00%) compared to males (63.25%). This gender difference was statistically significant (P = 0.004). **Conclusions:** The study showed a generally positive knowledge and attitude toward the seasonal influenza vaccine, with most respondents willing to receive it. However, awareness of potential side effects and severe reactions varies. Targeted interventions are needed to address lower vaccine acceptance.

Key words: Knowledge and attitude, Seasonal influenza, Seasonal influenza vaccine, Vaccine confidence

INTRODUCTION

Influenza viruses are members of the Orthomyxoviridae family of RNA viruses. These viruses have a genome made up of segmented, single-negative-stranded RNA.[1] The influenza virus is recognized for its elevated mutation rates and its annual epidemics affect approximately 5–15% of the global population, resulting in a staggering 290,000–650,000 deaths around the world each year.[2]

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Seasonal influenza is a common and highly contagious infection that typically affects people during the winter months and can affect people of all ages' upper and lower respiratory tracts. It is caused by a variety of influenza viruses.[3] In the past, influenza viruses have been a major cause of seasonal influenza-related mortality.[4] Apart from the regular occurrence of annual epidemics, influenza A viruses were responsible for four global pandemics from 1918 to 2009.[5]

An estimated 20% of children who are not vaccinated and 10% of unvaccinated adults contract the virus annually.[5] The younger and middle-aged population, often with mild or asymptomatic cases, are potential source of infection within both households and communities. In addition, hospital workers, at greater risk of occupational exposure, play a crucial role in interrupting influenza transmission and are a priority for influenza vaccination.[6] Furthermore, influenza imposes a considerable economic burden, contributing Younger and middle-aged people, who frequently have mild or asymptomatic cases, are potential sources of infection in both households and communities. Furthermore, healthcare workers, who are at increased risk of occupational exposure, play an important role in preventing influenza transmission and are a priority for influenza vaccination.to increase healthcare costs.[7]

Numerous countrywide studies have found that annual influenza vaccination reduces both mortality and morbidity, especially in high-risk populations such as the elderly, people with chronic diseases, pregnant women, and children.[8,9] The World Health Organization endorsed influenza vaccination as the most cost-effective method of preventing seasonal influenza and its potentially fatal complications. Despite the existence of national recommendations advocating for this vaccination, vaccine acceptance and administration rates remain low.[10] The disparity in influenza vaccine coverage across countries reflects the level of awareness and attitude toward seasonal influenza vaccines, both among the general population and among at-risk groups. Individuals with limited knowledge and a pessimistic attitude toward vaccination frequently refuse to receive it.[10,11]

In Saudi Arabia, the seasonal influenza vaccine is provided free of charge to the entire population, including non-citizens. In response to the significant increase in influenza cases and influenza-like illnesses, the Saudi Arabian Ministry of Health (MOH) has recently urged the population to visit primary healthcare centers (PHCs) to receive the seasonal influenza vaccine. The Saudi Arabian MOH indicated that the number of influenza cases and influenza-like illnesses during the influenza seasons in 2022 increased markedly compared to the corresponding period in recent years, implying a potential burden on the health system in the Kingdom.[12] A cross-sectional study in Riyadh found that the majority of participants had poor knowledge about influenza vaccination. The general population was the least informed (8.8%), followed by students (11.8%) and healthcare workers (18.5%).[13] On the other hand, a study assessing the knowledge, attitudes, and practices (KAP) of seasonal influenza and vaccine immunization among 611 individuals in four PHCs in Riyadh found that most had good knowledge about the flu and flu vaccine. However, significant knowledge gaps and misconceptions about influenza led to negative attitudes and reduced vaccination coverage.[14]

Past research has not explicitly focused on the perception of influenza infection, which includes the assessment of the Saudi population's understanding of the risks and benefits associated with seasonal vaccination and its safety. The purpose was to evaluate knowledge and attitudes on influenza and influenza vaccination among the general public residing in the Aseer region.

MATERIALS AND METHODS

Study design and setting

A descriptive anonymous online cross-sectional survey was conducted from September to October 2023. The survey was conducted among residents of Saudi Arabia's Aseer region.

Study population, sample size, and sampling technique

In this study, the sample size was determined using G*power 3.1 with an assumed effect size of 0.1, an alpha error of 5%, and a power of 80%. This was based on a previous report that found that 8% of the general population had good knowledge of influenza.[14] The minimum sample size required to detect people with good knowledge was calculated at 89. To account for a potential non-response rate of 15%, the sample size was increased to 102. Inclusion criteria: we included male or female participants aged 18 years and older, living in the Aseer region, and who have access to the Internet through a mobile phone or computer device. We excluded non-Saudi individuals. Study participants were recruited using a non-probability sampling method (convince and snowballing methods). At first, we sent the link to the study questionnaire to relatives and friends, and they were asked to send the link to the questionnaire to their contacts.

The questionnaire and data collection

To fulfill the objectives of our study, a predesigned structured questionnaire was employed to assess participants' knowledge and attitudes toward seasonal influenza and its vaccination. The questionnaire was adapted from a survey used in Pretoria, South Africa, to evaluate KAPs about seasonal influenza and influenza vaccination among diabetics in September 2015.[15]

Several key steps were involved in the questionnaire's validation process. Initially, two bilingual co-authors independently performed a forward translation into formal Arabic, assessing the translation difficulty of each item and the response option. An expert panel comprised of methodologists, infectious disease consultants, public health experts, and language specialists evaluated the validity of the content. This panel scrutinized the translated version to ensure that it accurately captured the intended concepts. Subsequently, the pre-final version was cognitively tested through interviews conducted by trained research team members with 20 participants from the target respondent group. Comprehension, readability, linguistic accuracy, phrasing, cultural relevance of the items, response rate, and clarity of the response instructions within each section were all evaluated during these interviews.

The questionnaire is divided into three main sections:

- Demographic information: This section collected data on participants' sex, age, educational level, residence, smoking, and monthly income. Participants were asked about previous hospital admission due to seasonal influenza infection and if they had received the seasonal influenza vaccine
- General knowledge of influenza and seasonal influenza vaccine. This section consists of 28 questions assessing four main domains: Common knowledge about seasonal flu (7 questions), common symptoms of seasonal flu (11 questions), flu vaccine (6 questions), and side effects of vaccine (4 questions)
- Attitude of the participants: this section consists of 8 questions covering vaccine acceptance and trust in vaccine effectiveness and safety (3 questions), vaccination in chronic disease patients (2 questions), concern and misconception (3 questions).

Statistical analysis

Responses from the participants were transcribed into an Excel spreadsheet. For questions where participants agreed or agreed with a correct practice, the answers were considered accurate; conversely, if they disagreed and were neutral with a particular practice, the answers were considered incorrect. Numerical data were described using mean and standard deviation. Categorical data were presented using numbers and percentages. The Chi-square test was used to test the association between categorical variables. The dependent variable was receiving the influenza vaccine. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 27. The statistical significance was set at <0.05.

Ethical approval

Written informed consent was obtained from all participants before they completed the online questionnaire. All data collected was treated with strict confidentiality and was only used for research purposes.

Table 1: Sociodemographic and health-related characteristics of the populations studied

Variable	Level	Frequency	Percent
Age (years)	18–24	38	28.4
	25–34	70	52.2
	35–50	10	7.5
	50–65	15	11.2
Sex	Female	16	12.00
	Male	117	88.00
	Post graduate	5	3.80
Education	Secondary	17	12.80
	University	111	83.50
Residence	City	108	81.20
	Village	25	18.80
	15,000–20,000 SAR	22	16.50
	50,000–10,000 SAR	71	53.40
Income	Less 5000 SAR	31	23.30
	More 20,000 SAR	9	6.80
	Current smoker	5	3.80
Smoking	Ex-smoker	3	2.30
	No	99	74.40
	Yes	26	19.50
	No	126	94.70
Respiratory disease	Yes	7	5.30
	No	128	96.20
Cardiac disease	Yes	5	3.80
Hypertension	No	126	94.70
	Yes	7	5.30
Diabetes	No	126	94.70
	Yes	7	5.30
Thyroid disease	No	129	97.00
	Yes	4	3.00
Admitted to hospital because of influenza	No	127	95.49
	Yes	6	4.51

SAR: Riyal Saudi

RESULTS

Sociodemographic characteristics

The table 1 presents demographic and health-related data of the

studied population. In terms of age distribution, more than half of the participants (52.2%, 70 respondents) were 25–34 years old, followed by the age range of 18–24 (28.4%, 38 respondents). The gender distribution was skewed toward males, comprising 88% (n = 117) of the sample, while females represented 12% (n = 16). Educational attainment showed a prevalence of university-level education (83.5%, n = 111), with postgraduate education at 3.8% (n = 5). Residents of the city make up 81.2% (n = 108), exceeding 18.8% living in villages (n = 25). The income distribution was notable, with 53.4% falling in the 50,000–10,000 SAR category (n = 71). Regarding smoking habits, 74.4% were non-smokers (n = 99), 3.8% were current smokers (n = 5), and 2.3% were ex-smokers (n = 3). The majority of respondents reported no respiratory disease (96.2%, n = 128), cardiac disease (96.2%, n = 128), hypertension (94.7%, n = 126 respondents), diabetes (94.7%, n = 126), or thyroid diseases (97.0%, n = 129). A small percentage (4.51%, n = 6) of the respondents have been admitted to the hospital due to influenza.

Table 2 provides insights into the knowledge and perceptions of the surveyed population regarding seasonal flu. Around three-fourths of respondents correctly identified that seasonal flu is caused by a viral infection (74.44%, n = 99), can be transmitted from person to person (95.49%, n = 127), and occurs at certain times of the year (98.50%, n = 131). A significant proportion believed that seasonal flu can be prevented (90.98%, n = 121), while fewer acknowledged the difference between seasonal flu and colds (54.89%, n = 73). There is a notable awareness that seasonal flu symptoms are more severe among individuals with chronic diseases (83.46%, n = 111), and cause severe complications in this population (88.72%, n = 118).

The respondents demonstrated good recognition of common symptoms such as fever (81.20%, n = 108), rhinorrhea (84.21%, n = 112), sore throat (86.47%, n = 115), and headache (74.44%, n = 99). However, there is a lower awareness of symptoms such as vomiting (12.78%, n = 17), abdominal pain (12.78%, n = 17), and diarrhea (21.80%, n = 29).

The knowledge of the flu vaccine was generally positive, with a high awareness of vaccination methods such as intramuscular injection (93.23%, n = 124) and the absence of oral administration (90.23%, n = 120). Interestingly, 5.26% low proportion of the participants studied knew that there is a nasal spray vaccine (n = 7). There is a good understanding that the duration of protection from the vaccine extends for 1 year (90.23%, n = 120), and the best time to get the vaccine is before the influenza season (91.73%, n = 122). Moreover, there was a good conception among a significant portion of respondents that it is possible to get seasonal influenza if vaccinated (73.68%, n = 98).

The respondents are aware of potential side effects, with fever (71.43%, n = 95), swelling (54.14%, n = 72), and headache (45.11%, n = 60), while the low sector correctly

Table 2: Responses of the study participants regarding knowledge about influenza and its vaccine

Question		*n*	%
Common knowledge about seasonal flu			
k1	Seasonal flu is caused by a viral infection	99	74.44
k2	Seasonal flu can be transmitted from person to person	127	95.49
k3	Seasonal flu can be prevented	121	90.98
k4	There is no difference between seasonal flu and colds	73	54.89
k5	Seasonal flu occurs at certain times of the year	131	98.50
k6	Seasonal flu symptoms are more severe among people with chronic diseases such as immunocompromised	111	83.46
k7	Seasonal flu causes severe complications among people with chronic diseases such as immunocompromised	118	88.72
Common symptoms of seasonal flu			
k8	Fever	108	81.20
k9	Sneezing	88	66.17
k10	Vomiting	17	12.78
k11	Abdominal pain	17	12.78
k12	Rhinorrhea	112	84.21
k13	Cough	94	70.68
k14	Diarrhea	29	21.80
k15	Fatigue	85	63.91
k16	Myalgia	84	63.16
k17	Sore throat	115	86.47
k18	Headache	99	74.44
Flu vaccine			
k19	Given orally	120	90.23
k20	Nasal spray	7	5.26
k21	Intramuscular	124	93.23
k22	Duration of protection extends for 1 year	120	90.23
k23	Best time to get the SIV is before the influenza season	122	91.73
k24	Impossible to get seasonal influenza if vaccinated	98	73.68
Side effect of vaccine			
k25	Fever	95	71.43
k26	Swelling	72	54.14
k27	Headache	60	45.11
k28	Nausea	15	11.28

identified nausea (11.28%, *n* = 15) as one of the side effects of vaccination.

Participants' knowledge about seasonal influenza and its vaccination

Large sector of the surveyed population (80.0%) had good knowledge about influenza. While mall sector had poor knowledge 12% [Figure 1].

Participants attitude about the seasonal influenza and vaccination

Vaccine acceptance

Most of the respondents express a positive attitude toward obtaining the seasonal flu vaccine if it is effective, with 85.7% (*n* = 114) agreeing that they would receive it. There is general agreement that the seasonal influenza vaccine is safe (67.7%, *n* = 90) and effective (68.4%, *n* = 91).

Chronic disease and vaccination

A substantial proportion of respondents (75.2%, *n* = 100) agree that patients with chronic diseases should receive the seasonal flu vaccine annually, recognizing the potential benefits for this vulnerable population. Similarly, a majority (76.7%, *n* = 102) agrees that the vaccine can prevent serious complications among people with chronic diseases.

Concerns and misconceptions

A noteworthy finding is that a significant portion of the respondents (59.4%, *n* = 79) did not agree that the seasonal flu vaccine causes severe side effects. However, a smaller percentage (15.8%, *n* = 21) agreed that the vaccine causes severe side effects. The majority of respondents (67.7%, *n* = 90) did not agree that influenza is a minor disease, emphasizing the recognition of its potential severity and the importance of vaccination. A notable percentage (15.8%, *n* = 21) agreed that influenza is a minor disease. A noteworthy proportion of the respondents (69.2%, *n* = 92) did not agree that they did not need the flu vaccine because they have immunity to it [Table 3].

Among the studied population, 63.91% had good attitude about seasonal influenza and its vaccine while 11.28% had bad attitude [Figure 2].

The highest vaccination rate was observed in the 50–65 age group (73.33%), followed by the 50–65 age group (73.33%). The 18–24 and 25–34 age groups have lower vaccination rates at 68.42% and 54.29%, respectively. However, this difference was not statistically significant (*P* = 0.080). Females have a lower vaccination rate (25.00%) compared to males (63.25%). This gender difference was statistically significant (*P* = 0.004), suggesting that gender may play a role in vaccine uptake. There were no significant differences in vaccine

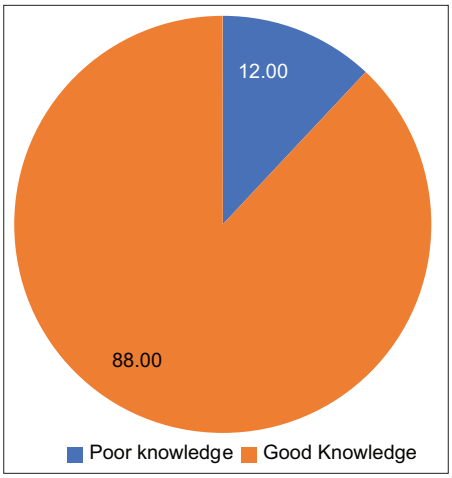

Figure 1: Participant knowledge regarding influenza and its vaccine

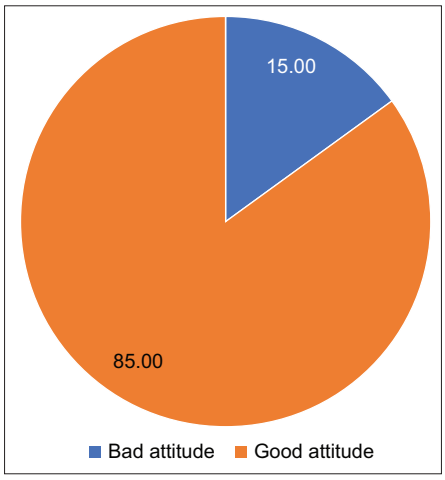

Figure 2: Attitude of the study participants toward influenza

uptake between different levels of education (*P* = 0.858). Post-graduate (60.00%), secondary (64.71%), and university-educated individuals (57.66%) show relatively similar vaccination rates. Although there was a higher vaccination rate in the city compared to the village, the difference was not statistically significant (*P* = 0.132). City residents had a 55.56% vaccination rate (*n* = 60), while village residents had a 72.00% vaccination rate. There were no significant differences in vaccine uptake between different income groups (*P* = 0.394). However, individuals with an income below 5,000 SAR had a slightly lower vaccination rate (57.75%) compared to other income groups. There were no significant differences in vaccination rates between people with poor knowledge and good knowledge (*P* = 0.454) or between those with a bad attitude and a good attitude (*P* = 0.394) [Table 4].

DISCUSSION

Main study findings'

The study reveals that most of the respondents were aware

Table 3: Explores individuals' attitudes and beliefs regarding the seasonal influenza vaccine

Question		*n*	%
	Vaccine acceptance		
K1	If there is an effective vaccine against seasonal flu, I will get it		
	Do not agree	19	14.3
	Agree	114	85.7
K2	Seasonal influenza vaccine is safe		
	Neutral	35	26.3
	Disagree	8	6
	Agree	90	67.7
K3	Seasonal influenza vaccine is effective		
	Neutral	35	26.3
	Disagree	7	5.3
	Agree	91	68.4
	Chronic disease and vaccination		
K4	Patients with chronic disease should get the seasonal flu vaccine annually		
	Neutral	24	18
	Disagree	9	6.8
	Agree	100	75.2
K5	Seasonal flu vaccine can prevent severe complications among people with chronic diseases		
	Neutral	26	19.5
	Disagree	5	3.8
	Agree	102	76.7
	Concerns and misconceptions		
K6	The seasonal flu vaccine causes severe side effects and therefore I should not take it.		
	Neutral	33	24.8
	Do not agree	79	59.4
	Agree	21	15.8
K7	Influenza is a minor disease, so I should not get vaccinated		
	Neutral	22	16.5
	Do not agree	90	67.7
	Agree	21	15.8
K8	I do not need the flu vaccine because I have immunity to it		
	Agree	20	15
	Do not agree	92	69.2
	Neutral	21	15.8

Table 4: Factors associated with vaccination against seasonal influenza

Parameter's	Received seasonal influenza vaccine				???	???
	No		Yes			
	n	%	*n*	%		
Age (years)						
18–24	12	31.58	26	68.42	6.76	0.080
25–34	32	45.71	38	54.29		
35–50	7	70.00	3	30.00		
50–65	4	26.67	11	73.33		
Sex						
Female	12	75.00	4	25.00	8.49	0.004
Male	43	36.75	74	63.25		
Education						
Post graduate	2	40.00	3	60.00	0.31	0.858
Secondary	6	35.29	11	64.71		
University	47	42.34	64	57.66		
Residence						
City	48	44.44	60	55.56	2.26	0.132
Village	7	28.00	18	72.00		
Income						
15,000–20,000 SAR	7	31.82	15	68.18		
50,000–10,000 SAR	30	42.25	41	57.75	0.73	0.394
Less 5000 SAR	15	48.39	16	51.61		
More 20,000 SAR	3	33.33	6	66.67		
Knowledge						
Poor	8	50.00	8	50.00	0.56	0.454
Good	47	40.17	70	59.83		
Attitude						
Bad	10	50.00	10	50.00	0.73	0.394
Good	45	39.82	68	60.18		

SAR: Riyal Saudi

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of influenza infection and the possible side effects of the seasonal flu vaccine, with fever, swelling, headache, and nausea being the most common. A majority of respondents express a positive attitude toward the vaccine, with 85.7% agreeing to get it if it is effective. A significant proportion of the respondents agree that patients with chronic diseases should receive the vaccine annually, recognizing its potential benefits. Moreover, a significant portion of respondents did not agree that the vaccine causes severe side effects. Females exhibit a lower vaccination rate than males, suggesting that gender may play a role in vaccine uptake. There were no significant differences in vaccine uptake among other different socioeconomic factors.

Interpretation of the main study findings

In this study, the level of knowledge among the study participants about seasonal influenza and vaccination was good. Nearly four-fifths of the studied participants scored above 65% in the knowledge score. Similarly, Alhatim

et al.[14] evaluated KAPs regarding seasonal influenza and influenza vaccine immunization among people visiting PHCs. The research involved 611 participants and most demonstrated good knowledge of seasonal flu (64.5%) and the flu vaccine (73.3%). However, only 52% exhibited a positive attitude toward seasonal influenza vaccination. A cross-sectional study assessed the Saudi undergraduate healthcare students' knowledge and opinions about influenza vaccinations. The majority agreed with seven out of nine knowledge statements, with medicine students having a higher mean knowledge score.[14] On the other hand, ElFeky *et al*.,[13] conducted a cross-sectional study that involved 500 participants from diverse backgrounds. The findings revealed generally poor knowledge across all participants' groups, and healthcare workers exhibited the highest awareness. This variation in knowledge level between different studies may be due to the inclusion of different study participants with different backgrounds and educational levels. Moreover, the assessment tool may play a role in these observed differences. The variability in knowledge levels observed in various studies could be attributed to the inclusion of participants with diverse backgrounds and educational levels. In addition, differences in the assessment tools employed can contribute to the observed variations.

Regarding the areas where participants exhibited limited knowledge, a notable portion lacked awareness that influenza could manifest symptoms such as abdominal pain, diarrhea, and vomiting. The low awareness of the gastrointestinal symptoms associated with influenza infection among participants could be attributed to the infrequent occurrence of these symptoms among influenza cases. A meta-analysis conducted by Minodier *et al*., revealed that the pooled prevalence of any digestive symptoms ranged from 30.9% (95% CI, 9.8–57.5; I^2 = 97.5%) to 2.8% (95% CI, 0.6–6.5; I^2 = 75.4%).[16] This suggests that gastrointestinal symptoms are not as prevalent in influenza cases, potentially contributing to the participants' limited knowledge in this area.

Interestingly, most did not know that the influenza vaccine could be administered intranasally. The nasal flu vaccine (FluMist) is a live-attenuated influenza vaccine (LAIV) non-invasive intranasal vaccine. A recent comparative study compared LAIV with the inactivated influenza vaccine and found that LAIV is more effective in preventing influenza in children.[17] One of its advantages lies in its ability to induce immune responses at the site of infection.[18] The primary adverse event reported after LAIV administration was nasal congestion.[19] However, a significant phase III trial noted an elevated incidence of medically significant wheezing in vaccine-naive children under 24 months, as well as an increase in hospitalizations for children aged 6–11 months compared to the trivalent inactivated vaccine. Nonetheless, Belshe *et al*. concluded that LAIV is highly effective and safe for children aged 12 through 59 months with no previous history of asthma or wheezing.[20]

Regarding the attitude of the participants, 85% had a good attitude toward seasonal influenza and its vaccines. However, a minority (15.8%) of the participants surveyed thought that influenza is a minor disease and around 40% thought that it is not indeed for vaccination as they have a competent immune system. Gender difference is significantly associated with vaccination against seasonal influenza. These findings underscore the significance of conveying health messages emphasizing that even individuals who are immunocompetent should receive the influenza vaccine. While flu may cause severe complications among immunocompromised individuals, it is crucial for immunocompetent individuals to get vaccinated as part of a collective responsibility. By getting vaccinated, they not only protect themselves but also contribute to the well-being of others living in the same context who may be at a higher risk of developing severe complications. This collective effort in vaccination helps create a safer environment and reduces the overall risk of influenza-related complications for the community.[21]

Strengths and limitations

The study boasts several strengths that contribute to its potential impact on public health. Employing an inclusive validated questionnaire, covering demographic information, general knowledge about influenza, and attitudes toward influenza vaccines, provides a comprehensive approach for evaluating participants' understanding and attitudes. Nevertheless, the study is not without limitations. Conducting an online survey introduces selection bias, as it may exclude individuals without internet access or those less inclined to participate in online surveys, potentially impacting the generalizability of findings. Relying on self-reported data introduces the potential for recall bias and social desirability bias, where participants may provide socially acceptable responses. The study questionnaire, while comprehensive, may not thoroughly explore the underlying reasons behind participants' knowledge and attitudes and the main sources of information, suggesting a need for future qualitative components to enrich understanding. Finally, the small sample size of the surveyed sample is considered one of the main limitations.

Implication of the study

The study emphasizes the need for additional research on the general population's knowledge and attitudes toward influenza and its vaccines. It recommends looking into demographic differences in vaccine uptake, such as age and gender, in order to develop targeted strategies. To address the concerns of different age groups, genders, or income levels, tailored interventions should be developed. Longitudinal studies should be conducted to assess the long-term impact of vaccine acceptance on knowledge and attitude. Geographic differences in vaccine acceptance, behavioral interventions, and side effect misconceptions must be addressed.

Comparative studies on health communication strategies can help to develop evidence-based vaccination campaigns in the future.

CONCLUSIONS

In summary, the study findings underscore a generally positive knowledge and attitude toward the seasonal influenza vaccine, with a majority of respondents expressing willingness to receive it and acknowledging its safety and effectiveness. The awareness of potential side effects and concerns about severe adverse reactions were present but varied among respondents. Notably, a significant portion of the surveyed population demonstrated a good understanding of influenza, recognizing its severity and the importance of vaccination. These findings highlight the need for targeted interventions to address specific demographic groups with lower vaccine acceptance, tailoring public health campaigns to enhance overall knowledge and uptake.

Future research on influenza vaccine acceptance should look into demographic differences as well as cultural, socioeconomic, and psychological factors that influence decision-making. Longitudinal studies, geographical variations, behavioral economics, misconceptions, health communication strategies, digital health interventions, cross-cultural studies, and community engagement can all provide useful information. These strategies can help promote effective influenza vaccine uptake.

ACKNOWLEDGMENT

We thank the participants who all contributed samples to the study.

ETHICAL APPROVAL

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation was voluntary. Data collected were securely saved and used for research purposes only.

INFORMED CONSENT

Written informed consent was obtained from all individual participants included in the study.

DATA AND MATERIALS AVAILABILITY

All data associated with this study are present in the paper.

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