Awareness and Perception of Seasonal Influenza (Flu) among Medical and Non-Medical Students at Umm Al-Qura University in Makkah, Saudi Arabia: A Cross-Sectional Study

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Abstract

Background: Increasing vaccination rates and reducing the spread of influenza are both greatly improved by raising public knowledge about seasonal influenza. To promote acceptance and create awareness it is necessary to identify any potential barriers to vaccination. This study aimed to assess seasonal influenza awareness, knowledge, vaccination uptake, and barriers.

Methods: A cross-sectional study was conducted as an online survey of 355 medical and non-medical students of Umm Al-Qura University.

Results: Out of the total 355 participants, 175(49.3%) were medical students and 180 (50.7) were non-medical students. There was an almost equal distribution of males (178 (50.1%) and females 177 (49.9%) in both groups. Most of the students 208 (58.6%) were aged 21-24 and most of them were single 346 (97.5%). Awareness of seasonal influenza was 172 (98.3%) among medical students and 157 (87.2%) among non-medical students. The mean knowledge score was 7.75 ± 2.9, with a statistical difference between the two groups (P < 0.001). Vaccination uptake was low in both groups 29 (16.6%) vs 46 (25.6%) in medical and non-medical respectively. The most prominent barriers to vaccination were the negative perceptions of the vaccine's efficacy (53%) followed by accessibility (20%) and vaccine safety concerns (17%). More than one-third (37.7%) of the medical students and (8.9%) of non-medical students had good knowledge levels of seasonal influenza. Surprisingly, 145 (40.8%) had a poor knowledge level of seasonal influenza with a significant difference between the medical and non-medical groups (p < 0.001).

Conclusions: Despite the high level of awareness, the knowledge level and vaccine uptake were unsatisfactory. Negative perceptions of the vaccine's efficacy, and accessibility were the most significant barriers to vaccination. Campaigns and health education programmes should be considered to encourage others to get vaccinated to reduce the burden of seasonal influenza.

Keywords: Awareness, seasonal influenza, vaccine uptake, knowledge

Introduction

Influenza is a highly infectious human respiratory viral infection that is spread by droplets from coughing and sneezing (1). Around 5 million people worldwide are infected with influenza which kills about 300,000 people yearly. In 2019, influenza A infected 15850 individuals, and about 124 persons died in Saudi Arabia. It mostly occurs in the winter and early spring (2).

The influenza infection is usually caused by four types of viruses, A, B, C, and D. Influenza A and B viruses cause seasonal epidemics, types C and D do not affect humans. Type A influenza is the most common, spreading quickly and accounting for the majority of the epidemics or pandemics, and includes subtypes H1N1 and H3N2. It is associated with high mortality and morbidity. H3N2 affects older adults and causes more death among the same group compared to H1N1. This effect is primarily due to a weak immune response and antibody production acquired during adulthood (3).

Influenza can affect people of any age group with different prognoses, which can be self-limited in some cases, and fatal in other cases. It can exacerbate patients' underlying chronic diseases such as asthma, chronic obstructive pulmonary disease, diabetes, and renal disorders and can cause an indirect effect on the heart (4).

The best way to prevent infection is the seasonal flu vaccine (5). The annual influenza vaccine contains influenza type A (H1N1 and H3N2) and type B as inactivated or live-attenuated formulations. The flu vaccine timing and the type of flu vaccine are crucial to achieving immunity (6). Influenza vaccination significantly minimizes the risk of contracting the disease and its symptoms (7).

Despite the guidelines' recommendations, the vaccine coverage rates remain low in various regions worldwide. For example only 10.2% of students, 19.1% of patients, and 35.6% of healthcare workers were vaccinated regularly in the United States (8), In Turkey, only 8.1% of people received regular annual vaccinations (9), and the uptake of the influenza vaccine was 15.3% in Saudi Arabia (2).

Many factors influence influenza vaccination uptake, including a lack of awareness about the vaccine's efficacy and convenient access to the vaccine itself (10). Other significant barriers to vaccine uptake were found to be negative perceptions of the flu vaccine and a lack of physician recommendations (11).

Regarding the awareness of influenza, a study conducted in Pakistan on medical and non-medical students found that health awareness about seasonal influenza was low among university students, especially non-medical students (12). In Saudi Arabia, knowledge about seasonal influenza was also unsatisfactory (13)

The data about the level of knowledge among medical and non-medical students regarding seasonal influenza are scant. Hence, this study aims to assess awareness of seasonal influenza among medical and non-medical students of Umm Al-Qura University the vaccine uptake rate and to identify barriers to vaccination. The results might highlight the role of the level of knowledge among university students.

Material and Methods

During the 2022 flu season, an online based survey was conducted on Umm Al-Qura students in Makkah, Saudi Arabia. Medical and non-medical students from all UQU faculties were eligible to participate in the study, with students under the age of 18 excluded. A convenient sampling method was used to include all participants who met the inclusion criteria until the sample size was reached. The calculated sample size was 355 with a 5% alpha error, an 80% power, and a 95% confidence interval. n = [Z2 α/2P (1-P)]/d2 (14), where the Z = value corresponded to the confidence level (Z = 1.96 for 95% CI), P = the frequency of outcome in similar study (P = 0.3 (11), and d = precision (d = 0.05), with 10% dropout. The study used a self-administered, online-based questionnaire in Arabic. Student representatives from each faculty uploaded the survey and the link was then given to the students by email, social media, or by publishing on the websites of the respective faculties. The students had the right to refuse to participate in the survey. The survey was open for four months, from January 2021 to April 2022.

The tool of the study, had three parts. The first part was to assess socio-demographic characteristics such as (age, gender, marital status and specialty). The second part included questions to assess the awareness and knowledge of influenza such as the causes, symptoms, mode of transmission, prevention, vaccinations, and treatment. The third part assessed vaccine uptake and its barriers.

There were 13 questions to assess the level of knowledge about influenza and there were three possible responses for each question: (0 score for a wrong answer or I don't know response and 1 score for a correct answer) the highest score was 13.

The knowledge score was estimated as follows, Low knowledge level would be a score between 0 and 6. Scores between 6 and 9 would be categorized as moderate knowledge. Scores between 10 and 13 are classified as a high level of influenza knowledge.

Statistical Analysis Plan:
Descriptive and analytical analysis were performed using SPSS software, version 25. Depending on the kind of distribution for each variable, quantitative data was shown as mean, SD, or median and range. Percentages were displayed for categorical data. Independent t-tests for continuous variables and the Chi-square test for categorical data were used to compare the groups.

Ethical part & confidentiality:
The research was approved by the Institutional Review Board (IRB) of Umm Al-Qura University-College of Medicine (No. HAPO-02-K-012-2021-10-8O5). The students were included in the study after signing an informed consent form. Students' information remains confidential.

Results

Out of the total 355 participants, 175(49.3%) were medical students and 180 (50.7) were non-medical students. There was an almost equal distribution of males (178 (50.1%) and females 177 (49.9%) in both groups. Most of the students 208 (58.6%) were aged (21-24) and most of them were single 346 (97.5%). Most participants, (172 (98.3%) of medical students and 157 (87.2%) of non-medical students were aware of seasonal influenza, (P value < 0.001).

Regarding the vaccination rate among study participants, only 29 (16.6%) of medical students versus 46 (25.6%) of non-medical students received regular an annual vaccination with a significant difference in the flu vaccine uptake between the two groups, (P value 0.038). Socio-demographic characteristics of participants, awareness, and vaccination rate in both groups are described in Table1

Barriers to influenza vaccine uptake
There were many barriers to the flu vaccine uptake. The most prominent variable was the negative perceptions of the vaccine's efficacy which was reported by 53% of participants. Accessibility was the second most prevalent barrier (20%). Vaccine safety issues and side effects were highlighted by 17% of the students. Affordability and lack of awareness were other contributing factors that prevent the students from being vaccinated. Barriers to the influenza vaccine are shown in Figure 1.

Knowledge of seasonal influenza
One-third (37.7%) of the medical students and (8.9%) of non-medical students had good knowledge levels of seasonal influenza. Surprisingly, more than one-third of the participants had poor knowledge levels of seasonal influenza 145 (40.8%). with a significant difference between the medical and non-medical groups (p < 0.001).

Item-wise analysis showed that most of the participants 326 (91.8%) recognized influenza as a viral infection. 311 (87.6%) recognized the symptoms of influenza correctly.

Only one-third of the students (39.2%) knew that influenza can be fatal. More than two-thirds of the participants, 277 (78.0%) were familiar with the presence of an effective influenza vaccine. In addition, 240 (67.6 %) of participants were aware of preventive measures for influenza. The full details of participants' knowledge about influenza are described in Table 2

Table 1: Socio-demographic characteristics of participants, awareness, and vaccination rates

Socio-demographic Characteristics	Medical students	Non-Medical students	Total	X^2	P value
Gender					
Female	86 (49.1%)	91 (50.6%)	177 (49.9%)	0.071	0.790
Male	89 (50.9%)	89 (49.8%)	178 (50.1%)		
Age					
18-20	75 (42.9%)	72 (40.0%)	147 (41.4%)	0.299	0.585
21-24	100(57.1%)	108 (60.0%)	208 (58.6%)		
Marital status					
Single	171 (97.7%)	175 (97.2%)	346 (97.5%)	1.643	0.650
Married	2 (1.1%)	4 (2.2%)	6 (1.7%)		
Divorced	1(0.6%)	1 (0.6%)	2 (0.6 %)		
Widowed	1 (0.6%)	0 (0.0%)	1 (0.3%)		
Seasonal influenza awareness					
Aware	172 (98.3%)	157 (87.2%)	329 (92.7%)	16.001	< 0.001
Not aware	3 (1.7%)	23 (12.8%)	26 (7.3%)		
Influenza vaccine uptake					
Vaccinated	29 (16.6%)	46 (25.6%)	75 (21.1%)	4.298	0.038
Not Vaccinated	146 (83.4%)	134 (74.4%)	280 (78.9%)		

Figure 1, Barriers to influenza vaccine uptake

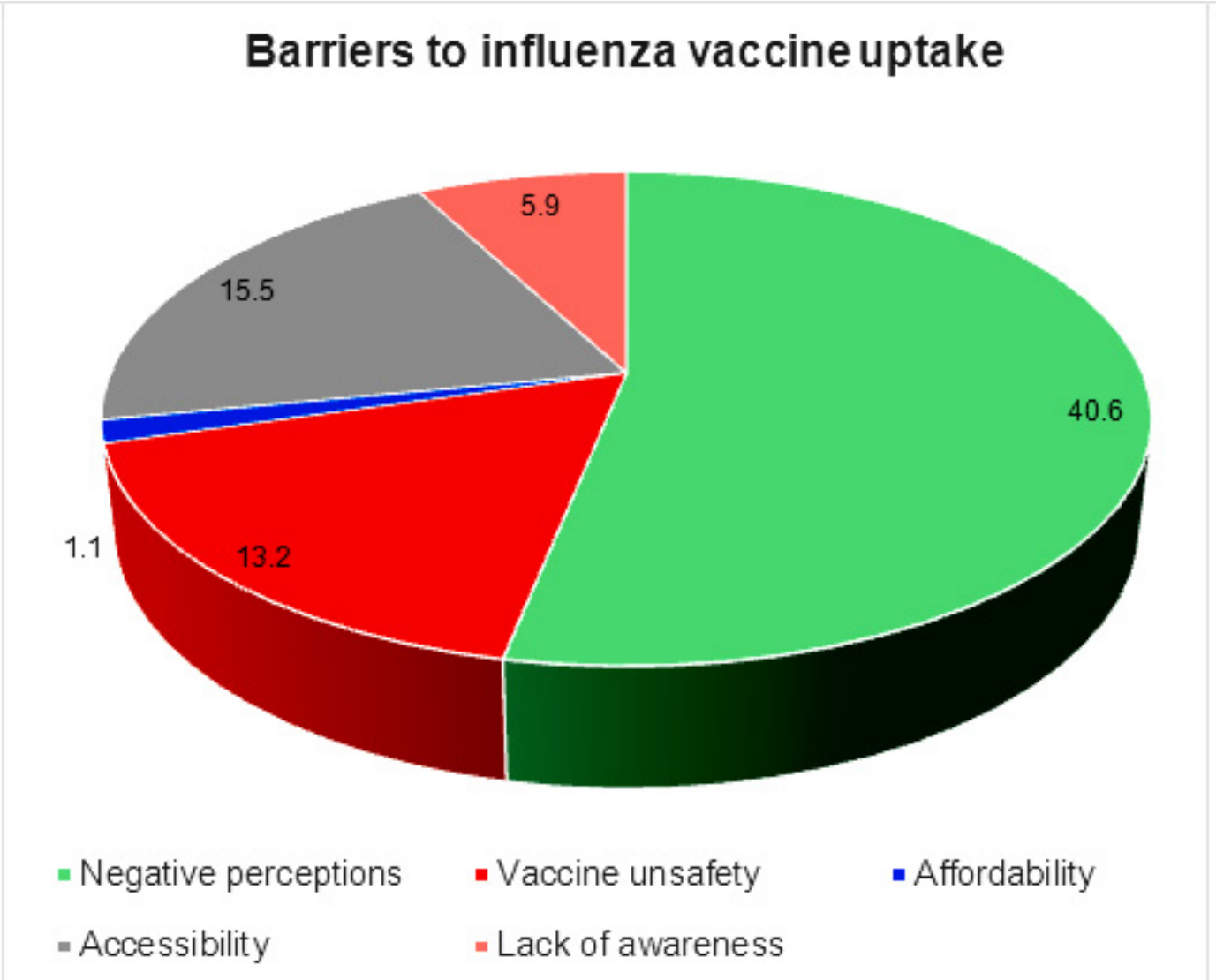

Table 2: Knowledge of seasonal influenza among medical and non-medical students

Knowledge items	Medical students	Non-Medical students	Total	X^2	P value
	Correct response N (%)	Correct response N (%)	Correct response N (%)		
Influenza is a viral infection	170 (97.1%)	156 (86.7%)	326 (91.8%)	12.982	< 0.001
Influenza usually occurs in winter	146 (83.4%)	134 (74.4%)	280 (78.9%)	4.298	0.038
Influenza may have serious complications	154 (88.0%)	146 (81.1%)	300 (84.5%)	3.219	0.073
Most infected persons have mild symptoms	107 (61.1%)	99 (55.0%)	206 (58.0%)	5.174	0.075
Influenza may cause death	80 (45.7%)	59 (32.8%)	139 (39.2%)	6.358	0.042
Symptoms of influenza	164 (93.7%)	147 (81.7%)	311 (87.6%)	11.861	0.001
Mode of transmission of influenza	123 (70.3%)	92 (51.1%)	215 (60.6%)	13.659	< 0.001
Preventive measures for influenza	129 (73.7%)	111 (61.7%)	240 (67.6 %)	5.881	0.015
There are investigations to diagnose influenza	80 (45.7%)	106 (58.9%)	186 (52.4%)	6.178	0.046
Severe infection requires seeing your physician	85 (48.6%)	77 (42.8%)	162 (45.6%)	1.201	0.273
Treatment of influenza is supportive	65 (37.1%)	33 (18.3%)	98 (27.6%)	16.969	< 0.001
Influenza has an effective vaccine	156 (89.1%)	121 (67.2%)	277 (78.0%)	27.834	< 0.001
Infected persons and immunocompromised can't take the vaccine	58 (33.1%)	41 (22.8%)	99 (27.9%)	8.977	0.0011
Knowledge level					
Poor	43 (24.6%)	102(56.7%)	145 (40.8%)	54.560	< 0.001
Average	66 (37.7%)	62 (34.4%)	128 (36.1%)		
Good	66 (37.7%)	16 (8.9%)	82 (23.1%)		
Knowledge score (Mean ± SD)	7.75 ± 2.9	5.71 ±2.8	6.71 ± 3.00	6.799*	< 0.001

Discussion

The present study aimed to assess the awareness of medical and other non-medical university students towards seasonal influenza in Makkah city. The findings showed that 98.3% of medical students and 87.2% of non-medical students were aware of influenza infection. Another study revealed a similar level of awareness, most of the respondents (85.5%) were aware of seasonal influenza and its preventive methods (1). Awareness assessment is considered the initial step in preventing and controlling infectious diseases.

Despite the evidence-based recommendations for an annual influenza vaccination, vaccine coverage and uptake are still very low, especially among medical students who had comparatively greater health awareness than other students. It was revealed that only (16.6%) of medical students versus (25.6%) of non-medical students received regular an annual vaccination with a significant difference in vaccination levels between the two groups. The findings were in line with those of another study, which found that college students were vaccinated at a very low (28%) rate (15). Benjamin reported similar findings, stating that only 20.6% of college students had received the flu shot (16). In Italy, much lower estimates were seen in students than in Health Care Workers (12.5% vs 15% for the flu shots (17), while in the USA, only 10.2% of students, 19.1% of patients, and 35.6% of healthcare workers were vaccinated regularly (8). From the previous studies, it was obvious that influenza vaccine uptake was low worldwide which could be due to different barriers to vaccination.

Negative perceptions of the vaccine's efficacy, which were stated by 53% of participants, emerged as the study's most significant barrier. The second most frequent barrier (20%) was accessibility. 17% of the students were worried about the safety of the vaccine as it might lead to infection or complications. Other factors preventing students to be vaccinated included affordability and lack of knowledge.

Similarly, in the USA, low vaccine uptake was primarily explained by unawareness (31%), worries about vaccine safety (29%), and negative perceptions (23%) (8). In Turkey, only 8.1% of people regularly received an annual influenza vaccination which was affected by people's sensitivity, lack of awareness, and unfavourable attitudes against the influenza vaccine (9). Another study revealed that the two main barriers are vaccine unsafety (41.6%) followed by a lack of awareness (39.6%) while the cost or access to the vaccine were not considered obstacles (16). Conversely, vaccine ineffectiveness and lack of convenient access to the vaccination were the main barriers to flu vaccine uptake in the UK (10). Vaccine uptake barriers varied by population, age group, education level, financial status, level of vaccine hesitancy, health insurance, and health awareness (11, 18). Awareness campaigns and health education programmes should be considered to encourage university students to behave as role models by maintaining appropriate health practises and encouraging others to get vaccinated regularly to reduce the frequency and adverse effects of seasonal influenza. Awareness programmes should be directed to address the negative perceptions, unfavourable attitudes, and unwillingness of students to be vaccinated. Awareness of the students will directly influence the willingness of the general population to get vaccinated.

Regarding the knowledge of influenza which may have a considerable effect on vaccine uptake, the present study found that the mean and standard deviation for knowledge score was 7.75 ± 2.9; better in medical students than non-medical students, with a significant difference in the level of knowledge among both groups. One third (37.7%) of the medical students and (8.9%) of non-medical had appropriate knowledge of influenza. Unexpectedly, more than one-third of the respondents (40.8%) had a poor knowledge level of seasonal influenza with statistical significance between the two groups. Close estimates were observed in Mallhi's study which reported, the mean knowledge score was 7.81 ± 1.96, where 20.4%, 67.6%, and 12% of the study population had good, moderate, and poor knowledge levels about seasonal influenza (11). In Al-Madinah, Saudi Arabia, there was a significantly lower level of understanding, with (53.5%) of the community having poor knowledge and attitudes toward influenza vaccination (19).

Limitation of the current study:
No causal inferences could be made using the cross-sectional study design, but the conclusion was limited to the association relationship between the current study variables. As the convenient sampling technique was used as a nonprobability sample, generalisability of the results was not possible. In addition, the self-reporting of students about their awareness, vaccination uptake, and potential barriers might give biased results about these items.

Conclusions

Despite the great awareness, the knowledge level and vaccine uptake were unsatisfactory among university students. Negative perceptions of the vaccine's efficacy, and accessibility were the most significant barriers. Campaigns and health education programmes should be considered to encourage university students to be role models and encourage others to get vaccinated according to the recommendations to reduce the burden of seasonal influenza.

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