Knowledge, attitudes, behaviors and, risk perception towards seasonal influenza and vaccination among adult population of UAE

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ABSTRACT

Seasonal influenza (flu) is responsible for the important cause of mortality and morbidity worldwide, vaccination against seasonal influenza is usually very protective. Understanding the level of knowledge, practice toward flu and its vaccine is essential for the effective limiting of disease, and prevention strategies. The purpose of this paper is to estimate the knowledge, attitude, behaviors, and risk perception of adults toward flu and its vaccine in the UAE. A cross-sectional study using a survey has conducted between adults. A total of 815 (613 females and 202 males) residents in the UAE participated in this study and complete the survey, between February to April 2020. Participants were selected by using a simple random technique. Knowledge, attitudes, practice, and risk perception of participants were investigated. Data were analyzed using the SPSS program. A p-value <0.05 was reported as statistically significant. The findings showed that a higher level of knowledge toward seasonal influenza was reported among the females, age group of >24, those with a higher level of education, and employed participants. The main source of participants' knowledge was social media (75.3%). The popular causes for unwillingness to getting vaccinated were fear of the many side effects of the vaccine and unavailability of participant's time. The study concluded that Lacking knowledge was found within various aspects. Many misconceptions about the effectiveness of the seasonal flu vaccine and shortage of risk perception were found. Improve the population's knowledge level, awareness campaigns to increase knowledge, and enhance flu vaccination coverage in UAE are essential.

Keywords: Seasonal influenza; Seasonal influenza vaccine; Knowledge; Risk perception.

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1.   Introduction

Sneezing, coughing, and exhaustion are the most typical symptoms of upper respiratory disease caused by virus strains, but the severity of the illness can range from moderate to severe pneumonia [1]. Flu-related deaths are possible in the event of severe complications. About 300,000–645,000 people die each year as a result of the influenza virus, which causes between 3 and 5 million severe disease cases and 43-67 percent of influenza-like illnesses in the peak of influenza season [3]. Flu outbreaks are on the rise in the United Arab Emirates as summer ends and winter begins [4]. A total of 355 people (2.56 percent) died from influenza and pneumonia in the United Arab Emirates in 2018 according to the most recent WHO data [5]. Since the flu virus has a rapid mutation rate, the immune system's ability to protect itself against new strains has been compromised. As a result, new vaccines are being developed each year to protect against new strains of influenza. In order to reduce influenza illness, disability, and mortality, annual flu vaccination has become a necessity [7]. This is especially true for those at high risk, such as the elderly, children, and those with chronic illnesses [8, 9]. Between 2 and

3 million people are saved each year because of immunization. Every year, the Centers for Disease Control and Prevention (CDC) recommends that everyone six months of age and older get a flu vaccine.

In many countries of Africa and Asia, vaccination rates for seasonal influenza were less than 1%. For countries in the tropics and subtropics, estimating flu vaccine coverage is a serious difficulty. Despite the fact that the United Arab Emirates does not have a national flu vaccination program, the flu vaccine is accessible and updated every year for the influenza virus, and it is free for all Emiratis and residents aged 65 and over; pregnant women; and individuals of determination [13]. Prior to 2009, the United Arab Emirates (UAE) distributed and provided free immunizations to high-risk groups, such as pilgrims, adults with chronic conditions, and healthcare personnel. Despite the flu vaccine being accessible in the United Arab Emirates, some people are still reluctant to get it. Flu and its vaccines have been studied by health care experts in the United Arab Emirates and other countries, but no study has been done to examine the knowledge of adults about flu and immunization in the UAE [14, 15]. Consequently, the purpose of this study is to identify the most significant gaps in knowledge on seasonal influenza, vaccination, and prophylactic measures, as well as to identify the barriers to vaccine uptake among adults in the UAE. We hope this study will assist raise knowledge about flu risk, complications, and vaccination acceptability.

2. Methodology

2.1. Study subjects

This study was carried out in the United Arab Emirates. A total of 815 adults ages 18 and over who are either English or Arabic speakers were included in the study. Located near the eastern extremity of the Arabian Peninsula, the United Arab Emirates (UAE) is a country with a population of 9.771 million people. The UAE comprises of seven distinct Emirates: Abu Dhabi; Dubai; Sharjah; Umm al-Qaiwain; Fujairah; Ajman; and Ra's al-Khaimah.

2.2. Study design

A current study is a cross-sectional survey implemented in the UAE, from February to April 2020, which is considered the peak of flu season, utilizing a self-administered questionnaire that was provided to randomly select adult individuals.

2.3. Participants

A cross-sectional study using a survey has been conducted between adults. A total of 815 (613 females and 202 males) residents in the UAE participated in this study and complete the survey, between February to April 2020. Participants were selected by using a simple random technique. Knowledge, attitudes, practice, and risk perception of participants were investigated. All completed questionnaires along were stored in a locked cabinet. The papers will be stored for 5 years and then will be destroyed.

2.4. Data collection

Five members of the team visited public sites in the UAE to administer the questionnaires. Volunteers have agreed to participate in the study and have been given the go-ahead to complete a questionnaire. With the questionnaire form, participants were given a brief explanation of the study's goal and instructions on how to fill it out. Based on previous research, the questionnaire was designed to be self-administered and structured [16, 17]. 15 community members participated in a pilot test of the questionnaire, and the results were used to make necessary revisions. Two versions of the questionnaire were prepared, one in Arabic and the other in English. There were 38 questions on the survey, and they were organized into five main areas. Those taking part in the survey were instructed to select as many personally relevant criteria as they could find. Demographic data such as gender, nationality and marital status were collected in the first section of the study. The second section contained information on immunization status and acceptance to take the vaccine.
The second section addressed participants' knowledge and attitude about seasonal influenza. Third section participants about the participants' knowledge about sesonal flu vaccine, the segment also included a 5-point Likert scale (always, often, sometimes, rarely, never) to evaluate the practices of the participants to avoid spread of influenza. Forth section was on practice of participants to avoid the spared of the seasonal flu virus the last section regarding the sources of seasonal influenza and vaccine information, included one question with many choices. The survey was built based on some previous studies such as [16, 17].

3. Findings

3.1. Demographic characteristics

As shown in Table 1. A total of 961 surveys were collected, 815 participants were included in this study. The majority 611 (75.2%) were females, and 202 (24.8%) were males. 387 (47.5%) from them were Emirati and 428 (52.5%) were Non-Emirati. More than half of the respondents 495 (57.5%) aged 18-25 years. The majority of the participants 521 (63.9%) were single, 267 (32.8%) were married, and 23 (2.8%) were divorced or widowed. About half of participants 386 (47.4%) were holding a bachelor's degree, while 368 (45.1%) were holding a high school degree and below, and 61 (7.5%) were holding postgraduate degree. Around 243 (29.8%) of the participants were employed and 572 (70.2%) were unemployed. The majority 597 (73.25%) have medical insurance while a smaller number of participants 218 (26.75%) don't have medical insurance. Moreover, almost 343 (54%) were vaccinated against seasonal influenza, and 288 (46%) were not vaccinated. Almost 636 (78%) of participants acceptance to take the vaccine, while 179 (22%) are not.

Table 1. Demographics characteristics of the participants, (n=815)

Demographic factors	Classifications	Frequency	Percentages
Gender	Male	202	24.8%
	Female	611	75.2%
Age	18-25	469	57.5%
	25-40	196	24.0%
	>40	150	18.4%
Nationality	Emirates	387	47.5%
	Non-emirates	428	52.5%
Emirates	Dubai	163	20.0%
	Abu Dhabi	111	13.6%
	Sharjah	395	48.5%
	Fujairah	8	1.0%
	Ras Al Khaimah	68	8.3%
	Ajman	59	7.2%
	Umm Al Quwain	11	1.3%
Marital status	Single	521	63.9%
	Married	267	32.8%
	Divorced/widowed	23	2.8%
Education level	High school and below	368	45.1%
	Bachelor's Degree	386	47.4%
	Postgraduate Degree	61	7.5%
Employment status	Unemployed	572	70.2%
	Employed	243	29.8%
Family income	< 20000 AED	437	53.6%
	≥ 20000 AED	367	45%
Medical insurance	Yes	597	73.25%
	No	218	26.75%
Vaccination status	Yes	343	54%
	No	288	46%
Acceptance to take the vaccine	Yes	636	78%
	No	179	22%

3.2. Knowledge and attitude of participants toward seasonal influenza

Table 2 represents the knowledge of participants regarding flu disease. The mean knowledge score of 15 questions was (10.95 ± 2.66). More than three quarters of the participants (86.8%) answered correctly that *flu*

is caused by a virus. Almost all participants (94.5%) had high knowledge that flu can spread from an infected person to other people. About 93.9% reported that flu spreads through cough and sneeze. About 64.1% knew that they can catch flu by touching a contaminated object, and around 61.4% knew that flu can spread before they know that they're sick. More than half of the participants 57.4% recorded that they can catch flu by going out in cold weather without a coat or with wet hair, while 77.5% reported that flu can cause serious complications, and 54.8% answered that flu can cause death. Almost 74.8% of participants had a high knowledge about the symptoms of flu. Most of the participants (85.1%) answered that flu can be treated.

Table 2. General knowledge and attitude of participants toword sesoal influenza (n= 815)

Question	Correctly answered n (%)
Flu is caused by a virus	708 (86.8)
Flu can spread from an infected person to other	770 (94.4)
Flu spreads through cough and sneeze	765 (93.9)
you can get flu by touching a contaminated object	523 (64.1)
You can spread the flu before you know you're sick	501 (61.4)
You can catch the flu by going out in cold weather without a coat or with wet hair	468 (57.4)
Flu can cause serious complications	632 (77.5)
Flu can cause death	447 (54.8)
The symptoms of seasonal Influenza (fever, sore throat, muscle aches, headache, stuffy nose and tiredness)	610 (74.8)
The flu can be treated	684 (85.1)

3.3. Knowledge and attitude of participants about seasonal flu vaccine

Table 3 presents the knowledge of participants regarding flu vaccine. The mean knowledge score of 11 questions regarding influenza vaccine was (4.84 ± 3.24). Three quarters of the participants (78.2%) had good knowledge about healthy and non-healthy people should take the flu vaccine, about (86.9%) disagreed with the question of the flu vaccine is only taken by children, while (68.3%) of the participants knew that the vaccine is the best way to avoid complications of the flu. Only (48.4%) agree that no serious side effects of the vaccine. Half of participants (52.4%) had knowledge regarding the flu vaccine should be taken every year. Only (20.4%)knew that the p*regnant women* should get a *flu vaccine*. When we asked regarding the safety of vaccine, (20.2%), and (56.6%) agree the that the vaccine safe for p*regnant women* and elderly, respectively, while (29.6%) reported that is the vaccine not safe for the children under 6 years old.

Table 3. General knowledge attitude of participants about sesonal flu vaccine, (n= 815)

Question	Correctly answered n (%)
Healthy people do not need to take the flu vaccine	495 (78.2)
The flu vaccine is only taken by children	550 (86.9)
The flu vaccine is the best way to avoid complications of flu	433 (68.3)
The flu vaccine has serious side effects	307 (48.4)
The flu vaccine needs to be taken every year	331 (52.4)
Pregnant women should not take the flu vaccine	129 (20.4)
Vaccine is safe for pregnant	125 (20.2)
Vaccine is safe for elderly	352 (56.6)
Vaccine safe for children under 6 months	184 (29.6)

3.4. Practices to avoid the spared of seasonal flu virus

Table 4 shows the practices of the participants to avoid the spared of flu virus. Around 36.6% of participants reported that they always washing their hands when they have flu and (7.2%) they never do it. of the participants, (41.7%) never wearing mask when they are sick, while (7.1%) always wearing mask when they are sick. About (33.5%) reported that they Avoid sharing their food with others, around (24%) always limiting close contact

with others while, (47.6%) of them always covering their mouth and nose when cough and sneeze, and only 6% stated that they never do it.

Table 4. Practices of participants to avoid the spared of seasonal flu virus, (n= 815)

Question	Never	Rarely	Sometime	Often	Always
	n (%)	n (%)	n (%)	n (%)	n (%)
Washing hands or use sanitizer	59 (7.2)	62 (7.6)	148 (18.2)	248 (30.4)	298 (36.6)
Wearing a mask	340 (41.7)	168 (20.6)	175 (21.5)	64 (7.9)	58 (7.1)
Avoid sharing the food with others	96 (11.8)	78 (9.6)	137 (16.8)	231 (28.3)	273 (33.5)
Limiting close contact with others	91.9 (11.2)	75 (9.2)	213 (26.1)	240 (29.4)	196 (24)
Covering mouth and nose when I cough and sneezes	49 (6)	42 (5.2)	106 (13)	230 (28.2)	388 (47.6)

3.5. Reasons of participants due to don't take influenza vaccine

When we asked the participant that not willing to take the vaccine regarding the reasons due to don't take the influenza vaccine, (16%) answered that they don't have time. Around (13.9%) thought that the flu is not a serious illness. 12% think that the flu vaccine has many side effects, while (11.2) don't believe that the vaccine is effective. About (9.1%) reported that they are not at risk of flu. Among the participants, (5.9%) people are afraid of needles. 4.5% that the vaccine is not covered by medical insurance. 3.7% they cannot afford the vaccine and (1.3%) they are allergic to it as shown in **Table 5.**

Table 5. Reasons of participants due to don't take the influenza vaccine n (%)

Reason	n (%)
I don't have time	131 (16.1)
The flu is not serious illness	113 (13.9)
The flu vaccine has many side effects	98 (12.0)
I don't believe that the vaccine is effective	91 (11.2)
I am not at risk of flu	74 (9.1)
I am a fried of needle	48 (5.9)
The vaccine is not covered by medical insurance	37 (4.5)
I cannot afford the vaccine	30 (3.7)
I am allergic to vaccine	11 (1.3)
May body can fight it	5 (0.6)

3.6. Assosiation between demographic factors with knowledge, practices of participants toword Sesonal influanza and Sesonal influanza vaccine

Table 6 present the relation between demographic characteristics with flu, influenzas Vaccine knowledge, and practices to prevent the flu.

Regarding the flu knowledge, the results show and no significant relationship between flu knowledge with gender(p=0.015), Nationality (P=0.318), income level (p=0.918), and the people with medical insurance (p=0.540), while there was a scientifically relation between the age , marital status, , education levels, and employment status (P <0.000). Our results present that the females, age group of more than 24 years, married women, participants with post-high school, employed, and participants with medical insurance had higher level of flu knowledge than other groups. While no different with Emiratis and non-Emiratis and income level.

About the knowledge of flu vaccine, our results reported no significant relationship between influenza vaccine knowledge with gender (p=0.252), age (p=0.084), nationality (P=0.306), marital status (p=0.126), education

level (p=0.704), employment status (p=0.035), income level (p=0.787) and the people with medical insurance (p=0.099). Our results show that the participants with age >24, married people, employed participants had higher level of flu vaccine knowledge that others, while no differences between other groups (gender, nationality education level, income level medical Insurance).

The prevalence no significant relationship between gender (p=0.252), age (p= 0.084), marital Status (p=0.220), education level (p=0.188), employment (p=0.991), and medical insurance (p=0.386) while there was a scientifically relation between the, nationality and income level (P <0.000).

Table 6. Relation between knowledge, and practices of participants by demographic factors, (n= 815)

		N	Mean	SD	T	df	p-value	OR (CI 95%) *	
Knowledge of participant toward Flu									
Gender	Male	202	10.52	2.948	-2.454	306.9	0.015	-1.024	-0.113
	Female	611	11.09	2.554					
Age	18-24	469	10.75	2.67	-2.593	813	0.010	-0.857	-0.119
	>24	346	11.23	2.633					
Nationality	Emirati	386	10.86	2.721	-0.999	811	0.318	-0.554	0.18
	Non-Emirati	427	11.04	2.613					
Marital Status	Single	521	10.69	2.72	-3.628	809	0.000*	-1.084	-0.323
	Married/divorced/ widowed	290	11.4	2.51					
Education Level	High school and below	357	10.65	2.716	-2.887	811	0.004*	-0.91	-0.173
	Bachelor's and above	456	11.19	2.605					
Employment	Unemployed	473	10.73	2.765	-2.9	808	0.004*	-0.919	-0.177
	Employed	337	11.27	2.48					
Income level	< 20,000 AED	437	10.97	2.582	-0.103	802	0.918	-0.386	0.347
	≥ 20,000 AED	367	10.99	2.705					
Medical Insurance	Yes	590	10.95	2.587	-0.614	799	0.540	-0.539	0.282
	No	211	11.08	2.666					
Knowledge of participant toward flu vaccine									
		N	Mean	SD	T	df	p-value	95% CI*	
Gender	Male	202	4.61	3.296	-1.147	811	0.252	-0.816	0.214
	Female	611	4.91	3.215					
Age	18-24	469	4.67	3.295	-1.732	813	0.084	-0.847	0.053
	>24	346	5.07	3.149					
Nationality	Emirati	386	4.72	3.179	-1.024	811	0.306	-0.68	0.214
	Non-Emirati	427	4.95	3.295					
Marital Status	Single	521	4.71	3.314	-1.533	630.5	0.126	-0.815	0.1
	Married/divorced/ widowed	290	5.07	3.106					
Education	High school and below	357	4.78	3.316	-0.38	811	0.704	-0.536	0.362
	Bachelor's and above	456	4.87	3.178					
Employment	Unemployed	473	4.63	3.26	-2.117	808	0.035	-0.942	-0.036
	Employed	337	5.12	3.207					
Income level	< 20,000 AED	437	4.87	3.285	0.27	802	0.787	-0.389	0.514
	≥ 20,000 AED	367	4.81	3.203					
Medical Insurance	Yes	590	4.93	3.22	1.651	799	0.099	-0.081	0.94
	No	211	4.5	3.306					
Practices of participant toward to avoid the flu									

		N	Mean	SD	t	df	p-value	95% CI*	
Gender	Male	202	11.95	4.853	-0.641	811	0.521	-0.999	0.507
	Female	611	12.2	4.681					
Age	18-24	469	12.21	4.443	0.657	680.6	0.511	-0.448	0.899
	>24	346	11.99	5.114					
Nationality	Emirati	386	11.59	4.783	-2.951	811	0.003*	-1.626	-0.327
	Non-Emirati	427	12.56	4.645					
Marital Status	Single	521	12.26	4.592	1.227	809	0.22	-0.256	1.109
	Married/divorced/ widowed	290	11.83	5.009					
Education	High school and below	357	12.35	4.492	1.317	792.2	0.188	-0.214	1.086
	Bachelor's and above	456	11.92	4.924					
Employment	Unemployed	473	12.12	4.579	0.012	808	0.991	-0.658	0.665
	Employed	337	12.12	4.929					
Income level	< 20,000 AED	437	12.6	4.801	3.21	802	0.001*	0.415	1.722
	≥ 20,000 AED	367	11.53	4.581					
Medical Insurance	Yes	590	12.21	4.749	0.866	799	0.386	-0.415	1.072
	No	211	11.88	4.652					
CI: Confidence interval P: probability *Significance <0.05									

3.7. Sources of information related to seasonal influenza and influenza vaccine among participants

The sources of information of participants on related to flu and flu vaccine, 75.3% and 94.4% reported that their main source of information were social media and university lectures, respectively. Among them 74.96%, 64.1%, 57.9%, 50.6%, and 4.2% indicated that they got the information related to flu from university lectures, news outlet, health care facilities, family and friends and community workshops, respectively. While 70.2%, 65.4%, 46.1%, 32.7% and 28.7% of participants reported that their sources of influenza vaccine information are mainly from social media, health care facilities, family and friends, news outlet, and community workshops, respectively as displayed in Table 7.

Table 7. Sources of information related to seasonal influenza among participants (n=815)

Sources	Seasonal influenza n (%)	Influenza vaccine n (%)
Social media (Twitter, Facebook, YouTube, WhatsApp, Instagram, Snapchat)	614 (75.3)	572 (70.2)
School and university lectures	611 (74.96)	769 (94.4)
Family and friends	412 (50.5)	375 (46.1)
Health care facilities (Hospitals, clinics, pharmacies)	472 (57.9)	533 (65.4)
News outlet (Newspaper, Television, Radio)	522 (64.1)	266 (32.7)
Community workshops	34 (4.2)	233 (28.7)

4. Discussion

Seasonal influenza is the most common cause of acute respiratory disease, globally it causes morbidity and mortality [18]. Many researchers conducted to evaluate flu knowledge and vaccination has been undertaken between healthcare professionals [14],[15] ,[19] ,[20]. Only a few numbers focus on the general public in Arab countries [16],[17]. This study is expected to be the first study to access the level of knowledge about seasonal influenza, vaccination, and the factors associated with their practices among UAE residents.

Almost three-quarters of participants indicated a willingness to get a flu vaccine. This finding is consistent with a similar study in Italy, as 71.6% of the participants had a very positive attitude toward the influenza vaccine [17] and with the study among Bichat hospital patients in Paris [21].

4.1. Knowledge about Seasonal influenza and its vaccine practices to avoid the spared of seasonal flu virus

In this study, we found that the participants have high knowledge about influenza illness and had good practices to avoid the flu, in addition, had acceptable knowledge of the importance of the vaccination. In our study group, most of the participants were considered knowledgeable about the flu causes, mild symptoms, and the common mode of transition. Critical gaps in knowledge were identified in this study about the incubation period, and risks of disease complications. Although more than half of our sample knew that influenza caused by a virus, only 64% identified that flu is caused by touching a contaminated object, respectively, these results were more than the results found among the population in Jordan [16]. On the other hand, more than half of the participants said that the flu can cause serious complications, while 45% of them are often thought that the flu is a mild upper respiratory infection, and if they caught the flu, the disease progress would have been mild and don't cause death. The flu leads to hospitalization, complications, and death, as WHO estimates that there are more than five million severe illnesses and 500,000 other deaths associated with seasonal flu annually worldwide [22]. This leads us to think of strategies to increase public information about the risk of developing the flu and its complications. Health awareness campaigns in the UAE community should consider the risk of influenza as a disease different from upper respiratory infections and must clarify that influenza can cause severe conditions that can be mitigated by vaccination and other precautions strategies. Regarding the flu vaccine, many gaps in the knowledge of the influenza vaccine were identified. More than half of the participants 51.5% overestimated the perception of the side effects of the flu vaccine, similar findings were reported in a study conducted in Jourdan, where 48.0% of the study population reported that the vaccine is not safe to take [16] and similar to the finding of the study in South African [20]. We observed that almost half of the participants did not believe that vaccinations should be taken every year to protect themselves from influenza, and there was limited understanding of the purpose of an influenza vaccine, as many of the participants did not know that the vaccine could prevent elderly, pregnant women, and children more than 6 months from flu complications.

Several studies indicated that influenza illness has been linked with the high rates of miscarriage, stillbirths, neonatal deaths, preterm deliveries, and low birth weight [23],[24], the Influenza vaccine is very safe, and it provides greater protection to pregnant women, and infants up to 6 months after birth [25],[26]. In a study among Italy's population, 64.2% did not think that a vaccine is safe and can protect pregnant women against influenza [27]. In another study done in Peru population, only 33, 30, and 36% of women, pregnant women, and adults ≥ 65y, respectively thought that the vaccine is safe and prevent young children, while 33, 30, and only 7,13, and 1% indicated that the vaccine is safe for pregnant women [28]. The results could explain, the low coverage of the vaccination benefits on pregnant women, the elderly, and children. This calls for the need to strengthen the risk communication component messages as an essential tool for providing the population with all of the necessary information about the vaccination and the value of targeting those at higher risk of influenza illness complications such as children, pregnant women, and the elderly [19], [17],[21].

Participants in the study believed that covering mouth and nose when they cough or sneezes and washing hands or use sanitizer was the most effective way to avoid the transition of flu virus, our sample considered Knowledgeable in important practices to avoid getting flu and to prevent the spread of influenza.

4.2. Reasons of unwillingness to getting influenza vaccine

In our study, we reported many barriers for not having had the flu vaccination, the majority of participants indicated that they don't have time to take the vaccine, this may be due to poor knowledge of the seriousness of influenza illness and complications, as it is 16.5% of the respondents said that the flu is not a serious illness, while 16% afraid of the side effects of the vaccine. Other studies showed similar results of the reasons for unwillingness to have influenzas vaccine, one done among adults with chronic conditions among Italy individuals, as (24.9%) fear of side effects, (18.3%) believe of not being at risk for influenza, and (14%) belief in the usefulness of the vaccine [17]. Others study among adults in Jordan reported that (36%) were worried about the safety of the vaccine, and (15%) doubts about the efficacy of the vaccine [16]. Our results found that 3.7% cannot afford the flu vaccine even though the vaccine is free for all Emiratis and residents who are 65

years and above; children below 5 years; pregnant women; and people of determination. The vaccine is offered at a very cheap cost for all other expats [29]. Providing information on the risks of influenza disease in the community and explanation the potential benefits of flu vaccination to avoid these risks might help improve vaccination coverage [30]. Also, the competent authorities must work to conduct annual influenza vaccination campaigns in workplaces of the public, moreover, the vaccine should be given at the schools.

4.3. Assosiation between demographic factors with knowledge, practices of participants toword Sesonal influanza and Sesonal influanza vacciney

Our present funding showed that the females, age group of more than 24 years, married women, participants with post-high school, employed, and participants with medical insurance had a higher level of influenza knowledge than other groups. ANOVA analysis indicated that the participants hold high degree education level had a higher level of knowledge about flu influenza, but no differences in vaccination practices. Similarly, a study finds reported between adults with chronic conditions in Italy[17]. The link of the knowledge with high education level may be due to the good of scientific material that the student receives during his studies in UAE. Moreover, in our sample, the females showed a higher level of flu knowledge than the males, this reported in similar studies [16],[17].

4.4. Sources of information related to seasonal influenza and influenza vaccine among

The media has a significant impact on people's attitudes on flu vaccination and flu education [31]. Influenza flu and vaccination information was most widely disseminated via social media (Twitter, Facebook, YouTube), as well as lectures. In comparison to a previous study conducted in two South African communities [20], these sources may be an effective target for advertising and raising health awareness about influenza and vaccination in the UAE. Community information regarding influenza and vaccination in Jourdan was mostly obtained from health care facilities (clinics or hospitals), television and radio, and newspapers [16]. This could be a reference to the disparity between the two countries' cultures. literature states that an efficient vaccination program is essential in preventing a flu outbreak, as well as increasing and coordinating preventative measures. [32,33]. To enhance public awareness about the need of vaccination and to protect government personnel against influenza, the Ministry of Health and Prevention (MOH) and Dubai Health Authority (DHA) initiated flu vaccination campaigns in October 2020. Elderly people, pregnant women and health care workers are among the most susceptible categories [34]. In order to reach all of the UAE's institutions, these campaigns need to be stepped up.

5. Conclusions

Knowledge gaps about influenza and its vaccine were discovered, as well as measures to avoid influenza. The study also identified the prevalent source of information that participants used to learn about influenza, as well as barriers to vaccination. Based on these findings, effective prevention programs in the community to an explanation of flu illness risk and its complications are essential. Implementing educational programs and using social media are required to spread a positive attitude towards the influenza vaccine and target people with a high risk of flu complications such as children under 5 years old, pregnant women, and the elderly.

References

[1] A. N. Nafziger and D. S. Pratt, "Seasonal influenza vaccination and technologies," *The Journal of Clinical Pharmacology,* vol. 54, pp. 719-731, 2014.

[2] A. D. Iuliano, K. M. Roguski, H. H. Chang, D. J. Muscatello, R. Palekar, S. Tempia, *et al.*, "Estimates of global seasonal influenza-associated respiratory mortality: a modelling study," *The Lancet,* vol. 391, pp. 1285-1300, 2018.

[3] J. M. McAnerney, C. Cohen, J. Moyes, T. G. Besselaar, A. Buys, B. D. Schoub, *et al.*, "Twenty-five years of outpatient influenza surveillance in South Africa, 1984–2008," *The Journal of infectious diseases,* vol. 206, pp. S153-S158, 2012.

[4] B. S., "Influenza virus highly active in the UAE " 2021.

[5] I. a. P. i. A. Emirates., "World Life Expectancy," 2021.

[6] K. F. A. S. F. Vaccine, "Centers for Disease Control and Prevention. Centers for Disease Control and Prevention," 2020.

[7] T. M. Uyeki, "Preventing and controlling influenza with available interventions," *New England Journal of Medicine,* vol. 370, pp. 789-791, 2014.

[8] L. Manzoli, J. P. Ioannidis, M. E. Flacco, C. De Vito, and P. Villari, "Effectiveness and harms of seasonal and pandemic influenza vaccines in children, adults and elderly: a critical review and re-analysis of 15 meta-analyses," *Human vaccines & immunotherapeutics,* vol. 8, pp. 851-862, 2012.

[9] I. (Seasonal), "World Health Organization. World Health Organization," 2021.

[10] Immunization, "World Health Organization. World Health Organization," 2021.

[11] Prevention and Control of Seasonal Influenza with Vaccines, "Centers for Disease Control and Prevention. Centers for Disease Control and Prevention," 2020.

[12] S. Hirve, P. Lambach, J. Paget, K. Vandemaele, J. Fitzner, and W. Zhang, "Seasonal influenza vaccine policy, use and effectiveness in the tropics and subtropics–a systematic literature review," *Influenza and other respiratory viruses,* vol. 10, pp. 254-267, 2016.

[13] D. T. S. INFLUENZA, " Health Information - Department of Health," *Dubai Government Media Office,* 2021.

[14] E. Abu-Gharbieh, S. Fahmy, B. A. Rasool, and S. Khan, "Influenza vaccination: healthcare workers attitude in three Middle East countries," *International journal of medical sciences,* vol. 7, p. 319, 2010.

[15] D. Firouzabadi and L. Mahmoudi, "Knowledge, attitude, and practice of health care workers towards antibiotic resistance and antimicrobial stewardship programmes: A cross-sectional study," *Journal of evaluation in clinical practice,* vol. 26, pp. 190-196, 2020.

[16] E. Y. Abu-Rish, E. R. Elayeh, L. A. Mousa, Y. K. Butanji, and A. M. Albsoul-Younes, "Knowledge, awareness and practices towards seasonal influenza and its vaccine: implications for future vaccination campaigns in Jordan," *Family practice,* vol. 33, pp. 690-697, 2016.

[17] G. Bertoldo, A. Pesce, A. Pepe, C. P. Pelullo, G. Di Giuseppe, and C. W. Group, "Seasonal influenza: Knowledge, attitude and vaccine uptake among adults with chronic conditions in Italy," *PLoS One,* vol. 14, p. e0215978, 2019.

[18] T. M. Alshammari, L. S. AlFehaid, J. K. AlFraih, and H. S. Aljadhey, "Health care professionals' awareness of, knowledge about and attitude to influenza vaccination," *Vaccine,* vol. 32, pp. 5957-5961, 2014.

[19] L. Albano, A. Matuozzo, P. Marinelli, and G. Di Giuseppe, "Knowledge, attitudes and behaviour of hospital health-care workers regarding influenza A/H1N1: a cross sectional survey," *BMC infectious diseases,* vol. 14, pp. 1-7, 2014.

[20] A. A. Azlan, M. R. Hamzah, T. J. Sern, S. H. Ayub, and E. Mohamad, "Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia," *Plos one,* vol. 15, p. e0233668, 2020.

[21] E. Casalino, A. Ghazali, D. Bouzid, S. Antoniol, L. Pereira, P. Kenway*, et al.*, "Patient's behaviors and missed opportunities for vaccination against seasonal epidemic influenza and evaluation of their impact on patient's influenza vaccine uptake," *PLoS One,* vol. 13, p. e0193029, 2018.

[22] I. (Seasonal), "World Health Organization. World Health Organization," *Available from: Influenza (Seasonal) (who.int).,* 2020.

[23] M. H. Yudin, "Risk management of seasonal influenza during pregnancy: current perspectives," *International journal of women's health,* vol. 6, p. 681, 2014.

[24] V. K. Phadke and S. B. Omer, "Maternal vaccination for the prevention of influenza: current status and hopes for the future," *Expert review of vaccines,* 2016.

[25] D. T. S. INFLUENZA, "Health Information - Department of Health," *Dubai Government Media Office,* 2021.

[26] V. W. Wong, K. Y. Lok, and M. Tarrant, "Interventions to increase the uptake of seasonal influenza vaccination among pregnant women: A systematic review," *Vaccine,* vol. 34, pp. 20-32, 2016.

[27] F. Napolitano, P. Napolitano, and I. F. Angelillo, "Seasonal influenza vaccination in pregnant women: knowledge, attitudes, and behaviors in Italy," *BMC infectious diseases,* vol. 17, pp. 1-7, 2017.

[28] S. Reinders, C. Romero, C. Carcamo, Y. Tinoco, M. Valderrama, S. La Rosa*, et al.*, "A community-based survey on influenza and vaccination knowledge, perceptions and practices in Peru," *Vaccine,* vol. 38, pp. 1194-1201, 2020.

[29] D. T. S. INFLUENZA, "Health Information - Department of Health," 2021.

[30] L. C. Bhat-Schelbert K, Matambanadzo A, Hannibal K, Nowalk MP, Zimmerman RK. , "Barriers to and facilitators of child influenza vaccine – Perspectives from parents, teens," *marketing and healthcare professionals. Vaccine.,* vol. 30, pp. 2448–52, 2012.

[31] E. Bonnevie, S. D. Rosenberg, C. Kummeth, J. Goldbarg, E. Wartella, and J. Smyser, "Using social media influencers to increase knowledge and positive attitudes toward the flu vaccine," *Plos one,* vol. 15, p. e0240828, 2020.

[32] M. Michaelis, H. W. Doerr, and J. Cinatl, "Novel swine-origin influenza A virus in humans: another pandemic knocking at the door," *Medical microbiology and immunology,* vol. 198, pp. 175-183, 2009.

[33] M. Michaelis, H. W. Doerr, and J. Cinatl, "An influenza A H1N1 virus revival–pandemic H1N1/09 virus," *Infection,* vol. 37, pp. 381-389, 2009.

[34] M. o. H. a. P. L. i. A. S. F. A. Campaign, "Ministry of Health and Prevention Launches its Annual Seasonal Flu Awareness Campaign - Ministry of Health and Prevention," *UAE,* 2021.