

The Knowledge and Attitudes of Medical Students, Nurse Trainees, and Pediatric Patients' Caregivers About Influenza and Influenza Vaccination in Prepandemic Era

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ABSTRACT

Objective: Influenza is a highly contagious respiratory infection influencing all aged people. Healthcare workers (HCWs) not only are vulnerable to influenza infection, but also act as a possible mediator for infection transmission. The best way to prevent influenza is annual vaccination. The aim of this study is to evaluate the knowledge and attitudes of medical students, nurse trainees, and pediatric patients' caregivers about influenza and influenza vaccination in our tertiary hospital.

Methods: We performed the study between April 01, 2019 and June 01, 2019. The survey consisted of a 22-item questionnaire that included questions about the demographic properties, vaccination status, decisions and attitudes about the influenza disease and influenza vaccination.

Results: Among 600 participants 502 of them completed the survey (response rate: 83%). One hundred and fifty participants from each group, who fully completed the questionnaires were included in the study. Most of the study participants have never get flu vaccination before ($p < 0.001$). It was seen that the difference between common cold and flu was better known by medical students and nurse trainees, than the caregivers ($p < 0.001$). A higher percentage of caregivers agreed with the decision that flu could not disappear without using antibiotics (26.0% vs 5.3% and 6.7%) ($p < 0.001$). Most of the participants declared the thought of unnecessary of vaccination, as influenza is a simple infection ($p = 0.05$). Approximately half of the medical students, 70% of the nurse trainees, versus 46% of the caregivers reported that to experience a disease itself is better than vaccination against it ($p = 0.007$). A higher proportion of caregivers noted that they heard or read about harmful effects of influenza vaccines on internet or social media ($p = 0.008$).

Conclusion: This study showed that most of the study participants did never get flu vaccination before. The difference between common cold and flu was better known by medical students and nurse trainees. A higher ratio of caregivers agreed that flu could not disappear without using antibiotics. Most of the participants declared the thought of unnecessary of vaccination. High percentage of participants had misinformation regarding influenza vaccines. A higher proportion of caregivers noted that they heard or read about harmful effects of influenza vaccines on internet or social media.

INTRODUCTION

Influenza (flu) is a respiratory infection influencing all aged people, which is caused by influenza viruses. It is a highly contagious disease, which presents with a wide spectrum varying from mild symptoms to lethal conditions. It is estimated that annual epidemics result in about 3-5 million severe cases and 290,000-

650,000 deaths from respiratory diseases, worldwide.¹ Turkish Health Ministry publishes territorial sentinel surveillance reports each week during the influenza season.² Fever, malaise, and cough are its most frequent symptoms. Risk groups, who are more prone to complications and mortality, consist of small children, elderly people, patients with underlying conditions, and healthcare workers



(HCWs). HCWs not only are vulnerable to influenza infection, but also act as possible mediators for infection transmission. In order to prevent influenza and its complications, the best way is annual vaccination. Hence, high coverage rate of vaccination plays a key role. Vaccination of HCWs has been recommended by CDC since 1981.³ Vaccination of doctors and nurses and reasons for barriers of non-vaccination have been widely investigated until now⁴⁻⁶ However, vaccine candidate HCWs, including medical students and nurse trainees had insufficient knowledge, about flu and flu vaccination. In addition, Turkish caregivers are under-evaluated, too. All of these groups have inevitably contact with patients and other risk groups during clinical rotations and hospital admissions. They should have responsibility and increased awareness about the disease and need for annual immunization against influenza.

In order to constitute a herd immunity against infectious diseases, HCWs and caregivers of children who are primarily responsible for care stand on the front row. However, there were hesitations and refusals about vaccines with a rising trend for childhood influenza vaccination before the Covid-19 pandemic.⁷ Generally, influenza is often confused with common cold and its real incidence and risks are underestimated. As a result, knowledge and perceptions about the influenza and its vaccines are not confidential. The rate of the vaccination is low in Turkey and all over the world.⁸⁻¹⁰ Despite various facilities promoting vaccination carried out by both individual and governmental authorities, disinformation in the media, various social network sites, and influencers have a negative impact in vaccination coverage among HCWs, like the rest of the population.

The aim of this study is to evaluate the knowledge and attitude of medical students, nurse trainees, and pediatric patients' caregivers about influenza and influenza vaccination in pre-pandemic era in our tertiary hospital.

MATERIAL and METHODS

We performed this study in Adnan Menderes University Hospital between April 01, 2019 and June 01, 2019. The survey consisted of a 22-item

questionnaire based on available similar literature. Every participants filled out the questionnaires themselves. The survey included questions about the demographic properties, vaccination status, decisions and attitudes about the influenza disease and influenza vaccination.

The participants answered all questions with 5-point Likert scale [(1)Strongly disagree; (2)Disagree; (3) Neither agree nor disagree; (4)Agree; (5)strongly agree)]. During the analyses, we combined points 1 and 2, while combining points 3, 4, and 5.

The data were analyzed by descriptive statistics using SPSS (Statistical Package for the Social Sciences) version 17.0 software. We calculated mean and standard deviation for measurable variables and percentage and frequency of occurrence for qualitative features. We made comparison analyses by means of the chi-square test and One Way ANOVA-post hoc-Scheffe alpha tests. Statistical significance was set at 0.05.

RESULTS

Among 600 participants, 502 of them completed the survey (response rate: 83%). One hundred and fifty participants from each group, who fully completed the questionnaires, were included in the study. We discarded incompletely responded questionnaires. The mean age of the participants were as follows; medical students, 21.3±1.4; nurse trainees 18.6±1.4; and patients' relatives, 37.1±12.4 years. The mean age of the caregivers was statistically significantly higher (<0.001) (Table 1). Female gender predominance was seen in the study population (p=0.04). Education status of majority of the caregivers was elementary school, while the others were mostly high school graduates (p<0.001). Most of the study participants have never had flu vaccination before (p<0.001).

Influenza disease

It was seen that the difference between common cold and flu was better known by medical students and nurse trainees, rather than caregivers (p<0.001) (Table 2). Although, majority of the participants did not agree with the decision that flu cannot disappear without using antibiotics, a higher percentage of

Table 1. Demographic properties of the study population, n (%)

	Medical students (n=150)	Nurse trainees (n=150)	Caregivers (n=150)	p
Gender				
Female	80 (53.3%)	73 (48.7%)	94 (62.7%)	0.04
Male	70 (46.7%)	77 (51.3%)	56 (37.6%)	
Education status				
Elementary	0 (0%)	0 (0%)	60 (40.0%)	<0.001
High school	140 (93.3%)	150 (100%)	51 (34.0%)	
University	10 (6.7%)	0 (0%)	39 (26.0%)	
Flu vaccination status				
Never	89 (59.3%)	64 (42.7%)	94 (62.7%)	<0.001
Once	31 (20.7%)	34 (22.7%)	33 (22.0%)	
More than once	27 (18.0%)	51 (34.0%)	14 (9.3%)	
Every year	3 (2.0%)	1 (0.7%)	9 (6.0%)	

Table 2. The evaluation of knowledge and attitudes of study population with respect to influenza disease, n (%)

	Medical students (n=150)	Nurse trainees (n=150)	Caregivers (n=150)	p
Flu and common cold are the same				
Agree	9 (6.0%)	15 (10.0%)	52 (34.7%)	<0.001
Disagree	141 (94.0%)	135 (90.0%)	98 (65.3%)	
Flu cannot disappear without antibiotics				
Agree	8 (5.3%)	10 (6.7%)	39 (26.0%)	<0.001
Disagree	142 (94.7%)	140 (93.3%)	111 (74.0%)	
As influenza is a simple infection, there is no need of vaccination				
Agree	18 (12.0%)	27 (18.0%)	34 (22.7%)	0.05
Disagree	132 (88.0%)	123 (82.0%)	116 (77.3%)	
It is better to experience a disease itself, rather than vaccination				
Agree	74 (49.4%)	105 (70.3%)	69 (46.2%)	0.007
Disagree	76 (50.6%)	45 (29.7%)	81 (53.8%)	

caregivers agreed with this decision (26.0% vs 5.3% and 6.7%) ($p<0.001$). Most of the participants declared the thought of unnecessary of vaccination, as influenza is a simple infection ($p=0.05$). Approximately half of the medical students, 70% of the nurse trainees, against 46% of the caregivers reportedly decided that experience a disease itself was better than vaccination against them ($p=0.007$).

Influenza vaccine

The majority of the medical students (92.7%) and nurse trainees (94.7%) but only approximately half of the caregivers reported that they had known that influenza vaccines contained attenuated microbes,

($p<0.001$). Among all study groups, higher proportion of caregivers (85.0% vs. 61.3% and 60.0%) thought that influenza vaccines contained vitamins and minerals and influenza vaccines were curative ($p=0.002$ and $p<0.001$). Similarly, a higher proportion of caregivers noted that they had heard or read about harmful effects of influenza vaccines on internet or social media ($p=0.008$). Majority of the study population reported that they had known the risk groups for influenza vaccination. However comparatively higher percentage of medical students had this information (95.3% vs. 87.3% and 73.3%) ($p<0.001$).

Table 3. The evaluation of knowledge and attitudes of study population with respect to influenza vaccines and vaccination

	Medical students (n=150)	Nurse trainees (n=150)	Caregivers (n=150)	p
Influenza vaccines include attenuated microbes				
<i>Agree</i>	139 (92.7%)	142 (94.7%)	74 (49.3%)	<0.001
<i>Disagree</i>	11 (7.3%)	8 (5.3%)	76 (50.7%)	
Influenza vaccines include vitamins and minerals				
<i>Agree</i>	58 (38.7%)	60 (40.0%)	85 (56.7%)	0.002
<i>Disagree</i>	92 (61.3%)	90 (60.0%)	65 (85.0%)	
Influenza vaccines are curative				
<i>Agree</i>	15 (10.0%)	19 (12.7%)	79 (52.7%)	<0.001
<i>Disagree</i>	135 (90.0%)	131 (87.3%)	71 (47.3%)	
Influenza vaccines prevents disease				
<i>Agree</i>	129 (86.0%)	121 (80.7%)	119 (79.3%)	0.28
<i>Disagree</i>	21 (14.0%)	29 (19.3%)	31 (20.7%)	
Know the place to get influenza vaccine shot				
<i>Agree</i>	120 (80.0%)	110 (73.3%)	117 (78.0%)	0.37
<i>Disagree</i>	30 (20.0%)	40 (26.7%)	33 (22.0%)	
Prevent him/her-self and family against influenza if get vaccinated				
<i>Agree</i>	95 (63.3%)	78 (52.0%)	84 (56.0%)	0.13
<i>Disagree</i>	55 (36.7%)	72 (48.0%)	66 (44.0%)	
Should get influenza vaccine annually				
<i>Agree</i>	47 (31.3%)	45 (30.0%)	53 (35.3%)	0.58
<i>Disagree</i>	103 (68.7%)	105 (70.0%)	97 (64.7%)	
No doctor advised me influenza vaccination				
<i>Agree</i>	103 (68.5%)	98 (65.2%)	105 (70.3%)	0.78
<i>Disagree</i>	47(31.5%)	52 (34.8%)	45 (29.7%)	
Heard/read about harmful effects of influenza vaccines on internet/social media				
<i>Agree</i>	15 (10.0%)	33 (21.9%)	43 (28.6%)	0.008
<i>Disagree</i>	135 (90.0%)	117 (78.1%)	107 (71.4%)	
Do not think influenza vaccines are useful				
<i>Agree</i>	32 (21.3%)	30 (20.0%)	43 (28.6%)	0.39
<i>Disagree</i>	118 (78.7%)	120 (80.0%)	107 (71.4%)	
Did not have influenza shot because of fear of needle phobia				
<i>Agree</i>	10 (6.7%)	21 (14.1%)	23 (15.4%)	0.16
<i>Disagree</i>	140 (93.3%)	129 (85.9%)	127 (84.6%)	
Would vaccinate regularly if influenza vaccine was free of charge				
<i>Agree</i>	30 (20.0%)	21 (14.1%)	30 (20.0%)	0.51
<i>Disagree</i>	120 (80.0%)	129 (85.9%)	120 (80.0%)	
Know the risk groups for influenza vaccination				
<i>Agree</i>	143 (95.3%)	131 (87.3%)	110 (73.3%)	<0.001
<i>Disagree</i>	7 (4.7%)	19 (12.7%)	40 (26.7%)	

DISCUSSION

Vaccine subtypes are analyzed and changed annually according to the worldwide trends. Despite advice of health authorities regarding annual vaccination, only a small percentage of the study population declared that they got regularly vaccinated each year. Dramatically, most of the participants reported to have never got flu vaccination before. A multicenter survey including all medical faculties revealed that 59% of Turkish medical students have never got influenza vaccination.¹¹ In the study of Oguz MM¹², after introduction and elucidating the characteristic features of the flu vaccine, coverage rate was shown to increase from 10.8% to 39.9% in the next season. Among students in all grades of medical education including freshmen and students training in medical and healthcare-related faculties were reported to have higher vaccination coverage than the others.¹³ However, a comparison was not performed between the students with respect to their academic years in this study. Influenza vaccination rates are known to be quite low among Turkish HCWs. Incorrect knowledge and attitudes about the vaccine and disease are the most important reasons to decline vaccination. In a multicenter study, it was reported that 6.7% of the HCWs were regularly vaccinated each year and that 55% of them had never had the influenza vaccine before similar to the result of this study.¹⁴ Even vaccination campaigns could not achieve a significant increase.¹⁵ In another survey, only 41.6% of Turkish HCWs chose the correct answer indicating the necessity of annual flu vaccination.¹⁶ Females predominance, for which mostly caregivers contributed, was seen in this study population, similar to other studies.^{5,15} Education status of majority of the caregivers was elementary school, while the others graduated mostly from a high school. However, education level does not always have a significant effect on the likelihood of being vaccinated among HCWs.¹⁷ A systematic review stated that sociodemographic variables such as gender and age were the most reported, but also the most inconsistent predictors of influenza vaccination.⁴

There may be some doubts and lack of knowledge of HCWs about the severity of influenza disease and the effectiveness of the vaccine, especially when

HCWs are new to the clinical practice. In the study by Erbay et al.¹⁵ it was stated that the reason for non-vaccination among the HCWs was mostly related to the thought of insufficient protection of the vaccines. In addition, the doctors added that ignoring the importance was another reason for non-vaccination. In this study, most of the participants entertained the thought of unnecessary of vaccination, as influenza is a simple infection. Similarly, in a previous study, 21.8% of medical doctors reported that they found influenza vaccines unnecessary.¹⁵ The responders including caregivers in the study by Adadan Güvenç et al.⁹ did not believe that vaccination protected people in close surroundings. The caregivers' belief in effectiveness of influenza vaccines was found as a strong predictor for vaccination of high-risk children against influenza.¹⁸

It was seen in this study that the difference between common cold and flu was better known by medical students and nurse trainees, rather than caregivers. The 34.7% of caregivers in this study agreed that flu and common cold were the same disease. In the survey of Adadan Güvenç et al.⁹, 20.9% of the patients and their relatives above 18 years of age did not know the right answer to this question. Although, majority of the participants in our study did not agree with the decision that flu could not disappear without using antibiotics, a higher percentage of caregivers agreed with this decision (26.0% vs 5.3% and 6.7%). In a previous report, 44.4% of Turkish adult patients and their caregivers reported that flu could not be treated without antibiotics.⁹ Fear of getting ill due to vaccine or its side effects can interfere with the vaccine coverage. Approximately half of the medical students, 70% of the nurse trainees, versus 46% of the caregivers in this study reported that they decided that to experience a disease itself was better than getting vaccinated against it. Differently, a recent, multicenter national survey in our country revealed that getting the vaccine in order not to catch influenza ranked first among the reasons why HCW responders got influenza vaccine.¹⁴

The majority of the medical students and nurse trainees, while approximately half of the caregivers, reported to know that influenza vaccines contained attenuated microbes. Moreover, in this study

among all study groups, most of the participants declared their opinions indicating that influenza vaccines contained vitamins and minerals. In the literature, one of most important barrier to vaccinations has been reported as lack of information.¹⁹ Anti-vaccination trend has started to become a big challenge before the Covid-19 pandemic, especially among the caregivers of children and these movements against vaccination take a large place especially in social media.

A higher proportion of caregivers noted that they had heard or read about harmful effects of influenza vaccines on internet or social media. In a Greek survey, public information about flu vaccines was cited as a major reason for refraining from getting vaccinated.²⁰ In a previous report, doctors who were not vaccinated against influenza declared that they thought of the presence of probable unknown, or neurological, or local side effects.¹⁵ Also in a previous report 31.1% of Turkish HCWs reported that they had believed that seasonal flu vaccines decreased body resistance.¹⁶ Majority of relatives of patients in a previous Turkish study declared that vaccines could cause flu and had serious side effects.¹ In our study, majority of the study population reported that they had known the risk groups for influenza vaccination. Although each risk category was not specified in this study, subjects with diseases of the hematopoietic organs or chronic circulatory, respiratory, or renal conditions, cohabitants of at-risk subjects, and people over 65 years of age were the mostly reported risk groups by the HCW responders in the study by Arghittu et al.⁶

While interpreting the results of this study, some limitations should be considered. This study was conducted in our tertiary care hospital in Turkey. As a result, the results may not be generalizable for all parts of Turkey. Anyway, number of the participants in the population is not low, and statistically important findings will be beneficial to review the knowledge and attitude of this population. Although there is a risk of lower response rates and unresponsiveness, a qualitative study might have allowed a deeper understanding of the knowledge and attitude towards determining the decision to vaccinate, which would help for improvements in more areas. However, our survey was also useful when considering

issues of time and cost.

As a conclusion, vaccination of HCWs continues to be a priority and vaccine uptake should be improved. This study showed that most of the study participants has never get flu vaccination before. The difference between common cold and flu was better known by medical students and nurse trainees. A higher percentage of caregivers agreed that flu cannot disappear without using antibiotics. Most of the participants declared the thought of unnecessary of vaccination, as influenza is a simple infection. High percentage of participants had misinformation regarding influenza vaccines. A higher proportion of caregivers noted that they had heard or read about harmful effects of influenza vaccines on internet or social media. In addition to an attempt to increase the level of knowledge of the physicians, multidirectional trainings targeting to change the attitude and behaviors of the HCWs and caregivers towards influenza vaccination should be applied in prevention of influenza.

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