Clinical and Experimental Health Sciences

Awareness of Infectious Disease Risks and Vaccination Behaviors Among Health Professionals

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ABSTRACT

Objective: This study aims to evaluate the awareness of infectious disease risks and vaccination behaviors of health professionals.

Methods: This descriptive and cross-sectional study was conducted who worked at a research and training hospital, met the inclusion criteria and agreed to participate. Personal Information Form and Communicable Diseases Risk Awareness Protection Scale (CDRAPS) were used for data collection. The study was completed with 208 health professionals actively working at the hospital. Personal information form and communicable diseases risk awareness and protection scale were collected.

Results: In this study, 62% of the participants have had influenza before and 85.1% were vaccinated with at least one of the adult vaccines. 10.6%were formerly vaccinated with pneumococcal vaccine and half of them were vaccinated during the COVID-19. 16.8% of the participants, who were not formerly vaccinated with influenza vaccine, stated their intentions to receive vaccine, 90% decided during the pandemic. Mean CDRAPS score was 155.70±15.47. There was statistically significant relationship between the knowledge of the participants on adult vaccines and the mean scores obtained from the CDRAPS (p=.004) and between the decision to receive influenza vaccination and the CDRAPS scores (p=.047).

Conclusion: There was a statistically significant relationship between knowledge on adult vaccines, plans to receive influenza vaccination and the scores obtained from the CDRAPS.

Keywords: Vaccine, vaccination, COVID-19, infectious disease, health professionals.

1. INTRODUCTION

Infectious diseases are disorders caused by microorganisms, which may result in morbidity, mortality, pandemics, and consequent economic and social problems, including, anxiety and panic among the population, overcrowding in health institutions, and high economic burden (1). Globalization, rapid urbanization, public transportation, climate change and global warming facilitated the spread of infectious agents throughout the world (2). Despite the advances in controlling infectious diseases, they are still among the crucial public health problems since they can be easily transmitted via contact with infected people or contaminated water and food products at health centers or outside (3). Knowledge, attitudes, and beliefs among the population are as important as health systems and technologies to control infectious diseases. Appropriate attitudes and behaviors to prevent the occurrence and transmission of these diseases have important individual and social benefits (4). Consequently, individual awareness about infectious diseases and protective behaviors are vital to protect personal well-being and prevent the transmission of these diseases (1).

Immunization is the leading method of protection against infectious diseases. Immunization with vaccination is the most effective and the cheapest method of protection (5). No methods other than vaccination have far-reaching returns in the struggle against infectious diseases (6). World Health Organization (WHO) reported that global vaccination programs prevent 2-3 million deaths every year and may save 1.5 million people every year if the target vaccination levels may be reached (7). Although infectious diseases are mostly considered as a reason for mortality among developing countries, COVID-19 disease, which turned into a global pandemic in a short time and was responsible for hundreds of thousands of deaths as of April 2020, shows that infectious diseases will be a problem for all countries in the near future (8).

Following the outbreak of the COVID-19 pandemic, most of the health professionals without former intentions for vaccination applied to health centers for vaccination. Due to these reasons, analysis of the awareness of infectious disease risks among health professionals and their protective

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behaviors, including vaccination, are crucial to take measures to prevent the spread of infectious diseases and prepare education programs on this public health problem. This study aims to analyze the awareness of infectious disease risks and vaccination behaviors of health professionals.

2. METHOD

2.1. Ethical Considerations

Prior to the study, we obtained permission from the Republic of Turkey Ministry of Health COVID-19 Scientific Research Commission and Acıbadem University and Acıbadem Healthcare Institutions Medical Research Ethics Committee (ATADEK) (17/09/2020-20/16).

Written informed consent of the participants that agreed to participate was obtained. The research was conducted in accordance with the Declaration of Helsinki.

2.2. Study Design

The descriptive and cross sectional study was conducted to determine the awareness of infectious disease risks and vaccination behaviors of health professionals.

2.3. Participants

All health professionals, including physicians, nurses, medical assistants, and technicians, who had been working at a research and training hospital in İstanbul Provincial Directorate of Health Süreyyapaşa Chest Diseases and Thoracic Surgery Training and Research Hospital between September and December 2020, constituted the universe of the study. Sample of the study comprised 208 health professionals, who agreed to take part in the study and met the inclusion criteria. Being above the age of 18 years and actively working at the hospital constituted the inclusion criteria. Participants, who did not complete all the questions in data collection instruments, were excluded from the study. Cochran's formula for unknown population sample size was used to calculate the sample size of the study. According to this, the minimum sample was calculated at 200 people for P = .50 and q = 0.50, with 5% error (d = 0.05) in the confidence interval range of 95% (α = .05) (9). Considering that there may be some dropouts from the study, it was decided to include 208 people in the study.

2.4. Data Collection

Personal Information Form and Communicable Diseases Risk Awareness and Protection Scale (CDRAPS) were used for data collection. The form and the scale were completed by the participants in about 15 minutes. The data were collected by the researchers through the face-to face. The form and the scale were distributed to the participants and asked to fill them out.

2.5. Instruments

Personal Information Form

This form was prepared by the researchers by using the existing studies in the literature and was composed of two parts with 26 questions in total (10-16). The first part asked 6 questions on personal characteristics (age, martial status, sex, educational level, and occupation etc.) of the participants whereas the second part had 20 questions on vaccination attitudes and behaviors. After the questions were created by the researchers according to the literature, expert opinions were taken from five people and their final form was given in line with the suggestions.

Communicable Diseases Risk Awareness and Protection Scale (CDRAPS)

CDRAPS was developed by Ener (2020) to measure the risk awareness and the levels of protection, and the validity and the reliability of the scale has been confirmed. The scale had 36 items that were scored on a five-point Likert scale. Answers to the items on risk awareness ranged between 'strongly disagree' (1 point) to 'strongly agree' (5 points) whereas the items on protective behaviors ranged between 'never' (1 point) to 'always' (5 point). No items were reverse scored. The scale had six factors, namely 'common life risk awareness' (items 1, 2, 3, 4, 5, 14, 15, 16 and 17), 'personal protection awareness' (items 6, 7, 8, 18, 19, 20, 21 and 22), 'protective behaviors' (items 24, 25, 26, 27, 28, 29, 30 and 31), 'hand washing behaviors' (items 23, 32 and 36), ' social protection awareness' (items 9, 10, 11 and 12), and 'personal contact awareness' (items 13, 33, 34 and 35). Total score was calculated by summing the scores obtained from each item and higher scores indicated higher risk awareness and protective behaviors. Cronbach's alpha of the original scale was 0.91 (10). Cronbach's alpha in our scale was also 0.91, indicating that the scale was a reliable instrument for the sample.

2.6. Data Analysis

Statistical analyzes were reported using the SPSS version 26.0 statistical software. Frequency, mean, and standard deviation were used as descriptive statistics. Independent Samples t test, Mann-Whitney U test and Kruskal-Walli's test were used to analyze the difference between mean scores of the continuous variables. The value of $p<0.05$ was accepted to be statistically significant.

3. RESULTS

The mean age and length of professional experience of the 208 participants were 32.39±9.38 and 9.66±9.37 years, respectively. Of the participants who participated in the study 44.2% were physicians (n=92), 39.4% were nurses (n=82), 6.3% were medical assistants (n=13) and 10.1% were medical technicians (n=21). Of the participants who participated in the study 75% were female (n=156) and 50.5% were married (n=105). 4.3% had high school degree (n=9), 9.1% had associate degree (n=19), 63.5% had bachelor's degree (n=132) and 23.1% had master's or doctoral degree (n=48) (Table 1).

***Table 1**. Sociodemographic and vaccination characteristics of the participants*

Variables	n	%
Martial Satatus		
Single	103	49.5
Married	105	50.5
Sex		
Female	156	75.0
Male	52	25.0
Occupation		
Physician	92	44.2
Nurse	82	39.4
Medical assistant	13	6.3
Medical technician	21	10.1
Educational Status		
High school degree	9	4.3
Associate degree	19	9.1
Bachelor's degree	132	63.5
Master's or doctoral degree	48	23.1
Previous diseases		
İnfluenza	129	62.0
Pneumonia	19	9.1
Hepatitis B	5	2.4
Hepatitis A	10	4.8
Diphtheria –Tetanus	1	.5
Meningitis	1	.5
Type of adult vaccines*		
Influenza vaccine	61	29.3
Pneumococcal vaccine	17	8.2
Hepatitis B vaccine	120	57.7
Hepatitis A vaccine	43	20.7
Diphtheria – Tetanus vaccine	86	41.3
Meningitis vaccine	6	2.9
Reasons for vaccination*		
Recommended by a physician	95	45.7
Believed in and relied on vaccines	107	51.4
Positive news on TV and media	178	85.6
Knowledge on adult vaccination		
Excellent	18	8.7
Sufficient	130	62.5
Insufficient	60	28.8
Reasons for not being vaccinated		
Negative news on TV and media	1	.5
Did not believe in the protective potential of vaccines	7	3.4
Fear from side effects	9	4.3
Believed that vaccines might be allergic	6	2.9
Did not know the vaccination schedule	6	2.9
Did not know how to access vaccination	2	1.0
Opinions on Influenza vaccine*		
Protects only the children	1	.5
May protect the adults and prevent the disease	60	28.8
Maintains a mild course of disease	147	70.7
Is not necessary for adults	27	13.0
No opinion	14	6.7
Vaccination due to travels or going abroad		
Yes	14	6.7
No	194	93.3

**more than one option can be ticked*

Table 1 showed the characteristics of the participants about vaccines and vaccination. Of the participants who participated in the study 62% had influenza previously (n=129). Of the participants who participated in the study 85.1% were vaccinated with at least one of the adult vaccines (n=177) and 57.7% were vaccinated with hepatitis B vaccine (n=120). Of the participants who participated in the study 51.9% were vaccinated in a state or a research and training hospital (n=108).

Of the participants who participated in the study, 10.6% (n=22) were vaccinated with the pneumococcal vaccine (n=22) and half of them were vaccinated during the COVID-19 pandemic. Of the participants who participated in the study 89.4% (n=186) were not formerly vaccinated with pneumococcal vaccine but 18.3% (n=34) expressed their intentions to be vaccinated. In this study, 82.4% (n=28) of the participants that planned to receive pneumococcal vaccine stated that they decided to receive the vaccine during the COVID-19 pandemic (Table 2).

Of the participants who participated in the study, 42.8% (n=89) were formerly vaccinated with influenza vaccine and 92.1% (n=82) were vaccinated before the COVID-19 pandemic. In this study, 57.2% (n=119) were not formerly vaccinated with influenza vaccine but 16.8% (n=20) expressed their intentions to be vaccinated. 90% (n=18) of participants that planned to be vaccinated with influenza vaccine stated that they decided to receive the vaccine during the pandemic (Table 2).

Table 3 showed the mean scores obtained from the CDRAPS and its subscales. Mean CDRAPS score of the participants was 155.701±15.474. Mean scores obtained from the common life risk awareness, personal protection awareness and protective behaviors subscales were 37.043±5.483, 34.783±3.871 and 34.711±4.515, respectively. Besides, mean scores obtained from the hand washing behaviors, social protection awareness and personal contact awareness subscales of the CDRAPS were 14.019±1.427, 16.649±2.470 and 18.495±2.470, respectively.

Table 4 showed the findings on the distributions of vaccination characteristics of the participants and the scores obtained from the CDRAPS. There was no statistically significant relationship among healthcare professionals in terms of CDRAPS scores ($p > .05$). We found a statistically significant relationship between the knowledge of the participants on adult vaccines and the mean scores obtained from the CDRAPS ($p < .01$). Besides, there was statistically significant relationship between the decision to receive influenza vaccination and the CDRAPS scores ($p < .05$). However, there was no significant relationship between the mean CDRAPS scores and other vaccination characteristics.

Table 2. *Vaccination with pneumococcal and influenza vaccines before or during the COVID-19 Pandemic*

	n	%
Formerly vaccinated with pneumococcal vaccine		
Yes	22	10.6
No	186	89.4
If vaccinated, time of pneumococcal vaccination (n=22)		
Before the COVID-19 pandemic	11	50
During the COVID-19 pandemic	11	50
If not vaccinated, planned to receive pneumococcal vaccine (n=186)		
Yes	34	18.3
No	152	81.7
If planned to receive pneumococcal vaccination, intended time (n=34)		
Before the COVID-19 pandemic	6	17.6
During the COVID-19 pandemic	28	82.4
If vaccinated, time of influenza vaccination (n=89)		
Before the COVID-19 pandemic	82	92.1
During the COVID-19 pandemic	7	7.9
If not vaccinated, planned to receive influenza vaccine (n=119)		
Yes	20	16.8
No	99	83.2
If planned to receive influenza vaccination, intended time (n=20)		
Before the COVID-19 pandemic	2	10
During the COVID-19 pandemic	18	90

Table 3. *Scores obtained from the CDRAPS and its subscales*

	Min (min*)	Max (max**)	Mean	Standard Deviation
Common life risk awareness	21(9)	45 (45)	37.043	5.483
Personal protection awareness	20 (8)	40 (40)	34.783	3.871
Protective behaviors	15 (8)	40 (40)	34.711	4.515
Hand washing behaviors	5 (3)	15 (15)	14.019	1.427
Social protection awareness	8 (4)	20 (20)	16.649	2.470
Personal contact awareness	7 (4)	20 (20)	18.495	1.956
Total	79 (36)	180 (180)	155.701	15.474

**Minimum score to be obtained from the subscale and the CDRAPS; ** Maximum score to be obtained from the subscale and the CDRAPS.*

Table 4. *CDRAPS scores and vaccination characteristics*

	Mean	SD	p	Statistical value
Occupation				
Physician	157.043	1.511	.306	3.615[2]
Nurse	155.597	1.920		
Medical assistant	154.154	3.061		
Medical technician	151.190	3.035		
Vaccinated with vaccines other than childhood vaccines				
Yes	155.807	15.033	.814	.235[1]
No	155.096	18.048		
Knowledge on adult vaccination				
Excellent	151.611	14.649	**.004***	10.980[2]
Sufficient	158.100	15.694		
Insufficient	151.733	14.351		
Attitudes towards influenza vaccine				
Regularly vaccinated every year	162.583	16.483	.329	3.434[2]
Vaccinated irregularly	156.736	13.963		
Never vaccinated	154.735	14.631		
Did not have any information but could have been vaccinated if s/he knew	139.666	52.880		
Formerly vaccinated with pneumococcal vaccine				
Yes	153.545	16.271	.442	-.768[3]
No	155.957	15.402		
If vaccinated, time of pneumococcal vaccination				
Before the COVID-19 pandemic	148.454	16.439	.237	-1.183[3]
During the COVID-19 pandemic	158.636	15.121		
If not vaccinated, planned to receive pneumococcal vaccine				
Yes	157.823	13.347	.416	.815[1]
No	155.427	15.921		
If planned to receive pneumococcal vaccination, intended time				
Before the COVID-19 pandemic	154.000	10.899	.587	-.543[3]
During the COVID-19 pandemic	158.642	13.848		
Formerly vaccinated with influenza vaccine				
Yes	155.852	16.454	.905	.120[1]
No	155.591	14.783		
If vaccinated, time of influenza vaccination				
Before the COVID-19 pandemic	156.719	16.848	.191	-1.308[3]
During the COVID-19 pandemic	151.500	7.259		
If not vaccinated, planned to receive influenza vaccine				
Yes	160.636	16.831	**.047**	-1.985[3]
No	153.305	15.586		
If planned to receive influenza vaccination, intended time				
Before the COVID-19 pandemic	160.000	18.681	.886	-.144[3]
During the COVID-19 pandemic	160.736	17.077		

*[1] Independent Samples t test, 2 Kruskall-Wallis (KW), 3 Mann-Whitney U test (Z) * p<0.05*

4. DISCUSSION

Vaccination of the health professionals constitutes an important step of public health. Effective vaccination programs may not only protect the health professionals but also reduce the prevalence of nosocomial infections (11,12). Routine vaccination programs and developments in

infection control measures resulted with a 98% decrease in the prevalence of hepatitis B among the health professionals (12). A study reported that with the increase in COVID-19 vaccination, it resulted in a 90% decrease in intective cases (13). Another study noted that vaccination of five health professionals prevented a disease such as influenza and vaccination of eight health professionals prevented a death. Besides, influenza vaccination of healthcare workers has been shown to protect hospitalized patients, including bone marrow transplant recipients (14). In this study, 85% of the participants were vaccinated with at least one of the adult vaccines and more than half of the participants were vaccinated with hepatitis B vaccine. However, the percentage of participants that received other adult vaccines, including influenza and pneumococcal vaccines, was relatively low. Influenza vaccination among health professionals in the existing studies ranged from 2.1% to 82% (15). Despite all efforts, influenza vaccination among health professionals in developed countries was 52% (16). A study on Spanish health professionals reported that influenza vaccination among health professionals was 29.5% (17). Another study reported that health professionals did not have sufficient knowledge of pneumococcal vaccine and did not recommend pneumococcal vaccine to their patients compared to other adult vaccines (18). Reasons behind the behaviors of health professionals to refrain from vaccination included concerns about side effects, forgetting, doubts about the efficiency of vaccines and the belief that exposure to diseases helps protection (19, 20). Therefore, a working environment that encourages knowledge on and positive attitudes towards vaccination may help the health professionals to develop positive attitudes towards vaccination.

Among the participants that were not vaccinated, the percentages of health professionals that planned to receive pneumococcal and influenza vaccines in our study were 18.3% (n=34) and 16.8% (n=20), respectively. 82.4% (n=28) of the participants that decided to receive pneumococcal vaccine and 90% (n=18) of those that would receive influenza vaccine expressed that they changed their minds during the COVID-19 pandemic. The recent COVID-19 pandemic clearly showed the importance of vaccination. Importance of vaccines and immunization become clear during the periods of epidemics and pandemics, such as the current COVID-19 pandemic (21). Besides, higher vaccination rates among the health professionals have been observed during the pandemics. A study conducted in Italy reported that physicians were more likely to recommend vaccination to their patients during the times of pandemics (22). The study of Hidiroğlu et al. (2010) found that vaccination rate during the H1N1 pandemic was 27.2% among the health professionals (23). Our finding on the high percentage of participants that decided on vaccination during the COVID-19 pandemic indicates that the awareness on the importance of vaccination during the pandemic increased. Therefore, we may expect an increasing rate of vaccination among the health professionals during the COVID-19 pandemic. This finding of our study is similar to the literature. In a meta-analysis reviewing twenty-three articles, it was stated that COVID-19 vaccination intention was high at 73.3% worldwide (24). Another meta-analysis reported that the COVID-19 pandemic has increased vaccination rates worldwide (25).

High scores obtained by the participants from the CDRAPS indicate a high level of awareness of infectious disease risks among the health professionals and their inclination to perform protective behaviors. Existing studies suggested that lack of information on vaccines and the diseases that may be prevented with vaccination resulted in reluctance to vaccination. People with insufficient knowledge on vaccines and vaccination may reject to be vaccinated even if vaccination was for free. In this sense, knowledge of vaccination may have positive effects on the attitudes towards immunization services (17, 26). Since the increase in knowledge of vaccination resulted with a consequent awareness of the importance of vaccination, various institutions, including the WHO and the Ministry of Health, attempted to increase awareness of vaccination. Higher level of awareness of infectious diseases and vaccination behavior among the participants of our study may be influenced by these attempts.

Limitations of this study are twofold. Firstly, the study was conducted on health professionals, who were busy with delivering healthcare to the patients during the COVID-19 pandemic. Consequently, the number of participants was limited. Secondly, the sample was not randomly chosen but all health professionals that agreed to participate were included to the study.

5. CONCLUSION

Increasing the rate of vaccination among the health professionals is vital to maintain the well-being of health professionals and to preventing the transmission of infectious diseases from health professionals to patients. Participants of our study were vaccinated with at least one of the adult vaccines. Besides, most of the participants were vaccinated with hepatitis B vaccine and the rate of pneumococcal and influenza vaccination was relatively low. Furthermore, CDRAPS scores were higher for the participants that had sufficient knowledge of adult vaccination and that planned to receive influenza vaccination. Therefore, health professionals might be periodically informed about the vaccines and the diseases that may be prevented with vaccination. Besides, their immunization status might be periodically followed up by their institutions and vaccination might be recorded.

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