

COVID-19 vaccine hesitancy and related factors among primary healthcare workers in a district of Istanbul: a cross-sectional study from Turkey

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ABSTRACT

Objectives This study aimed to determine the COVID-19 risk perceptions, vaccination intentions and predictive factors of family physicians and family healthcare staff working in primary care in Üsküdar.

Design A cross-sectional study was performed using an online questionnaire to determine the demographic and general characteristics of the participants and their willingness to be vaccinated.

Setting An online questionnaire was applied to family physicians and family health workers working in primary care family health centres in Üsküdar between 25 and 29 December 2020. Multivariate analysis was performed to identify independent predictors of the willingness of individuals to be vaccinated.

Participants Out of 323 health workers working in 44 family health centres in the district, a total of 276 health workers were reached, including 126 physicians (n=158, 79.7%) and 150 midwives/nurses (n=165, 90.9%) (response rate 85.4%).

Results 50.4% (n=139) of the healthcare workers were willing to have the COVID-19 vaccine, 29% (n=80) were undecided and 20.7% (n=57) refused the vaccine. The rate of acceptance to be vaccinated was higher in physicians, in men and in those who had not received a seasonal influenza vaccination regularly each year.

Conclusions Half of the primary healthcare workers, one of the high-risk groups in the pandemic, were hesitant or refused to be vaccinated for COVID-19. Knowing the factors affecting the vaccine acceptance rates of healthcare professionals can be considered one of the most strategic moves in reaching the target of high community vaccination rates. For evidence-based planning in vaccination studies, there is a need to investigate the reasons for COVID-19 vaccine acceptance by healthcare workers at all levels.

INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) remains a global threat.¹ There is still a need for healthcare personnel to work with patients in the epidemic with the resulting high risk of infection.² Vaccination is an important weapon in the fight against the pandemic and is one of the most effective ways to control infectious diseases.³ Although

Key points

What is already known on this topic

⇒ Vaccination is the most effective strategy to combat infectious diseases. Primary care workers play a key role in immunisation services and vaccination counselling. However, little is known about the nature and extent of COVID-19 vaccine hesitancy in healthcare workers worldwide. COVID-19 vaccine hesitancy in healthcare workers is likely to have a major impact on a successful immunisation trial. We assessed the willingness of primary healthcare workers in a district of Istanbul to be vaccinated and the reasons underlying their hesitancy.

What this study adds

⇒ One-third of healthcare workers were undecided about having a COVID-19 vaccine. Physicians, men and those who had not received a regular influenza vaccine every year were more likely to get vaccinated.

How this study might affect research, practice and/or policy

⇒ The role of primary healthcare workers in COVID-19 vaccination is critical. It is necessary to develop new strategies to determine the factors related to vaccination intention in order to increase the communal success of vaccination and the acceptance rate of vaccination in healthcare workers.

a significant reduction in the global burden of the disease and death has been achieved through vaccines, it is known that the public's trust in vaccines has been affected for various reasons in recent years. Therefore, emerging vaccine hesitancy can lead to delays in vaccination and vaccine rejection and sometimes contribute to epidemics.⁴

Studies of vaccine hesitancy show that trust in healthcare workers is associated with increasing the likelihood of vaccine acceptance.^{5 6} Healthcare professionals are the first reliable source that individuals refer to when seeking answers to their vaccine-related



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questions.^{7 8} Primary healthcare workers are a critical component of immunisation services, a part of preventive health services. As unarguably the most intense advocates of vaccine-preventable diseases, they are often the first place of reference for both childhood and adult vaccinations. Family physicians and family health workers, considered reliable sources of vaccine information, have a unique position which individuals in rural and urban areas can access frequently, uninterrupted, cheaply and easily.⁹ As a result, they have an important role in reducing all kinds of vaccine hesitancy and establishing confidence in the vaccine in their population.¹⁰ Therefore, the increase in the number of healthcare workers who are hesitant about vaccination is worrying. Vaccination applications, which started with vaccines developed as a solution to the current epidemic, have revealed concerns and hesitation about the COVID-19 vaccine in healthcare workers, who are the priority group in vaccines as in all parts of society. Many factors such as the level of trust in the vaccine or the provider, the perceived need for the vaccine or the value of the vaccine, availability and access problems were found to have an effect in vaccine hesitancy.^{11 12}

In Turkey, vaccination was started for people aged 65 and over, together with healthcare workers, on 14 January 2021. At the beginning of September 2021 the rate of those who received the first dose of the vaccine among the population aged >18 years reached 78.24%.^{13 14} With the introduction of vaccination it was observed that there were positive attitudes as well as concerns in the priority vaccination groups. Studies on vaccine hesitancy among healthcare professionals in Turkey have indicated that there is no distinction between working in primary, secondary or tertiary healthcare services. Healthcare professionals have a positive attitude towards vaccination and more than two-thirds of them intend to be vaccinated.^{15 16} Moreover, no study has been found including only primary healthcare workers.

Family health centres are the facilities where the vaccination intention is most vital as they carry out the contact and case follow-ups during the pandemic and are the centre for administering vaccinations. We therefore conducted this study to determine the risk perceptions of primary care workers for COVID-19 vaccines and the predictive factors in their willingness to have the COVID-19 vaccine before vaccination, which started on 14 January 2021 in Turkey.

METHODS

This cross-sectional study was conducted from 25 to 29 December 2020 on family physicians and family healthcare staff working in primary care family health centres in the ?? district of Istanbul with a population of 520 771.¹⁷ Since 2010, every individual in Turkey has a family physician and family healthcare worker. Preventive, diagnostic, therapeutic and rehabilitative health services provided by a family physician and family healthcare worker assigned

to individuals in the country constitute the basic structure of the primary healthcare model. These services are provided by family physicians and family healthcare workers in family health centres to each person regardless of age, gender and disease comprehensively, continuously and as mobile health services to the extent necessary.¹⁸ On the other hand, family health centres work under the coordination of their district health directorates. Üsküdar, located on the shore of the Bosphorus in Istanbul which has a population of >15 million, has a population of >500 000. There are 44 family health centres, including 158 family physicians and 165 family health workers working in the district.

A sample was not selected as it was aimed to reach all 323 people working in family health centres in the district; 276 of the healthcare professionals were reached (response rate 85.4%). Data were collected with an online questionnaire prepared by the researchers (see online supplemental appendix 1). In order to reach the optimum data, a reminder message was sent to their phones about the online questionnaire every 3 days. The questionnaire was developed by researchers after a literature review of COVID-19 vaccine hesitancy.^{19 20} Before implementation, a pilot study was conducted to evaluate the intelligibility, usability, applicability and time spent on the survey questions. After this study on primary healthcare workers working in another district, the statement “I do not think that the COVID-19 disease threatens my health” in the suggestions in the questionnaire was changed to “I think that the COVID-19 disease threatens my health”. In addition, the option “I do not have it because I have doubts about the brand of the vaccine” was added to the reasons for not getting seasonal influenza vaccination and the questionnaire was finalised. The survey was prepared using Google Forms, and the generated web-based questionnaire link was shared online with all family health centre staff. At the beginning of the survey there was information about the rights of withdrawal, privacy and data protection and the purpose of the research. Only participants who gave consent completed the survey.

In the first part of the survey, questions about age, gender, profession, marital status, having children, individuals aged >65 years living in the same house, smoking and the presence of chronic diseases were included. In the second part, participants were questioned about the the diagnosis of COVID-19 disease and hospitalisation of them and their relatives. This section also included questions to determine employees' vaccination status for seasonal influenza and H1N1 influenza vaccine and the reasons for not being vaccinated. In order to assess risk perceptions regarding COVID-19 disease, questions such as “How would you rate yourself in terms of risk of having COVID-19 disease?” and “How would you rate yourself at risk of dying from COVID-19?” were included and they were asked to answer as very high, high, medium, low, very low and no risk. In the third part of the survey, 10 suggestions about the COVID-19 vaccine were included. For each suggestion, strongly agree/agree/undecided/

disagree/strongly disagree options were included. Participants' vaccination intentions against COVID-19 were analysed as agree, undecided or disagree.

Statistical analysis

Descriptive statistics were performed. Categorical data on demographic variables were presented as frequency and percentage. Relationships between independent variables and intention for the COVID-19 vaccine were appropriately tested using the Pearson χ^2 test and Fisher's exact test. Logistic regression was used to evaluate independent predictors of vaccine acceptance intention. Variables related to vaccination with H1N1 and seasonal influenza and demographic variables were tested in the models. The statistical significance level was accepted as $p < 0.05$. All analyses were performed with IBM SPSS Statistics 22.0.

This study was approved by the Clinical Research Ethics Committee of Üsküdar Maternity and Children's Training and Research Hospital (Ethics Committee No: dated 23 December 2020 and decree no 213).

RESULTS

One hundred and twenty-six of the 158 family physicians (79.7%) and 150 of the 165 midwives/nurses (90.9%) working in family health centres in the district were reached. Of these, 54.3% ($n=150$) of the respondents were midwives/nurses and 45.7% ($n=126$) were physicians. The mean age of the participants was 38.6 ± 10.3 years (range 21–62) and 82.6% ($n=228$) were women. The mean age of the physicians was 43.8 ± 9.5 years and the mean age of the midwives/nurses was 34.2 ± 9.0 years. 69.9% ($n=193$) of them were married and 64.9% ($n=179$) had children. The rate of individuals at home aged >65 years of age was 12.7% ($n=35$) and the rate of healthcare workers with a chronic disease was 24.6% ($n=68$). The frequency of smoking was 26.4% ($n=73$). Fifty-four (19.6%) of the participants were diagnosed with COVID-19 disease and 211 (76.4%) had relatives who were diagnosed with COVID-19. A total of 244 (88.4%) healthcare workers evaluated their probability of having COVID-19 disease and 81 (28.4%) evaluated their probability of dying due to COVID-19 as very high/high.

A total of 116 of family health centre workers (42.0%) had never had a seasonal influenza vaccine. Among those who answered the question concerning the reasons for not having a seasonal influenza vaccination, 30.4% ($n=76$) stated that they did not consider seasonal influenza as a risk for their health and 24% ($n=60$) did not think that the vaccine would protect them sufficiently. In addition, 7.6% ($n=19$) had doubts about the brand of the vaccine, 6.8% ($n=17$) had suspicions about the side effects of the vaccine and 5.2% ($n=13$) gave the cost of the vaccine/lack of vaccine and other reasons for not getting the vaccine.

While 50.4% ($n=139$) of family health centre employees agreed to have the COVID-19 vaccine approved by the Ministry of Health, 20.7% ($n=57$) refused it and

29% ($n=86$) were undecided about getting vaccinated. Univariate relationships between the intention to have a COVID-19 vaccination and sociodemographic variables are shown in table 1. It was found that there was a significant difference in vaccine acceptance between genders, between those aged ≤ 40 years of age and >40 years of age, and between physicians and nurses/midwives ($p < 0.001$).

Suggestions regarding vaccination showed that 60.1% ($n=166$) of healthcare professionals considered COVID-19 disease as a threat to their health and 56.1% ($n=155$) of the participants thought that the COVID-19 vaccine would effectively prevent and control the disease. Those who said they had knowledge about the COVID-19 vaccine were 41.0% ($n=113$); 45.6% ($n=126$) of the participants were concerned about the short-term side effects and 63.7% ($n=176$) were concerned about the long-term side effects of the vaccine. The vaccine acceptance rate was 44.4% ($n=24$) and the vaccine rejection rate was 25.9% ($n=14$) in those with COVID-19 disease. One-third of those who recovered from the disease were undecided about whether or not to have the COVID-19 vaccine. Even if they had had the disease, 34.8% ($n=96$) wanted to be vaccinated and 52.9% of participants ($n=146$) wanted all family members to be vaccinated (table 2).

Multivariate analysis was performed so that those who decided 'no' and 'undecided' for vaccination were included in the same group. In the logistic regression model, male gender, being a doctor and having an influenza vaccine were independently correlated with vaccine acceptance ($p < 0.05$) (table 3).

Factor analysis for the construct validity of the questionnaire items and Cronbach's alpha coefficients were used for internal consistency. The suitability of the explanatory questionnaire items for factor analysis was made based on the Barlett sphericity test, the Kaiser–Meyer–Olkin (KMO) test and the diagonal values in the anti-image correlation matrix. The Barlett test performed within the scope of the study and the calculated KMO ratio showed that the data were suitable for analysis (KMO=0.89 and Barlett's test $\chi^2=1300.108$, $SD=28$, $p < 0.001$). In order to examine the factor structure and determine its sub-dimensions, exploratory factor analysis was performed using the Direct Oblimin rotation technique. A two-factor structure with an eigenvalue >1 and explaining 69.87% of the total variance was determined. The Cronbach's alpha value of 10 propositions related to the vaccine used in the study was 0.732.

DISCUSSION

Vaccination is one of the potentially effective measures to reduce and control mortality and morbidity in the COVID-19 pandemic. However, the obstacles to COVID-19 vaccine acceptance, especially in healthcare workers, are not fully understood. Vaccine hesitancy is growing, and it has been included among the 10 threats to global health by the World Health Organization.²¹

Table 1 Perception of risk and vaccination intention by demographic characteristics

	Vaccination intent				P value†
	Yes	Undecided	No	Total*	
	N (%)	N (%)	N (%)	N (%)	
Profession					
Midwife/nurse	56 (37.3)	50 (33.3)	44 (29.3)	150 (54.3)	<0.001
Doctor	83 (65.9)	30 (23.8)	13 (10.3)	126 (45.7)	
Age groups					
<40 years	69 (42.6)	48 (29.6)	45 (27.8)	162 (58.7)	0.001
≥40 years	70 (61.4)	32 (28.1)	12 (10.5)	114 (41.3)	
Gender					
Female	101 (44.3)	72 (31.6)	55 (24.1)	228 (82.6)	<0.001
Male	38 (79.2)	8 (16.7)	2 (4.2)	48 (17.4)	
Marital status					
Married	100 (51.8)	53 (27.5)	40 (20.7)	193 (69.9)	0.676
Single	39 (47.0)	27 (32.5)	17 (20.5)	83 (30.1)	
Having a child					
Yes	94 (52.5)	48 (26.8)	37 (20.7)	179 (64.9)	0.523
No	45 (46.4)	32 (33.0)	20 (20.6)	97 (35.1)	
Chronic disease					
Yes	35 (51.5)	16 (23.5)	17 (25.0)	68 (24.6)	0.412
No	104 (50.0)	64 (30.8)	40 (19.2)	208 (75.4)	
Smoking					
Yes	34 (46.6)	24 (32.9)	15 (20.5)	73 (26.4)	0.670
No	105 (51.7)	56 (27.6)	42 (20.7)	203 (73.6)	
Individuals >65 years of age at home					
Yes	23 (65.7)	7 (20.0)	5 (14.3)	35 (12.7)	0.151
No	116 (48.1)	73 (30.3)	52 (21.6)	241 (87.3)	
COVID-19 diagnosis of self					
Yes	24 (44.4)	16 (29.6)	14 (25.9)	54 (19.6)	0.501
No	115 (51.8)	64 (28.8)	43 (19.4)	222 (80.4)	
COVID-19 diagnosis of a relative					
Yes	98 (46.4)	66 (31.3)	47 (22.3)	211 (76.4)	0.06
No	41 (63.1)	14 (21.5)	10 (15.4)	65 (23.6)	
H1N1 vaccination					
Yes	87 (45.3)	65 (33.9)	40 (20.8)	192 (69.6)	0.001
Doesn't remember	10 (40.0)	5 (20.0)	10 (40.0)	25 (9.1)	
No	42 (71.2)	10 (16.9)	7 (11.9)	59 (21.4)	
Seasonal influenza vaccination					
Regularly every year	39 (33.6)	44 (37.9)	33 (28.4)	116 (42.0)	<0.001
Several times	77 (57.5)	34 (25.4)	23 (17.2)	134 (48.6)	
Never	23 (88.5)	2 (7.7)	1 (3.8)	26 (9.4)	
Total	139 (50.4)	80 (29.0)	57 (20.7)	276 (100)	

*Column %.

†P value calculated by χ^2 test.

Table 2 Distribution of responses to recommendations regarding COVID-19 vaccine by vaccine intention

COVID-19 vaccine suggestions*	Vaccination intention			P value†
	Yes N (%)	Undecided N (%)	No N (%)	
The vaccine is effective in preventing and controlling COVID-19 disease	118 (76.1)	29 (18.7)	8 (5.2)	<0.001
COVID-19 disease threatens my health	122 (51.3)	68 (28.6)	48 (20.2)	0.708
I know enough about the COVID-19 vaccine	77 (68.1)	21 (18.6)	15 (13.3)	<0.001
I am concerned about the short-term side effects of the vaccine	50 (39.7)	42 (33.3)	34 (27.0)	<0.01
I am concerned about the long-term side effects of the vaccine	58 (33.0)	68 (38.6)	50 (28.4)	<0.001
I will be vaccinated even if I had the disease before	91 (94.8)	5 (5.2)	0	<0.001
I will be vaccinated in case of national COVID-19 vaccine	110 (75.3)	19 (13.0)	17 (11.6)	<0.001
I will be vaccinated in case of foreign vaccine	112 (94.9)	6 (5.1)	0	<0.001
I would like all my family members to be vaccinated	127 (87.0)	15 (10.3)	4 (2.7)	<0.001

*Suggestions: strongly agree/agree/undecided/disagree/strongly disagree.
†P value calculated by χ^2 test.

According to our results, half of the family health centre employees agreed to be vaccinated, one-fifth refused to be vaccinated and 30% of employees were undecided about getting vaccinated. In studies of the vaccination intention of healthcare professionals to date, the frequency of vaccination acceptance varies between 30% and 80%.²⁰⁻²² In these studies, although being in contact with the patient increases the acceptance of vaccines in healthcare workers, there are no data on the healthcare field where the target population works.²⁰⁻²² In Turkey, more than half of the population agrees to have the COVID-19 vaccine. On the other hand, healthcare workers have a vaccination acceptance rate up to two-thirds higher than the general population.¹⁵ With new studies to be performed in the future of the vaccination programme, real vaccination rates will be reached, not just possible vaccine acceptance rates.²³ In addition, this study included only primary healthcare

workers. With this study, which is special in this respect, the change of the burden of the pandemic on healthcare workers in different health service areas will be studied and it will contribute to insights into the differences in the psychological burden.²⁴⁻²⁵ Physicians, nurses and midwives working at a primary care family health centre in our country have followed up on COVID-19 cases and possible contacts, in addition to the routine health services for which they have been responsible since the beginning of the pandemic, and then took place at the centre of the planned vaccination applications. There is a need for more studies to find possible differences in vaccination willingness in healthcare professionals who follow and treat inpatients with COVID-19 in secondary and tertiary care. One of the critical factors affecting vaccine behaviour in societies is trust in vaccines, and healthcare professionals are among the most reliable sources

Table 3 Predictors of the intention to have COVID-19 vaccination among participants (binary logistic regression)*

		OR	95% CI	P value
Gender	Male (0)			
	Female (1)	3.016	1.261 to 7.212	0.013
Profession	Doctor (0)			
	Midwife/nurse (1)	2.046	1.102 to 3.797	0.023
Age	≥40 years (0)			
	<40 years (1)	0.784	0.438 to 1.402	0.412
Seasonal influenza	Yes, always (0)			
	Yes, occasionally (1)	0.367	0.210 to 0.642	<0.001
	No (2)	0.078	0.020 to 0.311	<0.001
H1N1	Yes (0)			
	I don't remember (1)	2.969	0.972 to 9.072	0.056
	No (2)	1.332	0.634 to 2.800	0.450

*Those with 'undecided' and 'no vaccination' intentions were included in the same group.

of information to which individuals refer while building their trust in vaccines.^{26 27} In Turkey, vaccination services are provided at the primary level and are among the most basic duties of family health units. With the Expanded Programme on Immunisation in the country, family health units have been authorised for implementation and follow-up of childhood vaccinations, risk group vaccinations and adult vaccinations.²⁸ The role of these units in the success achieved in the fight against contagious diseases and the reduction of mortality and morbidity in vaccine-preventable diseases is very significant. A healthcare worker who is hesitant about vaccination may be less willing to increase public confidence in vaccines and to recommend them. They may also be less likely to choose and recommend vaccination for their children and loved ones.^{26 27} Thus, it is critical to identify the reasons for COVID-19 vaccine hesitancy of primary healthcare workers for the success of pandemic control. Studies show that the pandemic imposes different burdens on the diagnosis, treatment, follow-up and control of the disease in primary, secondary and tertiary healthcare services, and it causes psychological effects in different dimensions in healthcare workers.^{24 25} In Turkey, the COVID-19 vaccination programme is performed both in primary care family medicine units and in hospitals. Although being supported with regularly updated and easily accessible information helps healthcare professionals to establish their confidence in the vaccine and to guide society, the absence of a COVID-19 algorithm or COVID-19 guide specific to the primary healthcare services in the pandemic management process in the country and the lack of a vaccine administration schedule may have increased the stress of family physicians and family health workers due to uncertainty regarding disease management processes and may have affected their confidence. Moreover, due to the fact that follow-up and telephone visits required for patients who are administered outpatient COVID-19 treatment in primary care or isolated due to contact, new patient applications that continue in fluctuations as well as the continuation of the current pregnancy, baby and child follow-ups for which they are still responsible and isolation reports, the workload of primary care workers increased even more during the pandemic period.²⁹ The increased workload and stress of all these situations may have affected the efforts of primary care workers to address COVID-19 vaccine hesitations, both in themselves and in the community.

Our results show that approximately 90% of healthcare professionals rated the risk of contracting COVID-19 as very high/high and approximately one-third rated the risk of dying from the disease. Studies have indicated that the perception of disease risk can be a determinant in the attitudes of healthcare professionals to recommend and accept the vaccine and is even associated with believing that they are at high risk of receiving or transmitting the virus.³⁰ Despite the high-risk perception rates regarding having the disease and dying from it, about half of the participants did not consider COVID-19 to be a threat to

their health and thought that the vaccine would not be efficient in the course of the disease. However, since the beginning of the pandemic, at least one-fifth of all healthcare workers in Turkey is estimated to have been infected with the COVID-19 virus, and according to the report of the professional organisation, nearly 500 healthcare workers died due to COVID-19.³¹ The fact that a significant portion of healthcare workers who died 5 months following the initiation of the vaccination campaign was unvaccinated or that they did not receive an additional dose after two doses of the Sinovac vaccine also reveals the extent of vaccination hesitancy among healthcare workers in the country.³¹ On the other hand, the WHO announced that an average of 115 000 healthcare workers died from COVID-19 according to data from January 2020 to May 2021. A much better effort is needed in the fight against the pandemic in healthcare workers, about two-fifths of whom have been vaccinated.³² The disease risk perceptions of individuals also have an impact on the use of personal protective equipment and the attitude to vaccination. In addition, it is noteworthy that the employees are very concerned regarding the short-term and long-term adverse effects of the vaccine and vaccination of their family members. Concerns regarding the safety of COVID-19 vaccines are cited as major causes of hesitation or reluctance in studies examining vaccine acceptance by healthcare workers during the pandemic.^{33 34} It is claimed that risk perceptions arising from disease anxiety are effective in the preferences of individuals for preventive health behaviours. There may be changes in risk perception periodically during the pandemic process (pre-quarantine, quarantine period and post-quarantine), and the psychological burden of anxiety and fear caused by the presence of an unknown new virus may affect the perception and intention to be vaccinated.^{35 36} It is possible that there are differences in risk perception in different periods of the pandemic process and that the perception against newly developed vaccines is effective in willingness for vaccination.³⁷

As a result of our study, age, gender, profession and a history of seasonal influenza vaccination were found to be related factors in vaccine acceptance. Non-physician healthcare workers, women and those aged <40 years were less likely to agree to be vaccinated. The lower acceptance of women and nurses in vaccine hesitancy studies in healthcare workers during the pandemic is quite remarkable.^{34 36 38} Low vaccination acceptance among nurses/midwives, which is an important component of vaccination and plays the role of a personal and professional reference source for individuals, may also affect social vaccination compliance in the ongoing epidemic. Compared with the general population, healthcare professionals—who we expect to have evidence-based information about vaccines—are, of course, expected to have a positive attitude towards vaccines. However, the possible knowledge gap in healthcare professionals, who are a heterogeneous group, is an issue that should be evaluated in future studies. Also, the gender-based differences in

mortality from the disease during the pandemic may help explain the positive association of the male gender with vaccine acceptance. Studies show a significantly higher proportion of male deaths and adverse clinical outcomes of COVID-19 disease in men.^{39 40}

In addition, we found that a history of regular vaccination with seasonal influenza vaccine was, not surprisingly, a predictive factor in accepting COVID-19 vaccines. Not seeing influenza as a risk to their health and opinions that the vaccine would not work were the most prominent reasons for not having the influenza vaccine. Similar results have been found in previous studies, with a strong association between vaccine acceptance and acceptance of the seasonal influenza vaccine and H1N1 vaccine.^{34 38 41}

In influenza vaccine studies performed in Turkey and globally, the effectiveness of the individual's habit in accepting vaccination and the effectiveness of the safety of the vaccine are suggested.^{42 43} Higher vaccine acceptance for COVID-19, which has a seasonal influenza-like transmission pattern and clinical features, is also an expected outcome for healthcare workers who are vaccinated with regular influenza vaccines every year.

Since they are often the first place of contact for individuals in the community and are reliable sources for health counselling, primary healthcare workers are in a strategic position in vaccination applications for efficient vaccine advocacy. Accordingly, realising the reasons for COVID-19 vaccine hesitation of family physicians and family health workers and working with health managers and professional organisations on this issue will be an important step to reach the targeted levels in herd immunity. Updating evidence-based information on the prevention and control of the disease and information on the content of the vaccine and its long-term and short-term effects with training studies will both reduce the possible hesitation of healthcare professionals and enable them to take action to increase confidence in vaccination for possible reasons of rejection from the community. Qualitative and quantitative new studies should be planned for vaccination hesitancy of primary healthcare workers.

This cross-sectional study has shown the extent of vaccination hesitancy among primary healthcare workers in Üsküdar, which has a population of over 500 000. Although obtained before the vaccination campaign, our findings can be considered a preliminary study to evaluate the barriers to the adoption of the COVID-19 vaccine for the control of the pandemic with new variant viruses of varying sizes and can be used to identify evidence-based strategies to increase COVID-19 vaccination. In order to be successful against the pandemic, vaccination campaigns should be supported by trying to identify the doubts about the vaccine among healthcare professionals.

This study provides valuable information about the potential barriers to vaccination of primary healthcare workers, who are an important source of human resources in vaccination. The application of an online survey in our study may have limited the participation of some healthcare professionals. Social desirability biases are possible.

In addition, this cross-sectional and observational study was performed in a medium-sized district of Istanbul, so the results cannot be generalised and causal inferences cannot be made. Again, the study was carried out before the initiation of the COVID-19 vaccination of healthcare workers in Turkey. The data were based on self-reports, and it is possible that acceptance rates have changed since the start of vaccination and the results of efficiency studies. Qualitative research, such as focus group interviews or in-depth interviews, can help reveal and complement the findings on the positive and negative causes of vaccine acceptance.

CONCLUSION

Half of primary care workers, one of the high-risk groups in the pandemic, were hesitant or refused to be vaccinated for COVID-19. Critical positive predictive factors for COVID-19 vaccination were: male, physician, and having a history of vaccination against seasonal influenza. Knowledge of the factors affecting acceptance of vaccine by healthcare professionals can be considered one of the most strategic moves in achieving the goal of high community vaccination rates. For evidence-based planning in vaccination studies, there is a need for studies to investigate the reasons for acceptance of the COVID-19 vaccine by healthcare professionals at all levels.

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Contributors Hİ made a substantial contribution to the design of the overall work, including reviewing relevant literature to create the study questionnaire, creating the questionnaire, interpreting the results, performing all statistical analysis, constructing and designing data tables, reviewing first and final drafts, writing the first draft of the manuscript, approving revisions to the manuscript, final approval of the version to be published and is the guarantor of the work. MAS created the questionnaire, identified the means of questionnaire dissemination, coordinated the dissemination and receipt of study data and made a significant contribution to the overall work, reviewing relevant literature, providing significant revisions to the version to be published and agreement to be accountable for all aspects of the work. YT created the questionnaire, identified the means of questionnaire dissemination, coordinated dissemination and receipt of study data, provided substantial interpretation of the data from a clinical perspective, reviewed and approved included elements of the questionnaire, assisted in the dissemination of the questionnaire, reviewed and approved the first and final drafts, approved the version to be published and agreed to be accountable for all aspects of the work. İM made a significant contribution to the study design, reviewed the initial and final versions of the work, revised critically important intellectual content, reviewed the relevant literature, oversaw the statistical analysis and agreed to be accountable for all aspects of the work.

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Ethics approval This study involves human participants and was approved by Ethics Committee: The Clinical Research Ethics Committee of Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital Ethics Committee ID: 23.12.2020/ 213. Participants gave informed consent to participate in the study before taking part.

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Data availability statement No data are available.

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REFERENCES

- Looi M-K. Covid-19: is a second wave hitting Europe? *BMJ* 2020;371:m4113.
- Anderson RM, Heesterbeek H, Klinkenberg D, et al. How will country-based mitigation measures influence the course of the COVID-19 epidemic? *Lancet* 2020;395:931-4.
- World Health Organization. Immunization, 2019. Available: <https://www.who.int/topics/immunization/en/>
- Larson HJ, Jarrett C, Eckersberger E, et al. Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: a systematic review of published literature, 2007-2012. *Vaccine* 2014;32:2150-9.
- Smith LE, Amlôt R, Weinman J, et al. A systematic review of factors affecting vaccine uptake in young children. *Vaccine* 2017;35:6059-69.
- Yeung MPS, Lam FLY, Coker R. Factors associated with the uptake of seasonal influenza vaccination in adults: a systematic review. *J Public Health* 2016;38:fdv194-753.
- Dubé E, Gagnon D, Ouakki M, et al. Measuring vaccine acceptance among Canadian parents: a survey of the Canadian Immunization Research Network. *Vaccine* 2018;36:545-52.
- Eller NM, Henrikson NB, Opel DJ. Vaccine information sources and parental trust in their child's health care provider. *Health Educ Behav* 2019;46:445-53.
- Hostetter J, Schwarz N, Klug M, et al. Primary care visits increase utilization of evidence-based preventative health measures. *BMC Fam Pract* 2020;21:151.
- Day P, Strenth C, Kale N, et al. Perspectives of primary care physicians on acceptance and barriers to COVID-19 vaccination. *Fam Med Community Health* 2021;9:e001228.
- Ei-Sokkary RH, Ei Seifi OS, Hassan HM, et al. Predictors of COVID-19 vaccine hesitancy among Egyptian healthcare workers: a cross-sectional study. *BMC Infect Dis* 2021;21:762.
- Verger P, Fressard L, Collange F, et al. Vaccine hesitancy among general practitioners and its determinants during controversies: a national cross-sectional survey in France. *EBioMedicine* 2015;2:891-7.
- World Health Organization. Turkey, 2021. Available: <https://covid19.who.int/region/euro/country/tr>
- Our World in Data. Statistics and research coronavirus (COVID-19) vaccinations. Available: <https://ourworldindata.org/covid-vaccinations>
- Kose S, Mandiracioglu A, Sahin S. Vaccine hesitancy of the COVID-19 by health care personnel. *Int J Clin Pract* 2020:e13917.
- Oruç MA, Öztürk O. Attitudes of health care professionals towards COVID-19 vaccine - a sequence from Turkey. *Hum Vaccin Immunother* 2021;17:3377-83.
- Sağlık Bakanlığı TC. Halk Sağlığı Genel Müdürlüğü, Birinci Basamak Sağlık Hizmetleri. Available: <https://hsgm.saglik.gov.tr/tr/ailehekimligi/birinci-basamak-sa%C4%9F%C4%B1k-hizmetleri.html>
- Sağlık Bakanlığı TC. İstanbul İl Sağlık Müdürlüğü, Üsküdar İlçe Sağlık Müdürlüğü. Available: <https://uskudar.istanbulsaglik.gov.tr/>
- İkişik H, Akif Sezerol M, Taşçı Y, et al. COVID-19 vaccine hesitancy: a community-based research in Turkey. *Int J Clin Pract* 2021;75:e14336.
- Dzieciolowska S, Hamel D, Gadio S, et al. Covid-19 vaccine acceptance, hesitancy, and refusal among Canadian healthcare workers: a multicenter survey. *Am J Infect Control* 2021;49:1152-7.
- World Health Organization. Ten threats to global health in 2019. Available: <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>
- Galanis P, Vraika I, Fragkou D. Intention of health care workers to accept COVID-19 vaccination and related factors: a systematic review and meta-analysis. *medRxiv* 2020:2020.12.08.20246041.
- Sallam M. COVID-19 vaccine hesitancy worldwide: a concise systematic review of vaccine acceptance rates. *Vaccines* 2021;9:160.
- Atak M, ÇE Şahin, Sezerol MA. Primary health care services in Turkey during COVID-19 pandemic. In: Önal AE, ed. *Halk Sağlığı COVID-19*. Baskı. Ankara: Türkiye Klinikleri, 2020: 129-34.
- Kaplan AK, Sahin MK, Parıldar H, et al. The willingness to accept the COVID-19 vaccine and affecting factors among healthcare professionals: a cross-sectional study in Turkey. *Int J Clin Pract* 2021;75:e14226.
- Karafilakis E, Larson HJ. The paradox of vaccine hesitancy among healthcare professionals. *Clin Microbiol Infect* 2018;24:799-800.
- Le Marechal M, Fressard L, Agrinier N, et al. General practitioners' perceptions of vaccination controversies: a French nationwide cross-sectional study. *Clin Microbiol Infect* 2018;24:858-64.
- Sağlık Bakanlığı TC. Genişletilmiş Bağışıklama Programı Genelgesi. Available: <https://www.saglik.gov.tr/TR,11080/genisletilmis-bagisiklama-programi-genelgesi.html>
- KayaAÇ, Ünal CP, Akman M. COVID-19 Salgının Yönetilmesi İle İlgili Marmara Üniversitesi Tıp Fakültesi Aile Hekimliği Anabilim Dalının Görüşleri. *J Turk Fam Phy* 2020;11:95-101.
- Lin C, Mullen J, Smith D, et al. Healthcare providers' vaccine perceptions, hesitancy, and recommendation to patients: a systematic review. *Vaccines* 2020;8:713.
- Türk Tabipler Birliği. COVID-19 Pandemisi 18 AY Değerlendirme Raporu. Available: [https://www.ttb.org.tr/userfiles/files/COVID-19%20Pandemisi%2018%20Ay%20Deg%CC%86erlendirme%20Raporu%20ME%20\(1\).pdf](https://www.ttb.org.tr/userfiles/files/COVID-19%20Pandemisi%2018%20Ay%20Deg%CC%86erlendirme%20Raporu%20ME%20(1).pdf)
- World Health Organization. Health care worker deaths during COVID-19. Available: <https://www.who.int/news/item/20-10-2021-health-and-care-worker-deaths-during-covid-19>
- Verger P, Scronias D, Dauby N, et al. Attitudes of healthcare workers towards COVID-19 vaccination: a survey in France and French-speaking parts of Belgium and Canada, 2020. *Euro Surveill* 2021;26:2002047.
- Wang K, Wong ELY, Ho KF, et al. Intention of nurses to accept coronavirus disease 2019 vaccination and change of intention to accept seasonal influenza vaccination during the coronavirus disease 2019 pandemic: a cross-sectional survey. *Vaccine* 2020;38:7049-56.
- Caserotti M, Girardi P, Rubaltelli E, et al. Associations of COVID-19 risk perception with vaccine hesitancy over time for Italian residents. *Soc Sci Med* 2021;272:113688.
- Gagneux-Brunon A, Detoc M, Bruel S, et al. Intention to get vaccinations against COVID-19 in French healthcare workers during the first pandemic wave: a cross-sectional survey. *J Hosp Infect* 2021;108:168-73.
- Tomljenovic M, Petrovic G, Antoljak N, et al. Vaccination attitudes, beliefs and behaviours among primary health care workers in northern Croatia. *Vaccine* 2021;39:738-45.
- Dror AA, Eisenbach N, Taiber S, et al. Vaccine hesitancy: the next challenge in the fight against COVID-19. *Eur J Epidemiol* 2020;35:775-9.
- Galbadage T, Peterson BM, Awada J, et al. Systematic review and meta-analysis of sex-specific COVID-19 clinical outcomes. *Front Med* 2020;7:348.
- Li M, Luo Y, Watson R, et al. Healthcare workers' (HCWs) attitudes and related factors towards COVID-19 vaccination: a rapid systematic review. *Postgrad Med J* 2021. doi:10.1136/postgradmedj-2021-140195. [Epub ahead of print: 30 Jun 2021].
- Paterson P, Meurice F, Stanberry LR, et al. Vaccine hesitancy and healthcare providers. *Vaccine* 2016;34:6700-6.
- Karlsson LC, Lewandowsky S, Antfolk J, et al. The association between vaccination confidence, vaccination behavior, and willingness to recommend vaccines among Finnish healthcare workers. *PLoS One* 2019;14:e0224330.
- Torun SD, Torun F. Vaccination against pandemic influenza A/H1N1 among healthcare workers and reasons for refusing vaccination in Istanbul in last pandemic alert phase. *Vaccine* 2010;28:5703-10.

COVID-19 Vaccine from the Perspective of Healthcare Professionals

This study is performed in cooperation with Üsküdar District Health Directorate and Istanbul Medeniyet University. The questionnaire was prepared to evaluate the approaches of healthcare professionals regarding the COVID-19 vaccine. Your answers will be used for scientific purposes only. The number of questions in the survey is 26 and the response time is 3-4 minutes. Thank you in advance for your valuable contributions.

* Required

1. What is your age? *

2. What is your gender? *

Female

Male

3. What is your job? *

Family Physician

General Practitioner

Nurse

Midwife

Medical Assistant

Emergency Medical Technician (EMT)

Other: _____

4. What is your marital status? *

Married

Single

5. Do you have a child? *

Yes

No

6. Do you have an individual over the age of 65 that you live with in your home? *

Yes

No

7. Do you have a chronic disease? *

Yes

No

8. If your answer to the previous question is yes, what is your disease(s)?

9. Do you smoke? *

No, i do not.

I used to, but i quited before the pandemic.

I used to, but i quited during the pandemic.

Yes, i do.

10. Have you been diagnosed with COVID-19 disease during the pandemic? *

Yes

No

11. Has anyone in your close circle had COVID-19? *

Yes

No

12. How would you evaluate yourself in terms of the risk of having COVID-19 disease during the ongoing pandemic process? *

I have a very high risk.

I have a high risk.

I have a moderate risk.

I have a low risk.

I do not have a risk.

13. How would you rate yourself in terms of the risk of dying from COVID-19 during this period? *

- I have a very high risk.
- I have a high risk.
- I have a moderate risk.
- I have a low risk.
- I do not have a risk.

14. Did you get a flu vaccine during the H1N1 (Swine Flu) epidemic in 2009? *

- Yes, I did.
- No, I did not.
- I do not remember.

15. Have you had the seasonal influenza vaccine?? *

- I have it done every year.
- I had/will have it done first time this year.
- I had it done just few times before.
- I have never done it before.

16. What is your reason for not getting seasonal influenza vaccination? *

- I get the influenza vaccine.
- I do not have it because I do not think influenza is a threat to my health.
- I do not have it because I have doubts about the brand of the vaccine.
- I do not have it because I have doubts about the effectiveness of the vaccine in preventing the disease.
- I do not have it because I have concerns about the side effects of the vaccine.
- Other: _____

Please answer the following suggestions regarding the COVID-19 vaccine according to a 5-point rating. Strongly Disagree=1, Disagree=2, Undecided=3, Agree=4 and Strongly Agree=5

17. I could have the COVID-19 vaccine approved by the Ministry. *

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Vaccine will be effective in preventing and controlling COVID-19 disease. *

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. I think the COVID-19 disease threatens my health. *

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. I have enough knowledge about the COVID-19 vaccine. *

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. I am concerned about the short-term adverse effects (i.e., fever) of the vaccine. *

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. I am concerned about the long-term adverse effects of the vaccine. *

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. I would get vaccinated even if I had the disease. *

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

24. If there is a national COVID-19 vaccine, I will get it. *

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. If there is a vaccine coming from abroad, I will get it. *

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. I want all my family members to be vaccinated. *

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>