

ORIGINAL PAPER

Dermatology

Perspectives of dermatology specialists and residents on COVID-19 vaccines: A questionnaire-based survey

Efsun Tanacan  | Ogulcan Ibis | Gulhan Aksoy Sarac | Mehmet Ali Can Emeksiz  |
Didem Dincer | Fatma Gulru Erdogan

Department of Dermatology and
Veneorology, Ufuk University Hospital,
Ankara, Turkey

Correspondence

Efsun Tanacan, Department of Dermatology
and Veneorology, Ufuk University Hospital,
Ankara, Turkey.
Email: efsunkln@yahoo.com

Abstract

Background: To evaluate the perspectives of dermatology specialists and residents on coronavirus disease 2019 (COVID-19) vaccines.

Methods: Present questionnaire-based study was conducted on dermatology residents and specialists between January 5 and 20. A non-validated online questionnaire evaluating the attitude of the participants about the COVID-19 vaccine was performed. In the first step of the study, data related to the demographic features, all participants' clinical characteristics, and working conditions were recorded. Thereafter answers given to 12 specific questions were recorded. The study population was divided into two groups: dermatology residents (n = 138) and specialists (n = 159). Mentioned variables were compared between the two defined groups. Furthermore, a correlation analysis was performed to assess the relationship between vaccination acceptance and various study parameters.

Results: Majority of the cases had positive attitudes against COVID-19 vaccines. However, there were significant differences between the resident and specialist groups related to the source of information, working conditions, degree of concern, and type of vaccines. Statistically significant negative, weak correlations were observed for age and duration of medical practice ($r = -.128, P = .028$; $r = -.132, P = .041$ respectively). Statistically significant positive weak correlations were observed for chronic diseases, level of knowledge about COVID-19 vaccines, number of information sources about COVID-19, and previous COVID-19 infection ($r = .133, P = .021$; $r = .207, P < .001$; $r = .335, P < .001$; $r = .176, P = .002$ respectively).

Conclusion: The acceptance of COVID-19 vaccination may be affected by working conditions, medical experience, level of knowledge and the presence of risk factors for severe disease among dermatology residents and specialists.

1 | INTRODUCTION

Coronavirus disease 2019 (2019) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has a prominent impact on our daily life since the beginning of the pandemic.¹ People worldwide are under tremendous pressure since this novel infection forces states to take extraordinary measures like social isolation, strict hygiene control and flexible working hour.² Although more than a year has passed since

the onset of the pandemic, unfortunately, no effective treatment has yet been found. This novel infection continues to cause mortality and morbidity, putting a severe burden on the health system.³ Despite this condition, promising vaccines have been developed, and mass vaccination programmes are being carried out rapidly worldwide.^{4,5}

Dermatology practice has also been deeply affected by the pandemic.⁶ Postponing non-urgent procedures, reducing the number and duration of routine physical examinations, together

with the widespread use of telemedicine services are the main strategies to protect dermatologists during the pandemic period.⁶ Despite all these, dermatologists have expertise that requires close contact with the patient, and they are at high risk for viral transmission. Additionally, many of them have been assigned to pandemic clinics and intensive care units to reduce the burden on the health system in this extraordinary period.⁶ Thus, effectively protecting themselves from the transmission of infection is vital for dermatologists.

Inactivated, vector and RNA vaccines have been developed and approved by the health-care authorities in the last month.⁷ However, there are on-going debates related to vaccines' efficacy, safety, and accessibility, and some people are hesitant about getting vaccinated.⁸ Turkish Ministry of Health has started a national vaccination programme on 14 January 2021, starting from the health-care professionals. On the other hand, health-care professionals also have various concerns about getting vaccinated. There is no study in the current literature evaluating the attitude of dermatologists towards vaccines to the best of our knowledge.

This study aims to evaluate the perspectives of dermatology specialists and residents on COVID-19 vaccines.

2 | MATERIALS AND METHODS

The present questionnaire-based study was conducted on dermatology residents and specialists between 5 and 20 January. A non-validated online questionnaire evaluating the attitude of the participants about the COVID-19 vaccine was performed. All physicians who gave the required written permission to participate in the study were included. The study protocol was approved by the Turkish Ministry of Health Ankara City Hospital Ethics Committee.

In the first step of the study, data related to the demographic features, participants' clinical characteristics, and working conditions were recorded. Thereafter answers given to 12 specific questions were recorded. The study population was divided into two groups: dermatology residents and specialists. Mentioned variables were compared between the two defined groups. Furthermore, a correlation analysis was performed to assess the relationship between vaccination acceptance and various study parameters

Statistical Package for the Social Sciences 21 (SPSS 21, IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) software was used for the statistical analysis. The data were evaluated in terms of normal distribution criteria. Median and interquartile-range values were used for continuous variables, while percentage values were used for categorical variables as the data were not normally distributed. Mann-Whitney *U* and chi-square tests were conducted for the comparison of variables between the groups. Spearman rho test was performed for the correlation analysis. A type-1 error of 0.05 was claimed statistically significant.

What's known

- Coronavirus disease 2019 caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has a prominent impact on our daily life.
- Dermatology practice has also been deeply affected by the pandemic.
- This novel infection continues to cause mortality and morbidity, putting a severe burden on the health system.
- Despite this condition, promising vaccines have been developed, and mass vaccination programs are being carried out rapidly worldwide.

What's new

- The acceptance of COVID-19 vaccination may be affected by working conditions, medical experience, level of knowledge, and the presence of risk factors for severe disease among dermatology residents and specialists.

3 | RESULTS

There were 138 and 159 participants in the resident and specialist groups, respectively. Demographic features, clinical characteristics, and working conditions of the two groups were compared in Table 1. Significantly lower values for age, body-mass index, duration of medical practice, rate of alcohol consumption, chronic diseases, regular check-ups, exercise, number of total and elderly people in the household were observed in the group consisted of residents. On the other hand resident group had significantly higher rates of the male gender, single marital status, working in the university hospital, number of patients treated per week, and working in pandemic clinics ($P < .05$).

A comparison of questionnaire answers between the groups was given in Table 2. The specialist group reported a higher rate of sufficient information related to the COVID-19 vaccines. They also reported a higher rate of access to information sources related to the vaccines. The resident group had a higher rate for influenza vaccination. Resident group had also reported a higher rate of taking care of a critically ill COVID-19 patient. Furthermore, the resident group had a more positive attitude against the COVID-19 vaccination. However, they had a more negative attitude related to the vaccination of family members. Yet, both groups reported higher rates for the vaccination of family members. The specialist group had more concerns related to the efficacy and safety of COVID-19 vaccines. Although inactive vaccines were the most preferred type for both groups, specialist group had a higher demand for mRNA vaccines ($P < .05$).

Correlations analyses between acceptance of vaccination and various study parameters were given in Table 3. Statistically significant negative weak correlations were observed for age and duration of medical practice. ($r = -.128, P = .028$; $r = -.132, P = .041$

TABLE 1 Comparison of demographic features, clinical characteristics and working conditions between the groups

Variables	Group 1 (resident) (n = 138)	Group 2 (specialist) (n = 159)	P values
Age (years)(median, IQR) ^a	29 (3)	37 (12)	<.001
Gender (n,%) ^b			
Male	71 (51.4%)	35 (22.01%)	<.001
Female	67 (48.5%)	124 (77.9%)	
Marital status			
Single	92 (66.6%)	28 (17.6%)	<.001
Married	46 (33.3%)	131 (82.3%)	
Body mass index (kg/m ²)			
<25	82 (59.4%)	68 (42.7%)	.003
25-29.9	46 (33.3%)	57 (35.8%)	
30-34.9	10 (7.2%)	27 (16.9%)	
35-39.9	0	1 (0.6%)	
≥40	0	6 (3.7%)	
Duration of medical practice(year)			
<1	16 (11.6%)	0	<.001
1-5	86 (62.3%)	8 (5%)	
5-10	36 (26%)	53(33.3%)	
10-20	0	57 (35.8%)	
>20	0	41 (25.7%)	
Institution			
Not working	0	4	<.001
State hospital	53 (38.4%)	67 (42.1%)	
University hospital	85 (61.5%)	40 (25.1%)	
Private hospital	0	31 (19.4%)	
Private office	0	17 (10.6%)	
Number of patients treated per week (n)			
<50	25 (18.1%)	36 (22.6%)	<.001
50-100	13 (9.4%)	49 (30.8%)	
100-200	46 (33.3%)	33 (20.8%)	
>200	54 (39.1%)	41 (25.8%)	
Number of interventional and/or cosmetic procedures performed per week (n)			
<10	48 (34.8%)	65 (40.9%)	.091
10-50	70 (50.7%)	83 (52.2%)	
50-100	12 (8.7%)	9 (5.7%)	
>100	8 (5.8%)	2 (1.3%)	
Rate of smoking (n,%)			
Yes	24 (17.4%)	24 (15.1%)	.45
No	110 (79.7%)	126 (79.2%)	
Exsmoking	4 (2.9%)	9 (5.7%)	
Frequency of alcohol consumption (n,%)			
Never	54 (39.1%)	74 (46.5%)	<.001
1-3 times per months	84 (60.9%)	63 (39.6%)	
1-5 times per weeks	0	20 (12.6%)	
Almost every day	0	2 (1.3%)	

(Continues)

TABLE 1 (Continued)

Variables	Group 1 (resident) (n = 138)	Group 2 (specialist) (n = 159)	P values
<i>Frequency of chronic diseases and medication (n,%)</i>			
Yes	15 (10.9%)	56 (35.2%)	<.001
No	123 (89.1%)	103 (64.8%)	
<i>Rate of healthy nutrition (n, %)</i>			
Yes	54 (39.1%)	76 (47.8%)	.24
No	18 (13%)	22 (13.8%)	
Partially	66 (47.8%)	61 (38.4%)	
<i>Rate of regular check-ups</i>			
Yes	52 (37.7%)	92 (57.9%)	<.001
No	86 (62.3%)	67 (42.1%)	
<i>Frequency of regular exercise (n,%)</i>			
Not exercise regularly	68 (49.3%)	94 (59.1%)	.001
<1 hour/per week	10 (7.2%)	13 (8.2%)	
1-2 hour/per week	16 (11.6%)	24 (15.1%)	
2-4 hours/ per week	36 (26.1%)	13 (8.3%)	
>4 hours/per week	8 (5.8%)	15 (9.4%)	
<i>Number of people in the household (n,%)</i>			
1	64 (46.4%)	18 (11.3%)	<.001
2	36 (26.1%)	43 (27%)	
3	34 (24.6%)	43 (27%)	
4	4 (2.9%)	36 (22.6%)	
5	0 (0%)	12 (7.5%)	
≥6	0 (0%)	7 (2.4%)	
<i>Are there any individuals over 65 years in the same household (n,%)</i>			
Yes	4 (2.9%)	23 (14.5%)	<.001
No	134 (97.1)	136 (85.5%)	
<i>During the pandemic period, working departments (n,%)</i>			
Dermatology clinics and polyclinics	6(4.3%)	74 (46.5%)	<.001
Covid-19 clinic, polyclinic and emergency	0 (0%)	4 (2.5%)	
Dermatology clinics/ polyclinics and Covid-19 clinic, polyclinic and emergency	132 (95.7%)	66 (41.5%)	
Other	0 (0%)	15 (9.4%)	

^a Statistical analysis was performed by Mann–Whitney *U* test.

^b Statistical analysis was performed by Chi-square test.

P values < 0.05 were highlighted in bold.

respectively). Statistically significant positive weak correlations were observed for chronic diseases, level of knowledge about COVID-19 vaccines, number of information sources about COVID-19 and previous COVID-19 infection. ($r = .133, P = .021$; $r = .207, P < .001$; $r = .335, P < .001$; $r = .176, P = .002$ respectively).

4 | DISCUSSION

The findings of the present study indicated that the majority of the cases had positive attitudes against COVID-19 vaccines. However,

there were significant differences between the resident and specialist groups related to the source of information, working conditions, degree of concern and type of vaccines. Only a very small proportion of the study participants were firmly determined not to be vaccinated. In our opinion, the relatively high prevalence of COVID-19 in Turkey might have an effect on the decisions of the participants. As of 29 May, 5 235 978 cases with a definitive diagnosis of COVID-19 have been detected in Turkey and 47 271 deaths have occurred.⁹ Furthermore, age, co-existing chronic diseases, duration of medical practice, level of knowledge about COVID-19 vaccines, number of information sources about COVID-19 and the history of previous COVID-19 were

TABLE 2 Comparison of questionnaire answers between the groups

Variables	Group 1(resident) (n = 138)	Group 2 (specialist) (n = 159)	P values
<i>What is your level of knowledge about COVID-19 vaccines?</i>			
Sufficient	14 (10.1%)	43 (27%)	.001
Intermediate	92 (66.7%)	84 (52.8%)	
Unsufficient	32 (23.2%)	32 (20.1%)	
<i>What source of information do you often use to learn about COVID-19 vaccines?</i>			
Online education – webinar	30 (21.7%)	26 (16.4%)	.001
Reading literature	32 (23.2%)	36 (22.6%)	
Social Media	48 (34.8%)	58 (36.5%)	
Corporate trainings	0	3 (1.9%)	
Literature + social media	8 (5.8%)	7 (4.4%)	
Online education – webinar + Corporate trainings	0	1 (0.6%)	
Online education – webinar +literature	4 (2.9%)	4 (2.5%)	
Literature + Corporate trainings	4 (2.9%)	0	
Online education – webinar +literature+ Corporate trainings	0	4 (2.5%)	
Online education – webinar +literature+social media	4 (2.9%)	7 (4.4%)	
Online education – webinar +literature+social media + Corporate trainings	8 (5.8%)	3 (1.9%)	
Other	0	3 (1.9%)	
<i>Have you had an influenza vaccine? (n,%)</i>			
Yes	46 (33.3%)	34 (21.4%)	.003
No	88 (63.8%)	107 (67.3%)	
I am thinking of having it done	4 (2.9%)	18 (11.3%)	
<i>Have you had a pneumococcal vaccine? (n,%)</i>			
Yes	16 (11.6%)	19 (11.9%)	.086
No	118 (85.5%)	126(79.2%)	
I am thinking of having it done	4 (2.9%)	14 (8.8%)	
<i>Have you been involved in the treatment of a critically ill patient with a COVID 19 infection? (n,%)</i>			
Yes	90 (65.2%)	61 (38.4%)	<.001
No	48 (34.8%)	98 (61.6%)	
<i>Have you had COVID 19 infection? (n,%)</i>			
Yes	26 (18.8%)	18 (11.3%)	.069
No	112 (81.2%)	141 (88.7%)	
<i>Are you considering getting the COVID-19 vaccine? (n,%)</i>			
I think if most of my colleagues get it done ^a	26 (18.8%)	35 (22%)	0.012
I think according to the results on a sufficient number of patients ^b	52 (32.7%)	75 (47.2%)	
I am thinking of getting the Covid-19 vaccine ^c	40 (29 %)	19 (11.9%)	
Under no circumstances ^d	4 (2.9%)	3 (1.9%)	
I have not decided yet ^e	12 (8.7%)	20 (12.6%)	
a+b	4 (2.9%)	7 (4.4%)	
a+e	0 (0%)	1 (0.06%)	
b+c	0 (0%)	3 (1.9%)	
<i>Would you like family members to be vaccinated?</i>			

(Continues)

TABLE 2 (Continued)

Variables	Group 1(resident) (n = 138)	Group 2 (specialist) (n = 159)	P values
No	24 (17.4%)	11 (6.9%)	.035
I would only want under 18s to be vaccinated	0 (0%)	0 (0%)	
I would like those aged 65 and over and those with chronic diseases to be vaccinated	30 (21.7%)	41 (25.8%)	
I would like all family members to be vaccinated	84 (60.9%)	107 (67.2%)	
<i>What is the factor that worries you the most about vaccination?</i>			
The vaccine itself could cause illness ^a	0	3 (1.9%)	.011
Vaccine-related side effects ^b	24(17.4%)	23 (14.5%)	
It has not been applied to a sufficient number of individuals before ^c	38 (27.5%)	47 (29.6%)	
Concern that the vaccine may have harmful effects in the long term ^d	14 (10.1%)	21 (13.2%)	
The vaccine is ineffective ^e	36 (26.1%)	20 (12.6%)	
b+c+e	26 (18.8%)	45 (28.3%)	
<i>Could you indicate your level of concern about COVID-19 infection (0-10, 0-no worries, 10-very worried)?</i>			
0-3	28 (20.3%)	16 (10.1%)	<.001
4-6	54 (39.1%)	40 (25.2%)	
7-10	56 (40.6%)	103 (64.8%)	
<i>If you think the vaccine will be beneficial, what factor would you give as the most apparent reason for this?</i>			
I think it will end the pandemic	22 (15.9%)	40 (25.2%)	.065
I believe it will effectively protect my loved ones and me against illness ^a	24 (17.4%)	17 (10.7%)	
I think the vaccine will reduce the severity and complications of the disease ^b	64 (46.4%)	76 (47.8%)	
I don't think the vaccine will be helpful	16 (11.6%)	9 (5.7%)	
a+b	12 (8.7%)	17 (10.7%)	
<i>Which vaccine type / s would you prefer to have?</i>			
Inactive vaccines (dead-virus vaccine) ^a	96 (69.6%)	67 (42.1%)	<.001
mRNA vaccines ^b	4 (2.9%)	29 (18.2%)	
Viral vector (adenovirus vaccines) ^c	0 (0%)	1 (0.6%)	
I wouldn't prefer any of them	16 (11.6%)	7 (4.4%)	
It does not matter	10 (7.2%)	37 (23.3%)	
a+b	8 (5.8%)	18 (11.3%)	
a+c	4 (2.9%)	0 (0%)	

^a Statistical analysis was performed by Mann-Whitney *U* test.

^b Statistical analysis was performed by Chi-square test.

P values < 0.05 were highlighted in bold.

significantly associated with acceptance of vaccination. Regular exercise, smoking or alcohol consumption did not affect the physicians' attitudes for vaccination in the present study most probably due to the relatively low number of participants and the impact of pandemic on the anxiety levels of physicians with or without healthy lifestyle habits.

It has been reported that advanced age, comorbid conditions, male gender and immunodeficiency are associated with worse prognosis in patients with COVID-19.^{9,10} For this reason, people with mentioned risk factors are on the top of the vaccination list along with the health-care professionals. In the present study, the

specialist group consisted of older physicians with higher comorbid conditions rates than the resident group. On the other hand, there was a female dominance in the specialist group. As expected, the rate of marriage, rate of working in private clinics and the number of people in the household were higher in the specialist group. The resident group was dealing with a higher number of patients per week and had a higher percentage of assignments in COVID-19 clinics and intensive care units. Although the specialist group had a higher number of risk factors for severe infection, the resident group had a higher risk for contact with a SARS-CoV-2 positive case.

TABLE 3 Correlations analyses between acceptance of vaccination and various study parameters

Parameters	<i>r</i>	<i>P</i>
Age	-.127	.028
Chronic diseases and medication	.133	.021
Duration of medical practice	-.132	.041
Level of knowledge about COVID-19 vaccines	.207	<.001
Number of information sources about COVID-19	.335	<.001
Previous COVID-19 infection	.176	.002

The vaccine development process usually takes years as pre-clinical evaluation, and three distinct clinical stages should be completed before its validation.¹¹ However, under extraordinary conditions like pandemics, the development process may be accelerated to decrease infection-related morbidity and mortality.⁴ On the other hand, this rapid process leads to confusion and an increased rate of public concern about the efficacy and safety of the newly developed vaccines. Turkish Government of Health has launched a nationwide vaccination programme starting from the healthcare professionals. For this reason, healthcare professionals may have higher rates of anxiety levels as they are being vaccinated by the new types of vaccines with limited knowledge on issues like efficacy and safety. Moreover, the implementation of novel vaccine platforms for the development of some COVID-19 vaccines has caused serious debates worldwide.^{7,8} Another important factor is the relatively high number of unreliable information sources, especially in social media. People mostly comment on COVID-19 vaccines without sufficient scientific knowledge, and some of them affect millions of people, putting the community under a great danger.^{12,13} Thus, level of scientific information and the quality of information source for COVID-19 vaccines are important determinants of acceptance rates.^{12,13} Unfortunately, a great number of participants in the present study did not have sufficient information related to the COVID-19 vaccines, and most of them used social media as the main information source. In our opinion providing reliable scientific information to people may positively affect the acceptance rates of the vaccines.

Turkish Ministry of Health has taken serious measures since the beginning of the pandemic. Administration of strict triage protocols during hospital admissions, improving the capacity of intensive care units, establishing competent filtration teams, forming large pandemic centres and providing free health-care for the community were the main components of health policy during the pandemic period.¹⁴ However, the majority of the dermatologists were assigned to the pandemic services, intensive care units and filtration teams, leading to a significant change in working conditions.⁶ Approximately two-thirds of the resident group had been involved in treating a critically ill patient with a COVID 19 infection and had a higher rate for previous COVID-19 infection. In our opinion, the change in the clinical practice of dermatologists may affect the perspectives of participants in the present study. As the dermatology residents have been

mostly working in the frontline since the beginning of the pandemic, this effect may be more prominent in the resident group.

Inactivated, vector and RNA vaccines are the leading platforms in COVID-19.^{4,7} Each platform has its advantage along with its limitation.^{15,16} However, due to the lack of sufficient information regarding the efficacy and safety of COVID-19 vaccines, some part of the community is hesitant about being vaccinated. Furthermore, potential adverse events like anaphylaxis and thrombosis may also affect people's choices.^{15,16} Most probably due to mentioned confusing factors, only 30% of residents and 10% of specialists are completely confident about vaccination. Most of the participants stated that they would decide according to the results on a sufficient number of patients. However, the majority of the cases in both groups wanted their family members to be vaccinated. There are two available vaccine options in Turkey for the time being: the inactive and mRNA vaccines. However, Turkish Ministry of Health is working on new projects and in the near future all vaccine platforms will be available. In our opinion as inactive vaccine platforms have been used for years with relatively low side effects and knowledge related to novel vaccine platforms are still limited, inactive COVID-19 vaccine was the most commonly preferred platform in the present study.

On the other hand, the resident group had a higher rate of negative attitude toward the vaccination of family members. In our opinion, the low rate of marriage and the low number of household people in the resident group might impact this outcome. Lack of information about the safety and efficacy of COVID-19 vaccines was the most common factor that worried the participants the most about vaccination. Moreover, the specialist group had a significantly higher level of concern. The majority of the participants in the present study thought the vaccination might reduce disease severity and its associated complications. Strikingly, while residents mostly preferred inactivated vaccine, specialists had a higher preference rate for RNA vaccine. Statistically significant, weak correlations between age, duration of medical practice and acceptance of vaccination might indicate that experienced dermatologists were more hesitant about vaccination. On the other hand, statistically significant weak correlations between the co-existing chronic diseases, level of knowledge about the vaccines, number of information sources, previous COVID-19 infection, and acceptance of vaccination might indicate that presence of risk factors, history of COVID-19 infection, level, and quality of information might affect participants' preferences.

The present study's main strengths were its novelty, prospective design and relatively high number of participants. However, a relatively low number of questionnaire parameters was the main limitation.

In conclusion, the acceptance of COVID-19 vaccination may be affected by working conditions, medical experience, level of knowledge and the presence of risk factors for severe disease among dermatology residents and specialists.

DISCLOSURES

The authors state that declared no conflicts of interest in this study.

AUTHOR CONTRIBUTIONS

ET performed: study design, manuscript writing, statistical analysis, OI performed: Data data collection, literature review, manuscript writing, GAS performed: manuscript writing, literature review, CE performed: data collection, literature review, DD performed: data collection, literature review, FGE performed: manuscript writing, critical review, supervision.

ETHICAL APPROVAL

The study protocol was approved by Ministry of Health Ankara City Hospital Ethics Committee with reference number E1-21-1508 and informed consent was obtained from all participants.

DATA AVAILABILITY STATEMENT

Data available on request due to privacy/ethical restrictions.

ORCID

Efsun Tanacan  <https://orcid.org/0000-0003-1975-7460>

Mehmet Ali Can Emeksiz  <https://orcid.org/0000-0002-0933-4619>

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