



# Attitudes of Dermatologic Patients Towards COVID-19 Vaccines: a Questionnaire-Based Survey

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## Abstract

The objective of this paper is to evaluate the attitudes of patients with various dermatologic diseases towards coronavirus disease (COVID-19) vaccines. The present questionnaire-based study was conducted on patients admitted to the outpatient clinic of the Department of Dermatology and Venereology, Ufuk University Hospital, between January 1 and 31, 2021. The study population was divided into two groups based on their ages: (1) < 40 age group ( $n = 188$ ) and (2)  $\geq 40$  age group ( $n = 111$ ), and answers given to 35 specific questions were compared between the groups. The older group had significantly higher levels of anxiety compared to the younger group ( $p = 0.017$ ). Although approximately 60% of cases in the older group were dedicated to being vaccinated, 40% of the younger participants were not sure about vaccination ( $p < 0.001$ ). The most frequently demanded vaccine types were the inactivated and mRNA vaccines in the elderly and young groups, respectively ( $p < 0.001$ ). Statistically significant positive weak correlations were observed for age, chronic disease of medication, and presence of severe COVID 19 cases in the environment ( $r = 0.125$   $p = 0.031$ ,  $r = 0.184$   $p = 0.001$ ,  $r = 0.122$   $p = 0.035$ , respectively). Dermatologic patients had generally positive attitudes towards COVID-19 vaccination, and their preferences were affected by age.

**Keywords** COVID-19 · Dermatologic patients · Pandemic · Vaccines

## Introduction

Coronavirus disease 2019 (COVID-19) has been a global healthcare crisis threatening billions of lives for more than a year. It has forced states to take extreme measures like social isolation extensive lockdown and compulsory use of personal protective equipment [1]. Vaccination seems to be the only hope for achieving herd immunity in a reasonably short period of time [2]. However, there are ongoing debates about the efficacy, safety, and possible adverse effects of

COVID-19 vaccines [3]. Thus, some parts of the community have concerns related to COVID-19 vaccination [4].

Patients with dermatologic problems are generally susceptible to infections due to altered immunity, frequent use of immunosuppressant medications, and weakness of the skin barrier [5–7]. For this reason, management of risk factors for infectious agents and providing optimal immunity in this population are vital. On the other hand, some dermatologic patients may have concerns about new treatment modalities considering the possible adverse effects of them on their skin diseases. Furthermore, they may be afraid of novel vaccines as the administered immunosuppressive therapies may put them at risk of being infected [8, 9].

There are various studies in the literature focusing on the attitudes of patients towards COVID-19 vaccines [2, 10–13]. However, to the best of our knowledge, there is no study evaluating the perspective of dermatologic patients for COVID-19 vaccines.

The aim of the present study is to evaluate the attitudes of patients with various dermatologic diseases towards COVID-19 vaccines.

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## Materials and Methods

The present questionnaire-based study was conducted on patients admitted to the outpatient clinic of the Department of Dermatology and Venereology, Ufuk University Hospital, between January 1 and 31, 2021. A non-validated questionnaire evaluating the attitude of the participants about the COVID-19 vaccine was performed. All patients 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 socio-demographic features and clinical characteristics of all participants were recorded. Thereafter answers given to 35 specific questions were recorded. The study population was divided into two groups based on their ages: (1) < 40 age group and (2) ≥ 40 age group. 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.

The 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 was 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 was 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.

## Results

There were 188 and 111 participants in the < 40 age and ≥ 40 age groups, respectively. Distribution of dermatologic diseases among the study population is shown in Table 1. Socio-demographic features, clinical characteristics, and answers to questions of the two groups are compared in Table 2. A wide variety of dermatological diseases have been diagnosed. Significantly lower values for age, rate of smoking, chronic diseases, influenza, and pneumococcal vaccination were observed in the < 40 age group. On the other hand, < 40 age group have significantly higher levels of single marital status, education level, loss of work or income, regular exercise rate, and frequency of alcohol consumption ( $p < 0.005$ ).

Comparison of questionnaire answers between the groups is also shown in Table 2. The older group had significantly higher levels of anxiety compared to the younger group ( $p = 0.017$ ). While the younger group preferred the internet and multiple sources, the older group used television more frequently ( $p < 0.001$ ). Although approximately 60% of cases in the older group were dedicated to being vaccinated, 40% of the younger participants were not sure about vaccination ( $p < 0.001$ ). While the older group wanted all of the family members to be vaccinated, younger group demanded a more selective approach ( $p < 0.001$ ). While both groups mostly believed that the vaccine would reduce the disease's severity and complications, the older group thought that the vaccine would have their loved ones more frequently ( $p < 0.001$ ). Although the young group was more worried that the vaccine had not been administered to sufficient individuals before, the elderly group was concerned about the vaccine's side effects ( $p = 0.044$ ). The elderly group stated that healthcare workers encouraged them more to be vaccinated compared to the younger group

**Table 1** Distribution of dermatologic diseases

Diseases	<i>n</i>	%
Papulosquamous and eczematous disease (psoriasis, lichen planus, contact dermatitis, seborrheic dermatitis, PLEVA, parapsoriasis, PLC, pityriasis rosea, atopic dermatitis)	88	29.4%
Adnexal disease (acne, rosacea, folliculitis, hidradenitis suppurativa)	69	23.1%
Pruritus	21	7%
Pigmentary disorders	8	2.7%
Hair and Nail diseases	31	10.4%
Infectious diseases	34	11.4%
Benign and malign neoplasm of the skin	15	5%
Urticaria	20	6.7%
Others (bullous diseases, erythema nodosum, panniculitis, vasculitis, Behcet disease, discoid lupus erythematosus)	13	4.3%

**Table 2** Comparison of demographic features, clinical characteristics, and answers to questions in the study groups

Variables	Group 1 (< 40 years) (n = 188)	Group 2 (≥ 40 years) (n = 111)	p values
Age (years) (median, IQR) <sup>a</sup>	29 (3)	37 (12)	< 0.001
Gender (n, %) <sup>b</sup>			
Male	48 (25.5%)	40 (36.03%)	0.073
Female	140 (74.46%)	71 (63.9%)	
Marital status			
Single	161 (85.6%)	22 (19.8%)	< 0.001
Married	27 (14.4%)	89 (80.2%)	
Education level			
Primary school	1 (0.5%)	23 (20.7%)	< 0.001
Secondary school	7 (3.7%)	17 (15.3%)	
High school	37 (19.6%)	33 (29.7%)	
University and postgraduate	143 (76.06%)	38 (34.2%)	
Smoking			
Yes	68 (36.17%)	52 (46.8%)	< 0.001
No	111 (59.04%)	41 (36.9%)	
Ex-smoker	9 (4.78%)	18 (16.2%)	
Frequency of alcohol consumption (n, %)			
Never	103 (54.8%)	77 (69.4%)	0.01
1–3 times per month	74 (39.4%)	25 (22.5%)	
1–5 times per week	11 (5.9%)	9 (8.1%)	
Loss of work or income during the pandemic (n, %)			
Loss of work	9 (4.8%)	0	< 0.001
Loss of income	39 (20.7%)	30 (27.0%)	
None	140 (74.5.0%)	81 (73.0%)	
Chronic disease and/or medication (n, %)			
Yes	33 (17.6%)	59 (53%)	< 0.001
No	155 (84.2%)	52 (46.8%)	
Vaccinated for influenza (n, %)			
Yes	3 (1.6%)	15 (13.5%)	< 0.001
No	185 (98.4%)	96 (86.5%)	
Vaccinated for pneumococcus (n, %)			
Yes	3 (1.6%)	7 (6.3%)	0.03
No	185 (98.4%)	104 (93.7%)	
Rate of healthy nutrition (n, %)			
Yes	57 (30.3%)	38 (34.2%)	0.37
No	36 (19.1%)	26 (23.4%)	
Partially	95 (50.6%)	47 (42.3%)	
Rate of regular check-ups (n, %)			
Yes	54 (28.7%)	40 (36.1%)	0.19
No	134 (71.3%)	71 (63.9%)	
Frequency of regular exercise (n, %)			
Not exercise regularly	100 (53.2%)	83 (74.8%)	0.004
< 1 h/per week	20 (10.6%)	6 (5.4%)	
1–2 h/per week	20 (10.6%)	9 (8.1%)	
2–4 h/per week	31 (16.5%)	6 (5.4%)	
> 4 h/per week	17 (9%)	7 (6.3%)	

**Table 2** (continued)

Variables	Group 1 (< 40 years) (n = 188)	Group 2 (≥ 40 years) (n = 111)	p values
Previous COVID-19 infection? (n, %)			
<i>Yes</i>	42 (22.3%)	20 (18%)	0.46
<i>No</i>	146 (77.7%)	91 (82%)	
Have there been individuals in your environment hospitalized or died in intensive care due to COVID-19 infection?			
<i>Yes</i>	130 (69.1%)	67 (60.3%)	0.15
<i>No</i>	58 (30.9%)	44 (39.7%)	
Could you indicate your level of concern about COVID-19 infection (0–10, 0–no worries, 10–very worried)?			
<i>0–3</i>	13 (6.9%)	0	0.017
<i>4–6</i>	53 (28.1%)	36 (32.4%)	
<i>7–10</i>	122 (64.8%)	75 (67.6%)	
What is your level of knowledge about COVID-19 vaccines?			
<i>Sufficient</i>	28 (14.9%)	15 (13.5%)	0.35
<i>Intermediate</i>	112 (59.6%)	59 (53.2%)	
<i>Insufficient</i>	48 (25.5%)	37 (33.3%)	
What source of information do you often use to learn about COVID-19 vaccines?			
<i>Internet</i>	43 (22.9%)	16 (14.4%)	<0.001
<i>Television</i>	18 (9.6%)	29 (26.1%)	
<i>Health professionals</i>	7 (3.7%)	6 (5.4%)	
<i>Social environment</i>	13 (6.9%)	10 (9.1%)	
<i>Internet + television + written press</i>	58 (30.9%)	29 (26.1%)	
<i>Health professionals + internet + television + written press</i>	49 (26.1%)	21 (18.9%)	
Are you considering getting the COVID-19 vaccine? (n,%)			
<i>I am thinking of getting the COVID-19 vaccine</i>	61 (32.4%)	65 (58.6%)	<0.001
<i>I am thinking of getting the COVID-19 vaccine if the vaccine is free</i>	19 (10.1%)	10 (9%)	
<i>Under no circumstances</i>	32 (17.1%)	20 (18%)	
<i>I have not decided yet</i>	76 (40.4%)	16 (14.4%)	
Would you like family members to be vaccinated? (n, %)			
<i>No</i>	66 (35.1%)	33 (29.7%)	<0.001
<i>I would like those aged 65 and over and those with chronic diseases to be vaccinated</i>	55 (29.3%)	14 (12.6%)	
<i>I would like all family members to be vaccinated</i>	67 (35.6%)	64 (57.7%)	

( $p=0.041$ ). The most frequently demanded vaccine types were the inactivated and mRNA vaccines in the elderly and young groups, respectively ( $p < 0.001$ ).

Correlation analyses between acceptance of vaccination and various study parameters are shown in Table 3. Statistically significant positive weak correlations were observed for age, chronic disease of medication, and presence of severe COVID-19 cases in the environment ( $r = 0.125$   $p = 0.031$ ,  $r = 0.184$   $p = 0.001$ ,  $r = 0.122$   $p = 0.035$ , respectively).

## Discussion

The majority of the participants in this study showed a positive attitude to COVID-19 vaccines. On the other hand, approximately 40% of the younger group was hesitant about vaccination. There were also significant demographic clinic and intentional differences between the two groups. Moreover, positive weak/moderate correlations were observed between age, chronic diseases/medications,

**Table 2** (continued)

Variables	Group 1 (< 40 years) (n = 188)	Group 2 (≥ 40 years) (n = 111)	p values
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<sup>a</sup></i>	13 (6.9%)	19 (17.1%)	< 0.001
<i>I believe it will effectively protect my loved ones and me against illness<sup>b</sup></i>	14 (7.4%)	31 (27.9%)	
<i>I think the vaccine will reduce the severity and complications of the disease</i>	77 (41.0%)	33 (29.7%)	
<i>I don't think the vaccine will be helpful</i>	63 (33.5)	26 (23.4%)	
<i>a + b</i>	21 (11.2%)	2 (1.8%)	
How do you think vaccination will affect your current dermatological disease and treatment process?			
<i>I don't think it will have any effect</i>	94 (50%)	64 (57.6%)	0.18
<i>I think it will have a negative effect</i>	22 (11.7%)	16 (14.5%)	
<i>I am indecisive</i>	72 (38.2%)	31 (27.9%)	
What is the factor/s that worries you the most about vaccination?			
<i>The vaccine itself could cause illness<sup>a</sup></i>	13 (6.9%)	7 (6.3%)	0.044
<i>Vaccine-related side effects<sup>b</sup></i>	46 (24.4%)	31 (27.9%)	
<i>It has not been applied to a sufficient number of individuals before<sup>c</sup></i>	28 (14.8%)	11 (9.9%)	
<i>Concern that the vaccine may have harmful effects in the long term<sup>d</sup></i>	25 (13.2%)	10 (9%)	
<i>The vaccine is ineffective<sup>e</sup></i>	13 (6.9%)	14 (12.6%)	
<i>a + b + c</i>	12 (6.38%)	14 (12.6%)	
<i>b + c + d</i>	45 (23.9%)	24 (21.6%)	
<i>b + e</i>	6 (3.1%)	0	
Who would encourage you to be vaccinated?			
<i>Family members and close friends</i>	20 (10.6%)	11 (9.9%)	<b>0.041</b>
<i>Health workers<sup>a</sup></i>	63 (33.5%)	56 (50.4%)	
<i>Politicians<sup>b</sup></i>	63 (33.5%)	28 (25.2%)	
<i>With a disease similar to me<sup>c</sup></i>	11 (5.8%)	4 (3.6%)	
<i>a + b</i>	22 (11.7%)	8 (7.2%)	
<i>a + b + c</i>	9 (4.7%)	4 (3.6%)	
Which vaccine type/s would you prefer to have?			
<i>Inactive vaccines (dead-virus vaccine)<sup>a</sup></i>	15 (7.9%)	19 (17.1%)	< 0.001
<i>mRNA vaccines<sup>b</sup></i>	56 (29.7%)	18 (16.2%)	
<i>Viral vector (adenovirus vaccines)</i>	3 (1.6%)	0	
<i>I wouldn't prefer any of them</i>	54 (28.7%)	29 (26.1%)	
<i>It does not matter</i>	56 (29.7%)	33 (29.7%)	
<i>a + b</i>	4 (2.1%)	12 (10.8%)	

<sup>a</sup>Statistical analysis was performed by Mann–Whitney *U* test

<sup>b</sup>Statistical analysis was performed by chi-square test

Statistically significant *p* values were highlighted in bold

**Table 3** Correlation analyses between acceptance of vaccination and various study parameters

Parameters	<i>r</i>	<i>p</i>
Age	0.125	<b>0.031</b>
Chronic diseases and medication	0.184	<b>0.001</b>
Presence of severe COVID-19 cases in the environment	0.122	<b>0.035</b>

Statistically significant *p* values were highlighted in bold

presence of severe COVID-19 cases in the environment, and acceptance of COVID-19 vaccination for both groups.

People all over the world have been under excessive stress since the beginning of the pandemic and COVID-19 vaccines have been at the center of community's attention for months [14]. Although COVID-19 vaccines seem to be the only hope for overcoming this deadly virus, people still have question marks on their heads related to efficacy and safety of the vaccines [15]. The attitudes of people among vaccination were reported to be affected by socio-economic, educational, religious, and personal factors. Furthermore, source of information about the vaccines and experiences of close friends or relatives might also have an impact on people's preferences on vaccination [10, 16, 17].

The main reason behind the hesitancy of people for COVID-19 vaccination is the limited level of knowledge about the safety and efficacy of these novel vaccines. Generally, it takes years to develop an optimal vaccine for a specific pathogen, however due to the previous experience on other coronaviruses like severe acute respiratory syndrome and Middle East respiratory syndrome. Researches could develop novel types of vaccines for COVID-19 [18, 19]. On the other hand, there are different types of vaccines like inactivated, vector, and mRNA with their specific advantages and limitations [18, 20]. The most commonly reported adverse effects of COVID-19 vaccines are pain at the injection site, ipsilateral axillary lymph node enlargement, fever, fatigue, and headache. On the other hand, more serious events like anaphylaxis and thrombotic complications were also observed in some vaccine recipients [21, 22]. Thus, people have difficulty in choosing the most appropriate type of COVID-19 vaccine, and they have concerns related to the possibility of being infected by viral particles. Both inactivated and mRNA vaccine platforms are available in Turkey for the time being and people are free to choose between these two vaccine types [13, 22].

There are various studies in the literature evaluating the attitude of different populations towards COVID-19 vaccination [23–28] in a questionnaire-based study including 735 students from Italy reported that only 13.9% of the participants had low intention to vaccinate. On the other hand, no significant differences were found between healthcare

students and non-healthcare students [23]. In another study from Israel conducted in 1941, participants indicated that healthcare professionals dealing with severe acute respiratory syndrome coronavirus 2 positive patients were more eager to be vaccinated. Furthermore, rapid development of COVID-19 vaccines was the leading concern among the participants, and a higher hesitancy rate was observed in the nurses compared to the general population [24]. A cross-sectional survey performed on 1000 participants in the USA during the early pandemic period reported that approximately 3 in 10 adults were not sure they would accept vaccination, and 1 in 10 did not intend to be vaccinated [25]. Moreover, according to the results of a study including 5114 participants from the UK, approximately 70% of the responders were willing to be vaccinated. On the other hand, approximately 12% of responders were strongly hesitant. Additionally, younger age, female gender, lower income, and ethnicity were found to be associated with hesitancy [26]. Another questionnaire-based survey from China consisted of 1883 participants who revealed that vaccine effectiveness, side effects, and proportion of acquaintances vaccinated were the most important factors for the responders' decision, and approximately 85% of the responders had a positive attitude towards vaccination. Older participants, individuals with lower educational levels and income, had a higher trust rate for the vaccination. Moreover, participants with higher risk of being infected showed a higher probability to vaccinate [28].

To the best of our knowledge, this is the first study in the literature evaluating the attitude of Dermatologic patients towards COVID-19 vaccination. In our opinion, knowing the perspectives of special populations may help physicians to establish more effective vaccination protocols. Dermatologic patients represent a unique subgroup with higher rate of immunomodulatory medication use and altered immune response [5–7, 29]. COVID-19 provokes both humoral and cell-mediated immunity in the host resulting in an excessive immune response. A cascade of immunologic events leads to an uncontrolled immune-mediated injury in the vital organs in parallel with disease severity. Although our knowledge is limited about the impact of COVID-19 on immune-mediated diseases, COVID-19 has potential to worsen their prognosis [30, 31]. Thus mentioned patients population may have different concerns about COVID-19 vaccines. Papulosquamous and eczematous diseases were the most common dermatologic disease among the study population followed by adnexal diseases in the present study. These findings indicated that majority of the patients had chronic diseases necessitating regular treatment protocols. Moreover, mentioned cases had also an altered immunological system.

For this reason, they might have concerns related to their underlying skin diseases. We divided the groups based on their ages considering the possible adverse

effect of advanced age and higher frequency of coexisting chronic diseases in the elderly population on the course of COVID-19. It has been long known that advanced age is associated with worse disease courses and higher rates of morbidity/mortality [32]. In parallel with this point of view, the older group had higher rates for chronic diseases, influenza, and pneumococcus vaccinations. Furthermore, the older group had lower rates for regular sports activities. Although previous experiences for COVID-19 were similar between the groups, the older group have a higher level of anxiety. Both groups had comparable levels of knowledge about COVID-19 vaccines, yet the source of information was significantly different between the groups. While the younger group mostly preferred the internet as the main source of information, television was the most common information source in the older group. However, healthcare professionals were the least common information source for both groups. Although more than half of the older group were dedicated to vaccination, approximately 40% of the young participants were hesitant about vaccination.

Additionally, the older group wanted their family members to be vaccinated more commonly. While the older group was more delicate about their environment, the young participants mostly believed that COVID-19 vaccines would reduce disease severity. On the other hand, more than half of both groups thought that COVID-19 vaccines would not affect their dermatologic diseases and treatment process. Fear for vaccines' possible adverse effect was the most common factor about hesitancy for vaccination in both groups. Vaccination of healthcare professionals was the most motivational factor for both groups. Finally, the mRNA vaccine was the most preferred type of COVID-19 vaccine in the present study. These findings were mostly consistent with the current literature [23–28]. However, the present study had strengths like the inclusion of dermatologic patients, high number of study parameters, and the presence of direct correlation analysis for possible affecting factors. Yet, it had some limitations like relatively low number of participants and single-center experience. We believed that the findings of the present study would enlighten the path for the establishment of more effective vaccination programs in dermatologic patients.

In conclusion, dermatologic patients had generally positive attitudes towards COVID-19 vaccination, and their preferences were affected by age.

**Author Contribution** Efsun Tanacan: study design, statistical analysis, manuscript writing.

Ogulcan Ibis: data collection, manuscript writing.

Gulhan Aksoy Sarac: data collection, manuscript writing.

M. Ali Can Emeksiz: data collection, review of the literature.

Didem Dincer Rota: a critical review, study design.

Fatma Gulru Erdogan: supervision, manuscript writing.

**Availability of Data and Material** Yes, it is available.

**Code Availability** N-A

## Declarations

**Ethics Approval** The study protocol was approved by the Turkish Ministry of Health Ankara City Hospital Ethics Committee with number E1-21–1522.

**Consent to Participate** Informed consent was obtained from all patients.

**Consent for Publication** N-A

**Competing Interests** The authors declare no competing interests.

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