INTRODUCTION

Telemedicine is an alternative medical science that allows the evaluation of clinical information and digital or video camera recorded images of patients at a distance by electronic transfer, without traditional face-to-face patient examination. The use of telemedicine in dermatology is called “teledermatology.” Teledermatology techniques can be applied in three different ways including synchronous (real-time teledermatology), asynchronous (store-and-forward technique), and hybrid (which has the features of the other two methods). In synchronous teledermatology, a live video conference is conducted between the patient and the dermatologist. The most important disadvantage of the live video conference method is that it requires expensive technical equipment. Asynchronous teledermatology provides opportunity for higher resolution dermatological images compared to synchronous methods such as live video; however, the fact that there is no face-to-face communication with the patient is a disadvantage. Mixed or hybrid teledermatology methods combine live video conferences and store-and-forward clinical images.

COVID-19 was first identified in Wuhan (China) in December 2019 as a disease caused by novel coronavirus (SARSCoV-2); on March 11, 2020, it was declared an outbreak that had spread worldwide. Like many other countries, our country was also affected by the pandemic and a large number of protective measures were
The COVID-19 pandemic required the development of new assessment strategies. Pandemic hospitals were formed, and none¬
mergency admissions to hospitals were restricted. As a result of this situation, there had been a decrease in the number of patients who
were evaluated in the dermatology outpatient clinic.\textsuperscript{6,7-9}

During the pandemic, dermatologists should aim to protect their patients while also caring for their own safety. Since social distancing
is important during the period of the COVID-19 pandemic, teledermatology can help physicians and patients in overcoming the barriers of
accessing health care.\textsuperscript{10} In this study, using a web-based questionnaire, we aimed to evaluate the thoughts and experiences of dermatologists
regarding teledermatology during the pandemic period in our country.

\section{Material Method}

The present study has an observational cross-sectional design. The study was conducted with dermatologists in Turkey by using an online
survey. Google form was used in the design of the web-based survey. In the survey, the participants were asked questions such as gender,
age, academic career, unit they worked in, area they worked in, level
of knowledge about teledermatology, how they used teledermatology methods (video call by mobile phone, “online” video call on the inter¬
net, sending photograph messages through mobile phone, and sending photograph messages through e-mail or WhatsApp) within the pre¬
pandemic 2 months and the 2 months during the pandemic, the num¬
ber of patients evaluated with teledermatology method, how satisfied
the participants and patients were (compared to the dermatologists)
with teledermatology methods, whether they earned money with this
method, and whether they wanted teledermatology to be established
officially. The questions and the options of the related survey were re¬
viewed by two dermatologists. Possible misunderstandings, grammatic¬
al errors, etc were corrected as much as possible.

\subsection{Data analyses}

Qualitative data were given as number and percentage, and quan¬
titative data were summarized as mean ± SD. McNemar and chi¬squared tests were used to compare dependent categorical
variables. Comparisons of the categories of qualitative variables before and during the pandemic were realized by the chi¬squared
test. Comparisons of quantitative variables before and during the pandemic were made with the Wilcoxon test. A value of \( P < .05 \)
was accepted as statistically significant. All data analyses were carried out by employing IBM SPSS Statistics (Statistical Package for Social
Sciences) for Windows 26.0 software.

\section{Results}

Twenty-nine (27.1\%) of the 107 participants in the study were male, while 78 (72.9\%) were female. The average age was found to be
41.8 ± 11.3. Table 1 shows the academic degrees of the participants, the institutions they were working in, and the areas they were living in. The question “What is your level of knowledge about teledermatology” was answered as “high” by 13 (12.1\%) participants, as “mod¬
erate” by 62 (57.9\%) participants, as “low” by 22 (20.6\%) participants, and as “none” by 10 (9.3\%) participants.

The rates of using video call with mobile phone and online video
call methods were found to be statistically significantly higher in
the pandemic period when compared with the prepandemic period
\((P = .031, P = .004, \text{ respectively})\). The percentage of dermatologists
using photograph messages through mobile phone for evaluating pa¬
tients was found to be statistically significantly lower in pandemic
period when compared with the prepandemic period \((P = .007)\) (Table 2).

Table 3 shows the number of patients evaluated with teledermatology
methods in the prepandemic and pandemic period. The total
number of patients evaluated with photograph messages through mobile phone and WhatsApp application was found to be statisti¬cally significantly high in the pandemic period compared with the
prepandemic period \((P = .001, P < .001, \text{ respectively})\).

While the rate of earning money by using the teledermatology
method was found as 2.8\% in the prepandemic period, it was 11.2\%
in the pandemic period; the difference was statistically significant
\((P = .035)\).

\begin{table}
\centering
\caption{Sociodemographic characteristics of the participants}
\begin{tabular}{|l|c|}
\hline
\textbf{Sex} & \textbf{n (%)} \\
\hline
Male & 29 (27.1) \\
Female & 78 (72.9) \\
\hline
\textbf{Academic degree} & \\
Research assistant & 17 (15.9) \\
Specialist & 61 (57) \\
Assistant professor & 6 (5.6) \\
Associate professor & 13 (12.1) \\
Professor & 10 (9.3) \\
\hline
\textbf{Institution} & \\
Public Hospital & 17 (15.9) \\
Training and Research Hospital & 26 (24.3) \\
Private hospital & 15 (14) \\
Private outpatient clinic & 13 (12.1) \\
University Hospital & 36 (33.6) \\
\hline
\textbf{Living region} & \\
Mediterranean & 10 (9.3) \\
Eastern Anatolia & 27 (25.2) \\
Aegean & 8 (7.5) \\
Southeastern Anatolia & 5 (4.7) \\
Central Anatolia & 21 (19.6) \\
Black Sea & 7 (6.5) \\
Marmara & 29 (27.1) \\
\hline
\end{tabular}
\end{table}
Table 2 shows the preferences of dermatologists regarding the teledermatology methods in the pandemic period. The phone call method had a preference rate of 46.7%, the online call method was 54.2%, sending photograph messages through mobile phone was 34.6%, sending photographs with e-mail was 26.2%, and WhatsApp application had a preference rate of 55.1%. 75.7% of the patients stated that teledermatology methods were necessary during the pandemic period. The rate of participants who wanted teledermatology to be established officially was found as 64.5%.

4 | DISCUSSION

To the best of our knowledge, the present study is the first one in literature in which the opinions and experiences of dermatologists about teledermatology are evaluated. In our study, when pandemic and pre-pandemic periods were compared in terms of the rates of using teledermatology methods, this rate was found to be significantly higher in the pandemic period. We believe that this difference may be due to the restriction of face-to-face patient examinations except for in emergency complaints, or individuals’ refraining from examination in the hospital environment. 57.9% of the dermatologists who participated in our survey stated that they had moderate level of knowledge about teledermatology. In the literature, a study conducted in 2014 evaluated the teledermatology use of dermatologists in Turkey through surveys, and it was found that 50% of the participants had “low” level of knowledge about teledermatology. This rate was found as 20.6% in our study. This result shows that the dermatologists’ level of knowledge about teledermatology increased in the last 6 years.

In our study, the rate of using teledermatology methods like video call with mobile phone and online video call was statistically significantly higher in the pandemic period compared to the pre-pandemic period. In addition, teledermatology satisfaction rates of dermatologists and patients, and dermatologists’ rates of earning money with this method were found to be statistically significantly higher when compared with the pre-pandemic period. Most of the participants (75.7%) stated that teledermatology was necessary during the pandemic period. These results suggest that teledermatology is a good choice as a patient assessment tool during the pandemic period.

In a survey conducted in Australia with dermatologists, it was found that the participants thought teledermatology was suitable for use mainly for exchanging views between colleagues and for patient follow-up and that it could not replace the first consultation.

Table 3 Comparison of the number of patients evaluated by teledermatology methods before and during the pandemic period

| Method                           | Before the pandemic mean ± SD | Pandemic period mean ± SD | P values |
|----------------------------------|-------------------------------|---------------------------|----------|
| Video call by mobile phone       | 14.0 ± 17.3                   | 13.3 ± 16.7               | .445     |
| Online video call                | 10.5 ± 22.5                   | 17.9 ± 37.3               | .172     |
| Sending picture messages via mobile phone | 17.7 ± 19.1                  | 26.9 ± 26.3               | .001     |
| Sending images via e-mail        | 6.5 ± 9.6                     | 11.8 ± 26.7               | .169     |
| WhatsApp                         | 20.4 ± 21.5                   | 28.5 ± 27.2               | <.001    |

Statistically significant P values (P < .05) are indicated in bold font. *Wilcoxon test.

Table 4 Teledermatology methods preferred by dermatologists during the pandemic period

| Method                           | n (%) |
|----------------------------------|-------|
| Video call by mobile phone       |       |
| Yes                              | 50 (46.7) |
| No                               | 57 (53.3) |
| Online video call                |       |
| Yes                              | 58 (54.2) |
| No                               | 49 (45.8) |
| Sending picture messages via mobile phone |       |
| Yes                              | 37 (34.6) |
| No                               | 70 (65.4) |
| Sending images via e-mail        |       |
| Yes                              | 28 (26.2) |
| No                               | 79 (73.8) |
| WhatsApp                         |       |
| Yes                              | 59 (55.1) |
| No                               | 48 (44.9) |
In our study, the total number of patients evaluated by sending photograph messages with mobile phone and the WhatsApp application was statistically significantly high when compared with the prepandemic period. In contrast, the percentage of dermatologists using photograph messaging through mobile for evaluating patients was lower in the pandemic period than the prepandemic period; this may be because methods like WhatsApp are easier to utilize and were used at a higher rate during the pandemic period. In a study which evaluated the role of smarter smartphone technology use in dermatology practice, it was found that smartphone technology played an effective role in dermatology practice. WhatsApp is especially one of the most popular applications worldwide, and it allows users to communicate with texts/voice messages, photographs, and videos. Dermatology is one of the few areas of medicine in which visual examination is very important for diagnosis. Ease of use, portability, speed, cost effectiveness, and simplicity make WhatsApp a good assisting telemedicine tool. In our study, the rate of preferring the WhatsApp application during the pandemic period was found as 55.1%

In new studies published during the COVID-19 pandemic period, it is understood that the rates of admission to polyclinics decreased significantly and patients preferred to stay at home due to the restriction measures taken and the anxiety about catching the disease. In a questionnaire study they conducted, Türkmen et al. compared hair diseases before and during the pandemic and reported that the rate of seeking a doctor during the pandemic was significantly lower than before the pandemic. The authors reported that teledermatology could be used as an alternative, especially during the pandemic period. In our study, the rate of dermatologists who wanted teledermatology methods to be established officially was found as 64.4%. Based on the increase in the need for methods which are alternatives for face-to-face patient evaluation, we think that this rate will increase more in the future when the course of the pandemic continues.

In conclusion, the present study has shown that teledermatology methods had a higher use during the pandemic period, and this suggests that teledermatology will become more important as a patient assessment tool as we are still in the course of the pandemic period. One of the limitations of the study was that the questionnaire used in the study did not contain questions regarding which patient group and disease was evaluated by teledermatology methods. In addition, patient satisfaction was evaluated by asking dermatologists, not by asking patients directly. However, we believe that the present study in which we evaluated the views and experiences of dermatologists about teledermatology will contribute to literature.

CONFLICT OF INTEREST
The authors have no conflicts of interest to disclose.

ETHICAL APPROVAL
Ethical approval was obtained for the research protocol of this study by applying to the local noninterventional ethics board (#2020/779).

DATA AVAILABILITY STATEMENT
Research data are not shared.

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