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# The effect of the COVID-19 pandemic on perceptions of teledermatology

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## Abstract

There is limited information of the effect of the COVID-19 pandemic on the general population's perceptions towards teledermatology. This study aims to assess the pandemic's impact on people's willingness to use teledermatology as well as to investigate influencing factors. We recruited 544 participants through Amazon Mechanical Turk and surveyed them using REDCap. Participants' willingness to use teledermatology *before*, *during*, and *after* the COVID-19 pandemic was measured via a 5-point Likert scale. The survey also included questions regarding factors influencing participants' attitudes towards teledermatology and their sociodemographic characteristics. Of the 185 participants who reported unwillingness to use teledermatology *prior* to the COVID-19 pandemic, 79.2% and 66.5% became either neutral or willing to use teledermatology *during* and *after* the pandemic, respectively. Less than half of prior satisfactory telemedicine users reported willingness to use teledermatology *before* the pandemic; willingness to use teledermatology increased to 80.1% and 63.8% *during* and *after* the COVID-19 pandemic, respectively. The top reason for lack of interest in teledermatology was concern for security and privacy (24.4%). Although a useful tool, teledermatology has been met with reluctance by the public. However, the unique circumstances of the COVID-19 pandemic have improved the public's perceptions and readiness to use teledermatology.

Keywords: COVID-19 pandemic, teledermatology, telemedicine

## Introduction

The public health recommendations of social distancing amid the COVID-19 pandemic has demonstrated the need for telemedicine solutions to substitute face-to-face visits for dermatology [1]. Telemedicine was perceived as a satisfactory tool by some patients in the past but there was room for expansion of its usage among dermatology patients [2]. However, there has been hesitancy to use telemedicine by members of the general population. The unique circumstances of the COVID-19 pandemic have highlighted the advantages of telemedicine among current and potentially new patients in dermatology. There is currently limited evidence of the effect of global crises, such as pandemics, on the general public's perceptions towards using teledermatology. The objective of this study is to measure the changes in general public's willingness to use teledermatology *before* versus *during* the COVID-19 pandemic as well as participants' predilections for teledermatology usage *after* the pandemic.

## Methods

We created a survey to assess the COVID-19 pandemic's impact on people's willingness to use

**Table 1.** Demographic characteristics: comparison between survey sample and U.S. census.

Characteristic	Survey sample, N (%)	U.S. population, %
<b>Sex</b>		
Male	293 (53.9)	49.2
Female	250 (46.0)	50.8
<b>Age, years</b>		
18-25	83 (15.3)	10.3
26-30	133 (24.4)	7.2
30-40	185 (34.0)	13.4
40-50	79 (14.5)	12.3
50-60	44 (8.1)	12.8
60+	20 (3.7)	22.7
<b>Race/ethnicity</b>		
White	371 (68.2)	76.3
Black or African American	51 (9.4)	13.4
American Indian or Alaska Native	19 (3.5)	1.3
Asian	85 (15.6)	5.9
Native Hawaiian or Pacific Islander	4 (0.7)	0.2
Hispanic or Latino	168 (30.9)	18.5
Not Hispanic or Latino	357 (65.6)	60.1
<b>Annual household income</b>		
<\$24,999	143 (26.3)	17.0
\$25,000-\$49,999	176 (32.3)	20.1
\$50,000-\$74,999	95 (17.5)	16.5
\$75,000-\$99,999	66 (12.1)	12.3
\$100,000-\$149,999	38 (7.0)	15.5
\$150,000-\$199,999	17 (3.1)	8.3
≥\$200,000	9 (1.7)	10.3

tele dermatology and to investigate the influencing factors for each participant. The study was exempted by the Wake Forest School of Medicine Institutional Review Board. Participants were recruited through Amazon Mechanical Turk (MTurk) and surveyed online through REDCap [3]. Inclusion criteria included age  $\geq 18$  years and ability to read English. Both previous users and nonusers of tele dermatology were included in the study. A total of 544 participants completed the survey. Participants' willingness to use tele dermatology *before* and *during* the COVID-19 pandemic as well as

their predictive willingness *after* the pandemic were measured via a 5-point Likert scale (1-strongly unwilling, 2-slightly unwilling, 3-neutral, 4-slightly willing, 5-strongly willing). Participants were also asked to rank the importance of specific factors that influence their attitudes towards tele dermatology, particularly security and privacy, using a 5-point Likert scale (1-very important, 2-slightly important, 3-neutral, 4-slightly unimportant, 5-very unimportant). We also obtained sociodemographic characteristics to compare our study population to the general U.S. population [4].

## Results

Of the 185 participants who reported unwillingness to use teledermatology *prior* to the COVID-19 pandemic, 79.2% and 66.5% increased their score to neutral, slightly willing, or strongly willing in terms of teledermatology usage *during* and predictive willingness for *after* the pandemic, respectively.

Participants were asked to rank advantages of teledermatology by importance using a 5-point Likert scale. A significant association exists between a participant's ranking of importance of social distancing and his or her willingness to use teledermatology *during* the COVID-19 pandemic ( $\chi^2=134.1$ ,  $P<0.00001$ ). In addition, a significant association exists between perceived importance of insurance coverage for telemedicine and willingness to use teledermatology *after* the pandemic ( $\chi^2=113.3$ ,  $P<0.00001$ ).

The top reported reason for lack of interest in teledermatology was concern for security and privacy (24.4%), in which 48.5% of participants with security concerns reported confidentiality risks as the reason for their concern. Although 84.5% of participants were neutral or comfortable using popular third-party video chat applications, such as Apple Facetime and Zoom, for teledermatology, 51.4% of participants reported increased willingness to use teledermatology if stricter privacy regulations were enforced and third-party video chat applications were not permitted.

The majority of participants (76.4%) reported having prior experience with telemedicine, in which 47.8% were strongly satisfied and 22.3% were slightly satisfied with their previous telemedicine usage. Of these participants who reported prior satisfactory telemedicine usage, only 47.4% of them were slightly or strongly willing to use teledermatology *before* the COVID-19 pandemic. When asked about willingness *during* the COVID-19 pandemic, the percentage increased to 80.1% of prior satisfied telemedicine users reporting slight or strong willingness to use teledermatology. In addition, 63.8% of prior satisfied telemedicine users predicted slight or strong willingness to use teledermatology *after* the COVID-19 pandemic.

The sociodemographic distribution of the study population was similar to that of the total U.S. population reported by the most recent U.S. Census findings (2019), in terms of sex, age, race, and household income (**Table 1**), [4].

## Discussion

Teledermatology has served as a useful tool for both physicians and patients by offering an alternative to face-to-face visits. The COVID-19 pandemic highlighted the need for and advantages of telemedicine to the general public. The perspectives of the general public towards teledermatology usage have not been measured in regard to the unique circumstances of COVID-19 pandemic. Since the COVID-19 pandemic, willingness to use teledermatology has increased among the general public, among both prior telemedicine users and nonusers.

The majority of participants in our study transitioned from unwilling to use teledermatology *before* the pandemic to slightly or strongly willing to use teledermatology both *during* and *after* the COVID-19 pandemic.

Previous satisfactory telemedicine experience did not guarantee willingness to use teledermatology *before* the COVID-19 pandemic. Less than half of prior satisfied telemedicine users expressed willingness to use teledermatology *before*; however, a majority from this cohort converted to willingness to use teledermatology *during* and *after* the pandemic.

Surveying participants on their predicted willingness *after* the COVID-19 pandemic provided a measure for the possible lasting effect of the pandemic on the general population's attitudes towards teledermatology.

On an emergency basis, Centers for Medicare & Medicaid Services expanded Medicare coverage for telemedicine services and the U.S. Department of Health and Human Services currently waives Health Insurance Portability and Accountability Act violations in good faith through everyday video chat applications (i.e. Apple FaceTime, Zoom, etc.) during the COVID-19 pandemic [5,6]. Continued insurance

coverage and stricter privacy guidelines may help maintain increased voluntary teledermatology usage after the pandemic.

By recruiting a broad, diverse population on MTurk, our study avoids selection bias inherent in surveying only people who had previous access and willingness to use teledermatology services. Limitations include MTurk users having a younger mean age than the general population and excluding non-English speakers and individuals without internet and MTurk access.

While teledermatology serves as a helpful tool during the pandemic, teledermatology can also benefit patients under typical circumstances, particularly after the pandemic. With increased

willingness to use teledermatology *during* and *after* the COVID-19 pandemic, it is important to understand the general public's attitudes towards teledermatology to optimize the platform and patient experience.

## Conclusion

Owing to the unique circumstances of the COVID-19 pandemic, the general public has expressed increased willingness to use teledermatology both *during* and *after* the pandemic.

## Potential conflicts of interest

The authors declare no conflicts of interest.

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