



Original Research

Impact of COVID-19 pandemic on dermatology practices: Results of a web-based, global survey

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ABSTRACT

The spectrum and magnitude of changes in dermatology practice induced by the COVID-19 pandemic have not been adequately studied.

Objective: This study aimed to assess the immediate and long-term effects of the pandemic on dermatology practice on a large scale, including the clinical activity of participants, frequency and types of procedures used, and teledermatology (TD) use.

Methods: This web-based, global survey included 733 dermatologists. The primary outcomes are percentages of respondents providing in-person consultations, hospital service, and TD and performing procedures. Factors in logistic regression models that may influence the odds ratio (OR) for TD use during pandemic and for future use also were analyzed.

Results: The percentages of respondents providing in-person consultations (46.6% vs. 100% before the pandemic) and hospital service (27% vs. 52.8% before the pandemic) as well as performing procedures (25.6% vs. 100% before the pandemic) decreased, whereas practicing TD increased three-fold (75.2% vs. 26.1% before the pandemic) during the pandemic ($p < .001$ for each). Practice location was associated with TD use during the pandemic and with its expected use in the future ($p < .001$ for both), with North American respondents indicating the highest use. TD use during the pandemic showed a positive correlation with TD use before the pandemic, performing procedures and, more specifically, with biopsies of suspicious pigmented lesions during the pandemic ($p < .001$ for each). TD use before the pandemic was the most powerful predictor of TD use during the pandemic (OR: 16.47; 95% confidence interval, 7.12–38.06). More than two third of participants (68.6%) expect to use TD in the future. The factor with the largest increase in OR on the expectation of future TD use was >1000 COVID-19 cases in the country (OR: 3.80; 95% confidence interval, 2.33–6.21).

Conclusion: This survey indicates a profound immediate effect of the pandemic on dermatology practice. The pandemic appears to have substantially contributed to an increased use of TD in the long run.

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Introduction

Background

The COVID-19 pandemic is affecting health care systems across the globe (Emanuel et al., 2020; Mahmood et al., 2020). Dermatology has faced unprecedented challenges, including a reduction in nonessential visits and procedures (Gisondi et al., 2020; Kumar et al., 2020; Wollina, 2020). To contain COVID-19, in-person con-

sultations have been reduced and the implementation of teledermatology (TD) has increased (Fahmy et al., 2020; Litchman and Rigel, 2020; Muddasani et al., 2020). Dermatologists served on the frontline in several parts of the globe (Bhargava et al., 2020c; Zheng et al., 2020) and played an important role in enhancing preventive measures (Goren et al., 2020; Tao et al., 2020; Yan et al., 2020). However, dermatologists face a shortage of personal protective equipment in the health care system (Bhargava et al., 2020a; Goldust et al., 2020a). Although the immediate effects of the pandemic, including a decrease in patient visits and postponing nonessential procedures, have been documented in a few reports (Litchman and Rigel, 2020; Zheng and Lai, 2020), the long-term

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effects have not been assessed. The spectrum and magnitude of changes in dermatology practice during the COVID-19 pandemic also have not been evaluated on a large scale (Temiz et al., 2020).

Objectives

We assessed dermatology practices on a large scale during the pandemic, taking into account practice setting and population density, as well as conditions in each participant's country (i.e., number of COVID-19 cases and lockdown status). Our study addresses the clinical activity of participants, frequency and types of procedures performed, and TD use. We developed logistic regression models to identify factors that influence the odds ratio (OR) for TD use during the pandemic and for the future.

Methods

Study design

This is a web-based, cross-sectional study.

Survey instrument

Development of the survey went through the stages of item generation, item reduction, formatting, and composition. The questionnaire was then pilot tested in the investigators' academic dermatology departments to ensure proper flow, salience, and acceptability of the questions. During the pilot phase, we ensured that each question was understood the same way by dermatologists practicing in different continents. Questions relevant to dermatology practice specifics that are common in one geographic area but uncommon in another were eliminated during pilot testing.

Cognitive testing was further evaluated and refinements were made if deemed appropriate. The final instrument included sets of questions on demographics, practice specifics before and during the pandemic, and hospital service. The instrument also included questions relevant to the health care system, training of residents/fellows, and other questions (e.g., mental health status of participants during the pandemic) that are reported separately.

Survey administration

The survey instrument was formatted in Google forms and distributed electronically between April 1 and April 20, 2020 to the investigators' contacts on social media sites, specifically to board-certified dermatologists. Participants could access the survey via a link that was provided. The survey instrument was disseminated twice, the data collection period was extended, and reminder messages were sent to increase participation. Two questions relevant to the number of biopsies performed and postponed during the pandemic were added to the instrument before the second dissemination. This was an anonymous survey; there was no process of data linkage, and neither recording nor dissemination generated identifiable information.

Variables

The primary outcomes are percentages of respondents providing in-person consultations, hospital service, and TD and performing procedures during the pandemic. Factors in logistic regression models that may influence the OR for TD use during the pandemic and for future use were analyzed.

Statistical analysis

A total of 1120 dermatologists were surveyed, and 746 responded (response rate: 66.6%). Thirteen respondents were excluded because they were not board-certified dermatologists and/or missed essential demographic questions and/or responded to <80% of the questions for which they qualified. This left a sample of 733 respondents for analysis. Frequencies and percentages of respondents in the subgroups within each categorical variable are provided. Numerical data are presented with median and interquartile range (IQR) or mean, as appropriate. Pairs of categorical variables were assessed for association with the χ^2 or McNemar test. A Mann-Whitney (Wilcoxon rank sum) test was used to assess the relationships between two divisions of ordinal variables as defined by a binary covariant. The relationship between the only two continuous variables was characterized by the Spearman correlation coefficient. The threshold of significance for *p* values was adjusted for multiple comparisons using a false discovery rate (cutoff rate; *p* < .05; Chen et al., 2017).

Logistic regression models were generated for each of the following binary dependent variables: TD use during the pandemic and future TD use. Models were created through forward selection, in which candidate independent variables found to be associated with the outcome variable at *p* ≤ .0001 were entered in order from the smallest to larger *p* values. Once entered into the model, variables with an OR estimated at *p* > .05 were dropped. Nested models were compared using the log likelihood test, and those that were not nested were compared on model specification, Akaike information criterion, Hosmer-Lemeshow goodness-of-fit, variance inflation factor, tolerance, and condition index (Tolles and Meurer, 2016). When variables with >3 categories were found to fail the retention criterion or to have categories that did not differ significantly in their estimated OR, they were recoded into binary variables, which were then tested for inclusion. In the final best models, the OR that the dependent binary variable = 1 ("yes") is given by the baseline OR (value of _cons) multiplied by the OR of each independent binary variable when they are = 1 ("yes"). Statistical analysis was performed using Stata, version 15.1 (StataCorp, College Station, TX).

Table 1
Practice demographics.

Characteristic	Survey Distribution ^a n (%)
Years in practice (n = 733)	
≤10	330 (45.0)
11–20	205 (28.0)
>20	198 (27.0)
Location (continent; n = 733)	
Asia	349 (47.6)
North America ^b	137 (18.7)
Central/South America	131 (17.9)
Europe	102 (13.9)
Other	14 (1.9)
Population density of practice (n = 733)	
Urban	576 (78.6)
Suburban	137 (18.7)
Rural	20 (2.7)
Practice Setting (n = 733)	
Private	346 (47.2)
Private and hospital	249 (34.0)
Tertiary hospital	91 (12.4)
General hospital	47 (6.4)

^a Percentages are rounded to the decimal place.

^b Group includes predominantly U.S. participants.

Table 2
Practice specifics before and during the pandemic.

Before the pandemic		During the pandemic	
Characteristic	Survey distribution ^a n (%)	Characteristic	Survey distribution ^a n (%)
Activity (n = 733)		Activity (n = 733)	
Face-to-face consultations only	542 (73.9)	Face-to-face consultations only	68 (9.3)
TD consultations only	0 (0)	TD consultations only	277 (37.8)
Face-to-face and TD consultations	191 (26.1)	Face-to-face and TD consultations	274 (37.3)
Inactive	0 (0)	Inactive	114 (15.6)
Patients seen per week (n = 733)		Patients seen per week (n = 286)	
≤50	109 (14.9)	≤20	180 (62.9)
51–100	199 (27.2)	21–40	73 (25.5)
101–150	180 (24.6)	41–60	14 (4.9)
151–200	99 (13.5)	61–80	10 (3.5)
201–250	60 (8.2)	80–100	6 (2.1)
>250	86 (11.7)	>100	3 (1.1)
Procedures per week (n = 733)		Performing procedures? (n = 733)	
≤20	257 (35.1)	Yes	188 (25.6)
21–40	320 (43.7)	Type of procedure	
41–60	94 (12.8)	Biopsy	155 (82.4)
61–80	33 (4.5)	Mohs surgery	61 (32.4)
81–100	16 (2.2)	Cryotherapy	53 (28.2)
>100	13 (1.8)	Electrosurgery	53 (28.2)
		Incision and drainage	20 (10.6)
		Excision	19 (10.1)

TD, teledermatology.

^a Percentages are rounded to the decimal place.

Results

Descriptive data

Practice demographic characteristics are shown in [Table 1](#).

Outcome data

[Table 2](#) displays practice specifics before and during the pandemic. [Table 3](#) shows data regarding TD use before and during the pandemic and in the future. Regarding pandemic conditions, 360 (49.1%), 197 (26.9%), and 176 (24.0%) participants reported ≤1000, 1001 to 10,000, and 10,001 to 50,000 COVID-19 cases in their country, respectively. Furthermore, 486 participants (66.3%) responded that their area was in total lockdown whereas 246 participants (33.6%) were in partial lockdown.

Practice during the pandemic

Regarding the clinical activity of participants during the pandemic ([Table 2](#)), 37.8% of respondents provided only TD, 37.3% a combination of TD and in-person consultations, 9.3% solely in-person consultations, and 15.6% stopped clinical activity. Of those who stopped working, 79.8% were located in geographic locations on total lockdown ($p < .001$ for partial vs. total lockdown). More than one fourth of respondents were providing hospital services (27% vs. 52.8% before the pandemic; $p < .001$). The majority of participants (446 of 773; 60.8%) responded that outpatient dermatology clinics were discontinued at the hospital. Most participants who were providing hospital services (223 of 287; 77.7%) were seeing only emergencies at the hospital. The majority of participants (62.9%) were consulting ≤20 cases per week. Only 1.04% of respondents were consulting >100 cases per week, compared with 58% before the pandemic ($p < .001$).

Table 3
Teledermatology use.

TD before the pandemic	Survey distribution ^a n (%)
Practicing (n = 733)	
Yes	191 (26.1)
Patients (n = 191)	
New	8 (4.2)
Follow-up	112 (58.6)
Both	71 (37.2)
Consultations per week (n = 191)	
≤20	178 (93.2)
21–40	10 (5.2)
41–60	3 (1.6)
TD during the pandemic	
Practicing (n = 733)	
Yes	551 (75.2)
Patients (n = 551)	
New	11 (2.0)
Follow-up	171 (31.0)
Both	369 (67.0)
Consultations per week (n = 551)	
≤20	457 (82.9)
21–40	72 (13.1)
>40	22 (4.0)
TD types (n = 551)	
Video	323 (58.6)
Online consultation	199 (36.1)
Phone call	220 (39.9)
Other	1 (0.2)
Platform (n = 551)	
WhatsApp	269 (48.8)
Zoom	88 (16.0)
Facetime	83 (15.1)
Facebook messenger	64 (11.6)
Viber	23 (4.2)
Other	74 (13.4)
Are you able to bill for virtual visits? (n = 551)	
Yes	251 (45.6)
No	233 (42.3)
Sometimes	67 (12.2)
Has your medical board/council or other authority (eg, CMS) permitted virtual consultations/relaxed HIPAA compliance related to telehealth for the duration of the pandemic? (n = 733)	
Yes	476 (64.9)
No	41 (5.6)
Do not know	216 (29.5)
Future TD use	
Do you think you will use TD in the future? (n = 733)	
Yes	503 (68.6)
No	213 (29.1)
Unsure	17 (2.3)
If yes, when will you use TD? (n = 503)	
As part of my regular practice	402 (79.9)
During the COVID-19 pandemic	294 (58.4)
During other health system disruptions	262 (52.1)
Anticipated consultations per week (n = 503)	
≤20	372 (74.0)
21–40	98 (19.5)
>40	33 (6.6)

CMS, Centers for Medicare and Medicaid Services; HIPAA, Health Insurance Portability and Accountability Act of 1996; TD, teledermatology.

^a Percentages are rounded to the decimal place.

Only a quarter of respondents were performing procedures. Biopsy was the most common procedure, followed by micrographic (Mohs) surgery (82.4% and 32.4%, respectively, of those performing procedures). Excision was even less common (10.1%),

and only 7.4% of participants performing procedures were doing cosmetic procedures. The median value for biopsies of suspicious pigmented lesions taken per week by dermatologists providing face-to-face consultations during the pandemic (n = 220) was 1 (IQR, 0–3). The median value for biopsies postponed per week during the pandemic (n = 386) was 5 (IQR, 3–20). The mean values for biopsies taken (n = 88) and postponed (n = 94) in the North American group were 4.95 and 21.2, respectively.

Teledermatology

There was an almost 3-fold increase in the number of dermatologists practicing TD during compared with before the pandemic (75.2% vs. 26.1%; $p < .001$; Table 3). Only 6.8% of respondents were consulting >20 cases per week via TD before compared with 17.1% during the pandemic ($p < .001$). The percentage of respondents using TD for both follow-up and new patients increased from 37.2% before to 67% during the pandemic ($p < .001$). More than two thirds of participants (68.6%) expect to practice TD in the future, the majority (79.9%) as part of their regular practice. Respondents anticipated more consultations in the future than during the pandemic ($P = .002$ for >20 consultations/week). WhatsApp was the most common platform, not only in the total number

of participants (Table 3) but also across all continents (Europe: 62.4%; Asia: 62.6%; North America: 39.4%; Central/South America: 36.7%). Use of WhatsApp was more common in Europe and Asia than in North America and Central/South America ($p < .001$).

Comparative statistics

Comparative statistics are summarized in Table 4. Procedures were associated with years in practice, location, and the number of procedures per week before the pandemic ($p < .001$ for all). The number of biopsies for suspicious pigmented lesions performed during the pandemic was associated with the number of patients seen per week before and during the pandemic, North American location, and the number of biopsies postponed per week ($p < .001$ for all). Practice location was associated with TD use during the pandemic and with its expected use in the future ($p < .001$ for both), with North American respondents indicating the highest use.

TD use during the pandemic showed a positive correlation with TD use before the pandemic, performing procedures, and more specifically with biopsies of suspicious pigmented lesions during the pandemic ($p < .001$ for each). Future TD use showed a positive

Table 4
Statistically significant associations.^a

Practice specifics during the pandemic		p-value ^b	Group analyses, n (%) ^c
Patients/wk during the pandemic (n = 286)	Patients/wk before the pandemic ^d	<.001	
Performing procedures during the pandemic (n = 733)	Years in practice	<.001	Y/GT ^e : <10 (17.9); 11–20 (28.8); >20 (35.3) <10 vs. 11–20 ($p = .019$)
	Continent	<.001	Y/GT: NA (58.4); E (47.0); CSA (30.5); A (4.0) χ^2 test: NA vs. CSA ($p < .001$); E vs. CSA ($p = .009$), CSA vs. A ($p < .001$)
	Procedures/wk before the pandemic ^d	<.001	<40 (21.7); >40 (40.4)
Incision and drainage (n = 188)	Continent	<.001	Y/GT: A (42.8); E (12.5); NA (6.2); CSA (2.5) A vs. NA ($p < .001$)
No. of biopsies of suspicious pigmented lesions per week (n = 188)	Continent	<.001 ^f	NA Median (IQR), 2 (0–50) A + CSA + E Median (IQR), 0 (0–20)
	Patients/wk before the pandemic	<.001 ^f	>100 Median (IQR), 2 (0–50) ≤100 Median (IQR), 0 (0–20)
	Patients/wk during the pandemic	<.001 ^f	>20 Median (IQR), 4 (0–30) ≤20 Median (IQR), 1 (0–20)
	Number of biopsies postponed/wk	<.001 ^g	
TD use			
TD use before the pandemic (n = 733)	Continent	<.001	Y/GT: E (38.6); A (26.6); CSA (25.9); NA (16.7) E vs. A ($p < .019$); A vs. NA ($p = .022$)
TD use during the pandemic (n = 733)	Continent	<.001	Y/GT: NA (89.7); E (82.1); CSA (70.2); A (69.4) NA vs. CSA ($p < .001$); E vs. CSA ($p = .036$)
	TD use before the pandemic ^d	<.001	
	Performing procedures during the pandemic	<.001	
	Taking biopsy during the pandemic	<.001	
Future TD use (n = 733)	Continent	<.001	Y/GT: NA (83.9); CSA (77.1); E (63.4); A (60.3) E vs. CSA ($p = .022$)
	Patients/wk before the pandemic	<.001	Y/GT: <100 (77.8); 101–200 (67.3); >200 (59.4)
	TD use before the pandemic	<.001	
	TD use during the pandemic	<.001	
	Lockdown	<.001	Y/GT: Partial (76.8); total (64.4)

A, Asia; CSA, Central and South America; E, Europe, GT, group total; HIMG, hospital-issued management guidelines; IQR, interquartile range; NA, North America; TD, teledermatology; Y/GT, yes/group total.

^a χ^2 test performed unless otherwise noted.

^b Only statistically significant p-values are shown.

^c Refers to the groups of variables in the second column.

^d McNemar test.

^e Percentage rounded to the decimal place. Percentages of groups are listed in descending order.

^f Wilcoxon rank-sum (Mann Whitney) test.

^g Spearman rank correlation.

correlation with the number of patients seen per week before the pandemic and with TD use before and during the pandemic ($p < .001$ for each).

Logistic regression models

The results from the logistic regression models are summarized in Table 5. TD use before the pandemic was the most powerful predictor of TD use during the pandemic (OR: 16.47; 95% confidence interval, 7.12–38.06; Table 5, Model 1). Other variables significantly contributing to the OR of TD use during the pandemic were North American practice location and continuing to perform procedures. The presence of >1000 COVID-19 cases in the respondent's country had the largest effect on the OR of expecting future TD use (OR: 3.80; 95% confidence interval, 2.33–6.21; Table 5, Model 2). Other factors increasing this OR were TD use before the pandemic, using TD for both follow-up and new patients, and TD video visits during the pandemic.

Discussion

Impact on clinical activity

The COVID-19 pandemic is having a huge impact on dermatology practice, including a significant reduction in in-person consultations and nonemergency procedures, as well as a remarkable increase in TD use (Goldust et al., 2020b; Litchman and Rigel, 2020; Wollina, 2020). Our study confirms these trends by showing a 53% reduction in the number of dermatologists providing face-to-face consultations and a 49.1% increase in TD consultations. The survey also indicates that 15.6% of dermatologists stopped delivering care during the pandemic and were more likely to practice in areas of total rather than partial lockdown (Gorrepati and Smith, 2020).

Impact on procedures performed

Only one fourth of dermatologists continued performing procedures during the pandemic (Table 2). Biopsy was the most common, followed by Mohs surgery. Excision was performed less often than Mohs surgery, which possibly indicates a priority on treating high-risk tumors (i.e., performing Mohs surgery for high-risk squamous cell carcinoma while deferring treatment of low-

risk tumors and deciding on a case-by-case basis for intermediate-risk tumors) per the current guidelines on management of patients with skin cancer during the pandemic (Baumann et al., 2020; British Association of Dermatologists and British Society for Dermatological Surgery, 2020; Geskin et al., 2020; National Comprehensive Cancer Network, 2020a). Cosmetic procedures were uncommon. Although this is due mainly to deferring elective procedures (Galadari et al., 2020), it might also indicate decreased patient interest in such treatments during the crisis (Guzman and Barbieri, 2020).

The number of biopsies for suspicious pigmented lesions per week (median: 1; IQR, 0–30) was associated with the number of patients seen per week both before and during the pandemic ($p < .001$ for both; Table 5). A median of five biopsies per week (IQR, 3–20) were postponed. Neither the numbers of biopsies per week performed nor those postponed were associated with TD use. The North American group had both a lower mean for biopsies taken (4.95) and a higher mean for biopsies postponed (21.2) compared with a U.S. group (7.7 and 10.7, respectively) in a study performed during the pandemic (Litchman and Rigel, 2020). This is possibly due to the data having been collected at an earlier stage in the pandemic (i.e., through the week of March 16 in the comparative study). The correlation between the numbers of biopsies for pigmented lesions performed and postponed may indicate that dermatologists have been focusing more on not missing a melanoma diagnosis than on keratinocytic carcinomas during this pandemic (Der Sarkissian et al., 2020; National Comprehensive Cancer Network, 2020b).

Impact on hospital service

COVID-19 has a considerable impact on dermatology care provided in the hospital setting (Chen et al., 2020). In this study, outpatient dermatology clinics were discontinued at the local hospital (60.8%), and the number of dermatologists providing hospital service decreased during compared with before the pandemic. This disruption is probably due to social distancing measures and concerns that dermatology examinations may be a vector of COVID-19 transmission (Cengiz et al., 2020; Kwatra et al., 2020). Our findings align with reports of dermatology specialty clinics being reduced or postponed indefinitely (Radi et al., 2020), and wards turned into COVID-19 care and quarantine centers in developing countries (Kumar et al., 2020).

Table 5
Logistic regression models.

Model	Dependent variable	Independent variables	LR χ^2	OR	SE	Z ^a	p-value	95% CI
1	TD during the pandemic		126.98					
		TD before the pandemic		14.05	6.04	6.15	<.001	6.05–32.64
		North America		2.99	0.96	3.43	.001	1.60–5.60
		Performing procedures during the pandemic		2.12	0.58	2.74	.006	1.24–3.64
		Future TD		1.77	0.35	2.93	.003	1.21–2.60
		_cons ^b		1.06	0.16	0.37	.708	0.78–1.44
2	Future TD use		82.00					
		>1000 COVID-19 cases in country		3.80	0.95	5.35	<.001	2.33–6.21
		TD before the pandemic		2.51	0.66	3.51	<.001	1.50–4.21
		TD during the pandemic: Both follow-up and new patients		2.03	0.48	3.01	.002	1.28–3.23
		TD type during the pandemic: Virtual (video) consultation		1.98	0.47	2.82	.004	1.23–3.18
		_cons		0.55	0.13	-2.58	.009	0.35–0.86

CI, confidence interval; HIMG, hospital-issued management guidelines; LR, likelihood ratio; OR, odds ratio; PPE, personal protective equipment; SE, standard error; TD, teledermatology.

All LR $\chi^2 p < .0001$.

Numbers are rounded to two decimal places in all but the p-value column (three decimal places).

^a z defined as OR:SE.

^b _cons estimates baseline odds.

Impact on teledermatology use

TD provides patients ongoing access to dermatologic care and affords a safer way to evaluate patients, including those with confirmed or suspected COVID-19 infection (Madigan et al., 2020). Our study showed a 49.1% increase in the number of participants providing TD consultations during the pandemic and a significantly increased number of participants using TD for both new and follow-up patients. Relaxed compliance with the Health Insurance Portability and Accountability Act of 1996 was allowed by state medical boards and other authorities, as indicated by 64.9% of our respondents. Similar initiatives taken by federal authorities could have enhanced the implementation of TD (Azar, 2020; Bressler et al., 2020). Furthermore, TD reimbursement improved during the pandemic, as evidenced by the fact that most states currently have parity laws that reimburse telehealth as a regular office visit whereas only 16 states had such laws before the pandemic (American Telemedicine Association, 2019). Recent advances in communication technology via modern video-conferencing equipment are facilitating telehealth. Innovations including real-time diagnostic data transfer and cloud technology are enhancing telehealth and making it more popular (Bhargava et al., 2020b).

The dramatic increase in TD use reflects a need to continue providing dermatology care for nonemergent cases and an expectation that TD can significantly reduce the risk of COVID-19 transmission (Gupta et al., 2020; Lee et al., 2020; Sheriff et al., 2020; Temiz et al., 2020; Villani et al., 2020). In this study, video visit was the most common type of TD during the pandemic, and the WhatsApp messenger was the most common platform used (Jakhar et al., 2020). This platform allows users to communicate via text/voice messages, photos, and videos. A recent report of WhatsApp use during the pandemic highlighted the strength of this platform and instant text messaging in health care providers' activity (Duong et al., 2020). Despite a high percentage (42.3%) of nonreimbursement, more than two thirds of respondents (68.6%) expect to use TD in the future, the majority (68.6%) as part of their regular practice. Respondents anticipated more consultations in the future than during the pandemic.

Predictors of teledermatology use

Logistic regression analysis showed that TD use before the pandemic was the most powerful predictor of TD use during the pandemic, followed by North American practice location and performing procedures during the pandemic. The last association may indicate that providers who perform many procedures would prefer seeing medical dermatology cases and/or procedure follow-ups via TD. The factor with the largest increase in OR on the expectation of future TD use was >1000 COVID-19 cases in the participant's country. This finding highlights the profound effect of the COVID-19 pandemic on future TD use.

Other factors in the logistic model that increased the OR for future TD use were TD use before the pandemic and TD use for both follow-up and new patients and video visits during the pandemic. Dermatologists who used TD for new patients during the pandemic could have accommodated more appointment requests using TD, and video TD consultations may offer an advantage in physician–patient interactions compared with other TD forms (e/g, phone call). T, which may explain why dermatologists who used TD for new patients and/or provided video TD consultations are more likely to plan to use TD in the future. Our finding aligns with reports of higher satisfaction for video than store-and-forward TD among dermatologists before the pandemic (Marchell et al., 2017; Mounessa et al., 2018).

Limitations

We had only a small number of respondents from Africa and Australia. Participants with lower patient volumes, especially in areas of total lockdown, may have had more time to respond. To minimize this bias, we sent reminder messages to invited participants on weekends. Recall biases cannot be excluded, but the large sample size and representative distribution possibly diminished these biases. No-response biases cannot be excluded, but access to social media and demographics did not differ between the groups of respondents and nonrespondents.

Conclusion

This global survey indicates a profound immediate effect of the COVID-19 pandemic on dermatology practices, including a decreased number of visits and nonessential procedures and a remarkable increase in TD use. The logistic regression models in our study suggest factors that might influence the OR for TD use during the pandemic and for the future. This pandemic appears to have substantially contributed to an increased use of TD in the long term.

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Conflicts of Interest

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