Impact of the COVID-19 Pandemic on Care for Patients With Skin Cancer

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PRACTICE **POINTS**

- The COVID-19 pandemic has altered the landscape of medicine, as many individuals are now utilizing telemedicine to receive care.
- Many individuals will continue to receive telemedicine moving forward, making it crucial to understand access to care.

To the Editor:

The most common malignancy in the United States is skin cancer, with melanoma accounting for the majority of skin cancer deaths.[1] Despite the lack of established guidelines for routine total-body skin examinations, many patients regularly visit their dermatologist for assessment of pigmented skin lesions.[2] During the COVID-19 pandemic, many patients were unable to attend in-person dermatology visits, which resulted in many high-risk individuals not receiving care or alternatively seeking virtual care for cutaneous lesions.[3] There has been a lack of research in the United States exploring the utilization of teledermatology during the pandemic and its overall impact on the care of patients with a history of skin cancer. We explored the impact of the COVID-19 pandemic on care for patients with skin cancer in a large US population.

Using anonymous survey data from the 2020-2021 National Health Interview Survey,[4] we conducted a population-based, cross-sectional study to evaluate access to care during the COVID-19 pandemic for patients with a self-reported history of skin cancer—melanoma, nonmelanoma skin cancer, or unknown skin cancer. The 3 outcome variables included having a virtual medical appointment in the past 12 months (yes/no), delaying medical care due to the COVID-19 pandemic (yes/no), and not receiving care due to the COVID-19 pandemic (yes/no). Multivariable logistic regression models evaluating the relationship between a history of skin cancer and access to care were constructed using Stata/MP 17.0 (StataCorp LLC). We controlled for patient age; education; race/ethnicity; received public assistance or welfare payments; sex; region; US citizenship status; health insurance status; comorbidities including history of hypertension, diabetes, and hypercholesterolemia; and birthplace in the United States in the logistic regression models.

Our analysis included 46,679 patients aged 18 years or older, of whom 3.4% (weighted)(n=2204) reported a history of skin cancer (eTable 1). The weighted percentage

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The eTables are available in the Appendix online at www.mdedge.com/dermatology.

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was calculated using National Health Interview Survey design parameters (accounting for the multistage sampling design) to represent the general US population. Compared with those with no history of skin cancer, patients with a history of skin cancer were significantly more likely to delay medical care (adjusted odds ratio [AOR], 1.37; 95% CI, 1.21-1.54; *P*<.001) or not receive care (AOR, 1.35; 95% CI, 1.16-1.57; *P*<.001) due to the pandemic and were more likely to have had a virtual medical visit in the past 12 months (AOR, 1.12; 95% CI, 1.00-1.26; *P*=.05). Additionally, subgroup analysis revealed that females were more likely than males to forego medical care (eTable 2). β Coefficients for independent and dependent variables were further analyzed using logistic regression (eTable 3).

After adjusting for various potential confounders including comorbidities, our results revealed that patients with a history of skin cancer reported that they were less likely to receive in-person medical care due to the COVID-19 pandemic, as high-risk individuals with a history of skin cancer may have stopped receiving total-body skin examinations and dermatology care during the pandemic. Our findings showed that patients with a history of skin cancer were more likely than those without skin cancer to delay or forego care due to the pandemic, which may contribute to a higher incidence of advanced-stage melanomas postpandemic. Trepanowski et al[5] reported an increased incidence of patients presenting with more advanced melanomas during the pandemic. Telemedicine was more commonly utilized by patients with a history of skin cancer during the pandemic.

In the future, virtual care may help limit advanced stages of skin cancer by serving as a viable alternative to in-person care.[6] It has been reported that telemedicine can serve as a useful triage service reducing patient wait times.[7] Teledermatology should not replace in-person care, as there is no evidence of the diagnostic accuracy of this service and many patients still will need to be seen in-person for confirmation of their diagnosis and potential biopsy. Further studies are needed to assess for missed skin cancer diagnoses due to the utilization of telemedicine.

Limitations of this study included a self-reported history of skin cancer, β coefficients that may suggest a high degree of collinearity, and lack of specific survey questions regarding dermatologic care during the COVID-19 pandemic. Further long-term studies exploring the clinical applicability and diagnostic accuracy of virtual medicine visits for cutaneous malignancies are vital, as teledermatology may play an essential role in curbing rising skin cancer rates even beyond the pandemic.

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APPENDIX

eTABLE 1. Characteristics of Adults (≥18 Years) With and Without a History of Skin Cancer[a] in 2020-2021 NHIS (N=46,679)

Characteristic	With skin cancer history	Without skin cancer history	*P* value[b]
Prevalence, n (weighted %)[c]	2204 (3.4)	44,475 (96.6)	N/A
Delayed medical care due to pandemic, weighted %[c] (95% CI)[d]			
Yes	28.4 (26.2-30.8)	20.2 (19.6-20.7)	<.0001
No	71.6 (69.2-73.8)	79.8 (79.3-80.4)	
Did not receive care due to pandemic, weighted %[c] (95% CI)[e]			
Yes	17.7 (15.7-19.8)	13.0 (12.6-13.5)	<.0001
No	82.4 (80.2-84.3)	87.0 (86.5-87.4)	
Virtual medical appointment in the past 12 mo, weighted %[c] (95% CI)[f]			
Yes	45.4 (42.7-48.1)	35.1 (34.5-35.8)	<.0001
No	54.6 (51.9-57.3)	64.9 (64.2-65.6)	
Have ever received public assistance or welfare payments, weighted %[c] (95% CI)[g]			
Yes	1.5 (0.9-2.4)	3.3 (3.1-3.6)	.001
No	98.5 (97.6-99.1)	96.7 (96.4-96.9)	
Mean age, y (SD)	67.2 (15.2)	47.4 (18.4)	<.001
Sex, weighted %[c] (95% CI)[h]			
Male	50.9 (48.3-53.5)	48.1 (47.6-48.7)	.05
Female	49.1 (46.5-51.7)	51.8 (51.3-52.4)	
Health insurance status, weighted %[c] (95% CI)[i]			
Yes	98.2 (97.3-98.8)	91.0 (90.4-91.5)	<.0001
No	1.8 (1.2-2.7)	9.0 (8.5-9.6)	
Race/ethnicity, weighted %[c] (95% CI)			
Non-Hispanic White	96.8 (95.6-97.7)	61.7 (60.1-63.2)	<.0001
Non-Hispanic Black	0.5 (0.2-1.1)	12.0 (11.2-13.0)	
Hispanic	1.6 (1.0-2.5)	17.5 (16.1-18.9)	
Other	1.2 (0.8-1.8)	8.8 (8.1-9.6)	
Highest level of education, weighted %[c] (95% CI)[j]			
Some/no high school	4.7 (3.5-6.2)	10.1 (9.5-10.7)	<.0001
High school graduate/GED equivalent	23.8 (21.7-25.9)	28.8 (28.1-29.6)	
Some college/associate degree/college degree	49.8 (47.4-52.1)	48.9 (48.1-49.6)	
Postgraduate degree	21.8 (19.8-23.9)	12.2 (11.8-12.7)	
US citizenship status, weighted %[c] (95% CI)[k]			
Yes	99.4 (98.7-99.7)	91.7 (91.1-92.3)	<.0001
No	0.6 (0.3-1.3)	8.3 (7.7-8.9)	

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eTABLE 1. (continued)

Characteristic	With skin cancer history	Without skin cancer history	*P* value[b]
Birthplace in the United States, weighted %[c] (95% CI)[l]			
Yes	96.3 (95.1-97.2)	81.0 (79.9-82.0)	<.0001
No	3.7 (2.8-4.9)	19.0 (18.0-20.1)	

Abbreviations: GED, General Educational development test; N/A, not applicable; NHIS, National Health Interview Survey.
[a]Skin cancer history included self-reported history of melanoma, nonmelanoma skin cancer, or unknown skin cancer.
[b]Statistically significant, 2-sided $P \leq .05$.
[c]Weighted percentage was calculated using NHIS survey design parameters.
[d]Delayed medical care due to the pandemic was assessed by the question, "Was there any time when you delayed getting medical care because of the COVID-19 pandemic?"
[e]Did not receive care due to pandemic was assessed by the question "Was there any time when you needed medical care for something other than COVID-19 but did not get it because of the COVID-19 pandemic?"
[f]Virtual medical appointment was assessed by the question, "In the past 12 months, have you had an appointment with a doctor, nurse, or other health professional by video or by phone?"
[g]1878 patients missing.
[h]3 patients missing.
[i]50 patients missing.
[j]256 patients missing.
[k]1031 patients missing.
[l]960 patients missing.

Data from the National Center for Health Statistics.[4]

eTABLE 2. Multivariable Logistic Regression Analysis for Individuals With a History of Skin Cancer

Variable	Weighted %[a]		OR (95% CI)		*P* value[b]	
	With skin cancer history	Without skin cancer history[c]	Unadjusted	Adjusted[d]	Unadjusted	Adjusted[d]
All patients						
No care[e]	17.7	13.0	1.43 (1.24-1.65)	1.35 (1.16-1.57)	<.001	<.001
Delayed care[f]	28.4	20.2	1.57 (1.40-1.76)	1.37 (1.21-1.54)	<.001	<.001
Virtual[g]	45.4	35.1	1.54 (1.38-1.71)	1.12 (1.00-1.26)	<.001	.05
Delayed/no care[h]	31.0	22.4	1.55 (1.38-1.74)	1.36 (1.20-1.54)	<.001	<.001
Males						
No care[e]	14.0	10.4	1.41 (1.13-1.75)	1.23 (0.97-1.57)	.002	.09
Delayed care[f]	24.2	16.3	1.64 (1.38-1.96)	1.30 (1.07-1.58)	<.001	.009
Virtual[g]	42.6	30.0	1.73 (1.49-2.02)	1.09 (0.93-1.28)	<.001	.3
Delayed/no care[h]	26.1	18.3	1.58 (1.33-1.88)	1.27 (1.04-1.54)	<.001	.02
Females						
No care[e]	21.4	15.5	1.49 (1.24-1.78)	1.44 (1.18-1.75)	<.001	<.001
Delayed care[f]	32.8	23.8	1.57 (1.35-1.82)	1.41 (1.20-1.65)	<.001	<.001
Virtual[g]	48.3	39.9	1.41 (1.22-1.63)	1.11 (0.94-1.30)	<.001	.2
Delayed/no care[h]	36.0	26.3	1.57 (1.36-1.83)	1.43 (1.23-1.67)	<.001	<.001
White						
No care[e]	17.2	13.2	1.36 (1.18-1.57)	1.29 (1.10-1.51)	<.001	.001
Delayed care[f]	28.1	21.3	1.44 (1.28-1.62)	1.34 (1.18-1.52)	<.001	<.001
Virtual[g]	45.3	37.0	1.41 (1.26-1.57)	1.17 (1.05-1.32)	<.001	.007
Delayed/no care[h]	30.6	23.5	1.44 (1.28-1.61)	1.34 (1.18-1.52)	<.001	<.001
Non-White						
No care[e]	32.8	12.7	3.35 (1.72-6.55)	3.35 (1.55-7.23)	<.001	.002
Delayed care[f]	39.4	60.6	2.91 (1.56-5.43)	2.64 (1.27-5.48)	.001	.009
Virtual[g]	50.4	32.1	2.15 (1.21-3.83)	1.17 (1.05-1.32)	.01	.007
Delayed/no care[h]	41.1	20.7	2.67 (1.45-4.91)	1.34 (1.18-1.52)	.002	<.001

Abbreviation: OR, odds ratio.

[a]Weighted percentage was calculated using National Health Interview Survey design parameters.

[b]Statistically significant, 2-sided $P \leq .05$.

[c]Reference group for logistic regression models.

[d]Logistic regression models were adjusted for age, education, race/ethnicity, income, sex, region, US citizenship status, health insurance status, comorbidities (eg, history of diabetes, history of hypertension, history of high cholesterol), and birthplace in the United States with segmented variables to ensure data accuracy and thorough consideration of potential confounders.

[e]Participants who reported not receiving medical care due to the pandemic.

[f]Participants who reported delaying medical care due to the pandemic.

[g]Participants who reported receiving virtual care due to the pandemic.

[h]Included individuals who responded *yes* to delaying medical care due or not receiving care due to the COVID-19 pandemic.

Data from the National Center for Health Statistics.[4]

eTABLE 3. β Coefficients[a] for Dependent Variables in Regression Models

	Delayed care		No care		Virtual	
Dependent variables	**β**	**SE**	**β**	**SE**	**β**	**SE**
Skin cancer history	0.31	0.06	0.30	0.08	0.11	0.06
Age	0.24	0.06	–0.00	0.02	0.00	0.01
Education	0.32	0.02	0.26	0.02	0.29	0.02
Race/ethnicity	–0.03	0.02	0.01	0.02	–0.06	0.01
Received public assistance or welfare payments	0.39	0.08	0.67	0.09	0.30	0.07
Sex	–0.48	0.03	–0.47	0.04	–0.45	0.02
Region	–0.02	0.02	0.02	0.02	0.06	0.12
US citizenship status	–0.05	0.08	–0.17	0.10	0.18	0.07
Health insurance status	0.25	0.07	0.02	0.08	1.07	0.07
Birthplace in the United States	0.01	0.06	0.20	0.06	–0.01	0.04
History of hypertension	0.13	0.03	0.18	0.04	0.40	0.03
History of diabetes	.012	.005	0.24	0.06	0.56	0.04
History of high cholesterol	0.29	0.03	0.26	0.04	0.34	0.03
Constant (β_0)	–2.32	0.12	–2.67	0.13	–2.70	0.11

Abbreviation: SE, standard error.
[a]Analyses were performed using the regression equation $y = \frac{e^{(\beta_0+\beta_1 x)}}{1+e^{(\beta_0+\beta_1 x)}}$.

Data from the National Center for Health Statistics.[4]