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Analysis of dermatology-related search engine trends during the COVID-19 pandemic: Implications for patient demand for outpatient services and telehealth



To the Editor: Amid the coronavirus disease 2019 (COVID-19) pandemic, dermatologists face the challenge of providing care while adhering to guidelines established by the Centers for Disease Control and Prevention. The American Academy of Dermatology has advised limiting nonessential in-person visits¹ and provided guidance to accelerate telehealth services.² However, little is known regarding how the dermatologic needs of patients have evolved during this public health crisis. The objective of this study was to use the Google Trends search volume index, a normalized value from 0 to 100, to examine patient interest in skin conditions and procedures during the COVID-19 pandemic.

Google Trends search volume index data have been shown to describe patient interest in dermatologic issues.^{3,4} We divided common search queries into 3 categories: general dermatology conditions

(ie, acne, eczema, seborrheic dermatitis, psoriasis, hair loss, rosacea, dry skin, hives, and atopic dermatitis), premalignant and cancerous conditions (ie, melanoma, squamous cell carcinoma, basal cell carcinoma, and actinic keratosis), and cosmetic procedures (ie, Botox, laser treatment, laser therapy, chemical peel, dermabrasion, lip filler, and fillers). The primary outcome was the mean search volume index during 3 intervals: prepandemic (April 28, 2019, to March 8, 2020), the onset of national stay-at-home orders (March 15, 2020, to March 29, 2020), and the ongoing social distancing period (April 5, 2020, to the present). The Centers for Disease Control and Prevention restricted public gatherings on March 15, 2020, and stay-at-home orders were rolled out between March 23, 2020, and March 30, 2020. Two-tailed unpaired *t* tests were used for continuous variable comparisons (GraphPad Prism 7, GraphPad, San Diego, CA).

Significant decreases in search volume index were observed between the prepandemic period and the onset of stay-at-home orders for general dermatologic conditions (82.6 vs 71.9; *P* < .001), premalignant and cancerous conditions (77.6 vs 47.9; *P* < .001), and cosmetic procedures (71.8 vs 45.1; *P* < .001) (Table I). In contrast, only interest in general dermatologic conditions has returned to baseline during the ongoing social distancing period, whereas premalignant and cancerous conditions and cosmetic procedures showed persistently low search volume index (Table I and Fig 1).

Our findings suggest that public interest in dermatologic conditions and procedures has been influenced by the events of the pandemic. Although stay-at-home orders and the rapid spread of disease in mid-March reduced all categories of online searches, only general dermatologic conditions demonstrated a return to prepandemic levels of interest. It is possible that visits for these chronic, less urgent conditions—such as acne, rosacea, and seborrheic dermatitis—are more likely to be postponed or canceled amid the limitations of

Table I. Comparison of mean search volume indices of general dermatologic conditions, precancerous and malignant conditions, and cosmetic procedures during key intervals throughout the COVID-19 pandemic

	April 28, 2019, to March 8, 2020,	March 15, 2020, to March 29, 2020		April 5, 2020, to April 19, 2020	
	Mean (SD)	Mean (SD)	<i>P</i> value*	Mean (SD)	<i>P</i> value*
General dermatologic conditions	82.6 (10.1)	71.9 (6.6)	<.001	84.5 (8.2)	.31
Precancerous and malignant conditions	77.6 (11.0)	47.9 (7.3)	<.001	50.3 (6.8)	<.001
Cosmetic procedures	71.8 (12.5)	45.1 (9.5)	<.001	49.8 (14.0)	<.001

SD, Standard deviation.

*Mean search volume indices from these periods were compared with the prepandemic search volume index (April 28, 2019, to March 8, 2020), using 2-tailed unpaired *t* tests.

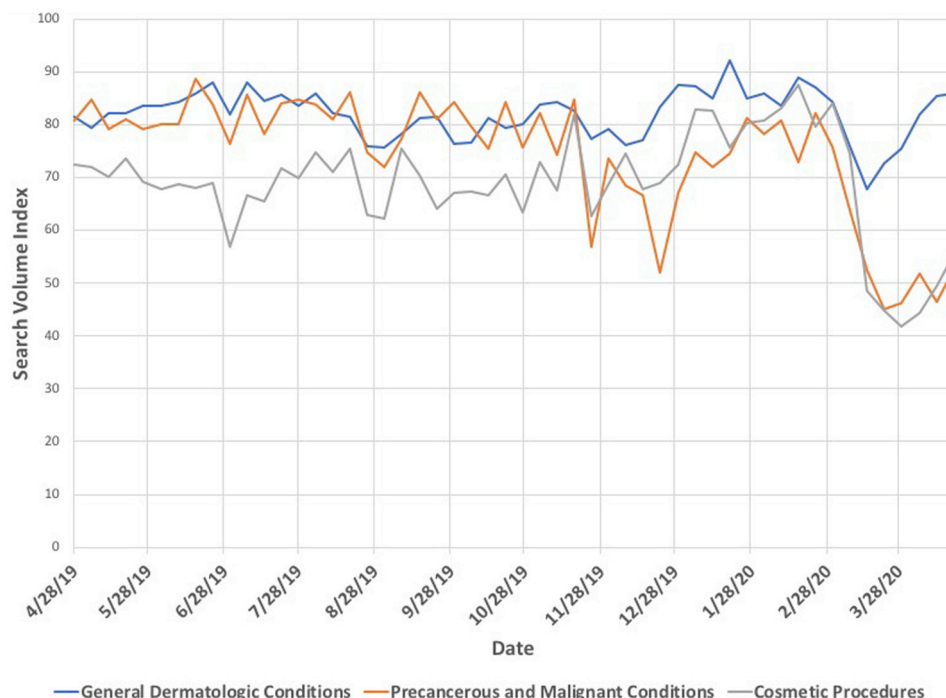


Fig 1. Mean search volume indices of general dermatologic conditions, precancerous and malignant conditions, and cosmetic procedures from April 28, 2019, to the present.

outpatient appointments and delays in teledermatology implementation. Consequently, with limited provider access, patients may turn to online resources, many of which exhibit bias and misinformation.⁵ In contrast, given premalignant and cancerous conditions' more urgent nature, their management may have been less disrupted by the COVID-19 pandemic. Alternatively, perhaps patients conducted online searches for information only after their diagnosis was introduced by a dermatologist; in this case, the increase in search volume index for general dermatologic conditions may be related to continued access during the pandemic through telehealth, whereas skin surgery and cosmetic procedures have been postponed.

Future studies are warranted to explore the relationship between search volume index and patient behaviors, and to examine its potential role in developing predictive models to identify patient demand. The results of this study should be interpreted with caution because search volume index may not completely reflect patient needs and intention. As we continue to adapt our practice habits during the COVID-19 pandemic, these findings suggest areas of greatest demand, in which targeted development of telehealth offerings may provide significant benefit.

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Outbreak of chilblain-like acral lesions in children in the metropolitan area of Milan, Italy, during the COVID-19 pandemic



To the Editor: Since the end of February 2020, when the first cases of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) were identified in Italy, the metropolitan area of Milan has been greatly affected by the spread of the disease. Individual case reports¹ and studies of case series²⁻⁵ have recently highlighted the presence of chilblain-like acral manifestations in young COVID-19 patients.

Between March 26 and April 26, 2020, 30 patients with a median age of 11 years (range 2-17 years) and chilblain-like acral lesions who had not started treatment with any new drug in the 15 days preceding lesion onset were referred to the Pediatric Dermatology Unit of the Fondazione IRCCS Ca' Granda in Milan, with the collaboration of the Italian Pediatric Primary Healthcare Society (SICuPP) Lombardy Section (Table I). Seventeen (56.7%) were male patients.

Thirteen patients (43.3%) experienced systemic symptoms a median of 6 days (range -1 to 35 days) before skin lesion onset, the most frequent being fever (n = 9/13; 69.2%), followed by cough (n = 6/13; 46.2%), coryza (n = 3/13; 23.1%), pharyngodynia (n = 2/13; 15.4%), weakness (n = 2/13; 15.4%), dyspnea (n = 2/13; 15.4%), abdominal pain (n = 1/13; 7.7%), and headache (n = 1/13; 7.7%).

In all cases, the lesions were erythematous-violaceous patches or slightly infiltrated plaques, associated with edema in 3 cases (Fig 1, A-D). No blisters, crusts, or ulcers were observed. Twenty-six patients (86.7%) had foot lesions, 2 involving only the ankle, and 4 had hand lesions, including 2 with foot involvement. Lesion distribution was unilateral in 4 cases (13.3%). Usually moderate itching (median

visual analog scale score 4.5) was recorded in 14 patients (46.7%), and pain in 5 (16.7%; median visual analog scale score 3). The median duration of the lesions in the 9 patients whose lesions healed was 7 days (range 1-23 days). Two patients underwent a skin biopsy, and histology showed perivascular and periadnexal dermal lymphocytic infiltrates suggesting chilblains (Fig 1, E). Polymerase chain reaction-based testing result of nasopharyngeal swabs for SARS-CoV-2 was negative in all 6 patients tested.

Like other centers,^{2,5} our Pediatric Dermatology Unit, which has a catchment area of approximately 3,000,000 people, has recently experienced an "outbreak" of 30 cases of chilblain-like lesions in comparison with only 3 cases of authentic chilblains in the corresponding period of 2019. The lesions are probably vasculopathic, and although their etiopathogenesis is still unclear, it seems to be related to SARS-CoV-2 infection. Median latency in our cohort was shorter than that reported in previous series^{2,4} and was slightly longer in the patients younger than 10 years (7.5 vs 6 days). This manifestation usually appears in asymptomatic or paucisymptomatic children, who do not often undergo SARS-CoV-2 testing in Italy for economic reasons. The recognition of chilblain-like lesions may facilitate a diagnosis of COVID-19 in asymptomatic or paucisymptomatic pediatric patients.

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