

## ORIGINAL CONTRIBUTION

# How does COVID-19 impact psoriasis practice, prescription patterns, and healthcare delivery for psoriasis patients? A cross-sectional survey study

Mohamed H.M. EL-Komy MD<sup>1,2</sup>  | Asmaa Abdelnaby MD<sup>3</sup>  | Mona El-Kalioby MD<sup>1,2</sup> 

<sup>1</sup>Dermatology Department, Faculty of Medicine, Cairo University, Cairo, Egypt

<sup>2</sup>Kasr AL-Ainy Psoriasis Unit (KAPU), Faculty of Medicine, Cairo University, Cairo, Egypt

<sup>3</sup>Department of Public Health, Faculty of Medicine, Cairo University, Cairo, Egypt

**Correspondence**

Mona El-Kalioby, Department of Dermatology, Kasr Al-Ainy Hospital, Cairo University, Cairo, Egypt.  
Email: mona.elkalioby@kasralainy.edu.eg

**Abstract**

**Background:** Psoriasis is a chronic skin disease that needs continuous medical care. During COVID-19, delivering medical service was negatively affected.

**Aims:** To describe the impact of COVID-19 on psoriasis healthcare delivery, management, and practice.

**Methods:** This observational cross-sectional study was conducted on 197 dermatologists using a validated online questionnaire. The survey evaluated the effect of COVID-19 on the decisions, prescription patterns, appointments rescheduling, and healthcare delivery for psoriasis patients by dermatologists. The questionnaire was developed and validated with a reliability score >0.7.

**Results:** During the pandemic, most dermatologists delayed initiating biological/immunosuppressive therapy for psoriasis unless urgently needed by the patient. For patients already receiving biologics or immunosuppressive treatment, most dermatologists favored continuation of therapy. Almost half (44.2%) of participants do not perform SARS-CoV-2 PCR screening before initiating biologics/immunosuppressive therapy. Dermatologists also reported an increased prescription of topical medications (79.2%), natural sunlight (28.4%), acitretin (26.9%), and home UVB (21.3%). Opinions regarding the use of hydroxychloroquine for COVID-19 treatment/prophylaxis for psoriasis patients were controversial. Intervals between face-to-face follow-up visits were prolonged by 71.6% of dermatologists. More than half of participants reported that their patients discontinued treatment without medical consultation. More than three fourth of responders either agreed or strongly agreed that COVID-19 negatively affected psoriasis patients.

**Conclusions:** The COVID-19 pandemic has a negative impact on psoriasis management and healthcare delivery. Dermatologists are cautious about using biologics and immunosuppressive drugs during the pandemic, making case-by-case decisions. Psoriasis patients need compliance monitoring, and psychological support during the pandemic, which can be facilitated by tele dermatology.

**KEYWORDS**

biologics, coronavirus, immunosuppressive, PCR, psoriasis, SARS-CoV-2

## 1 | INTRODUCTION

Coronavirus disease (COVID-19) emerged in Wuhan city in China by the end of December 2019.<sup>1</sup> Eventually, the virus spread far and wide to many countries all over the world.<sup>2</sup> On March 11, 2020, the World Health Organization declared COVID-19 as a pandemic. Authorities around the world issued restriction measures to limit virus transmission, for example, imposing lockdown, banning public gatherings, suspending schools and universities, and restricting travel.<sup>1</sup> Work-from-home was encouraged, whenever possible, with calls for a "stay home" policy. Hospitals' workforce was directed largely to the management of COVID-19 and urgent medical conditions, with a decrease in the outpatient clinics' capacity and elective procedures. Subsequently, healthcare delivery and medical services for patients with non-urgent conditions were constrained globally.<sup>3-5</sup>

Psoriasis is a chronic immune-mediated inflammatory skin disease. Psoriasis patients need continuous monitoring and medical care. Stress, smoking, and physical inactivity are major exacerbating factors for the disease.<sup>6</sup> Psoriasis comorbidities, for example, obesity, hypertension, and diabetes mellitus were recognized as risk factors for severe COVID-19 infections.<sup>7</sup> With the COVID-19 outbreak, physicians and patients are concerned regarding the use of biologics and immunosuppressive therapies for the treatment of psoriasis.<sup>8</sup> Furthermore, hydroxychloroquine, a drug prescribed for COVID-19, can flare up psoriasis.<sup>9</sup> In this work, we aimed to describe how the COVID-19 pandemic affected the psoriasis practice and altered the decisions, prescription patterns, management, and healthcare delivery for psoriasis patients by dermatologists.

## 2 | MATERIAL AND METHODS

This work was designed as an observational cross-sectional study. The data were collected using a validated online questionnaire conducted on Google forms. The questionnaire was designed and validated as follows: First, construct validity was performed by two dermatologists specialized in psoriasis and an epidemiology expert. Afterward, content validity was measured using Cronbach alpha reliability score and modified accordingly to reach >0.7 level. Finally, the questionnaire was pilot tested on 30 dermatologists.

After validation, the questionnaire was sent to Egyptian dermatologists via e-mail and social media (WhatsApp and Facebook). E-mail list and contacts were retrieved from records of Kasr Al-Ainy Psoriasis Unit (KAPU) at the Dermatology Department, Faculty of Medicine, Cairo University. The questionnaire was open to response in the period from October 6 to 23, 2020. The survey was anonymous, and response to the questionnaire was voluntary. Dermatologists consented to participation in the research before filling the questionnaire.

The questionnaire included 29 questions (21 multiple-choice questions, five checkbox questions, and three free-response

questions). Questions covered demographic data, therapy decisions, appointments rescheduling, tele dermatology use, and perception of the pandemic effect on healthcare delivery for psoriasis (Appendix I).

The sample size for the study was calculated using EPI Info sample size calculator with a confidence interval of 95% and an expected frequency of 50%. The population size of dermatologists in the database was 400. Accordingly, the total sample size calculated was 196 dermatologists.

Statistical analysis was done using SPSS (Statistical Package for the Social Sciences) version 21. Qualitative data were presented in terms of frequency and percentage, while quantitative data were presented in terms of mean and standard deviation (SD). Statistical tests for quantitative data were done using Chi-squared test and Fisher's exact test. The significant level was set to be equal to or less than 0.05.

## 3 | RESULTS

By the end of the survey period, 197 Egyptian dermatologists responded to the questionnaire (179 females, 90.9%, and 18 males, 9.1%). Their place of work was university hospital for 50 dermatologists (25.4%), public hospital for 32 dermatologists (16.2%), and private clinic for 23 dermatologists (11.7%). While ninety-two participants (46.7%) worked at more than one of these sectors. Their years of practicing dermatology ranged from 0.5 to 44 years with a mean  $\pm$  SD of  $8.86 \pm 6.67$  (Appendix II).

### 3.1 | The pattern of prescriptions for psoriasis patients by dermatologists during COVID-19

Forty-seven percent (47%) of dermatologists recruited were not using biologics for psoriasis treatment. Interleukin (IL)-17 inhibitors were the most frequently prescribed, while IL12/IL23 inhibitors were the least used. During the pandemic, dermatologists significantly delayed systemic therapy initiation ( $p < 0.001$ ) with phototherapy being the least delayed (53.8%). For biologics and immunosuppressive drugs, most dermatologists delayed initiation for most patients unless therapy is urgently needed, and this was statistically significant ( $p < 0.001$ ) (Table 1). Among biologics prescribers, the initiation preferences were also for those in urgent need for therapy (Appendix III).

There was a statistically significant difference in stopping certain therapies for psoriasis patients during the pandemic. Phototherapy and methotrexate were the least to be discontinued (no discontinuation in 53.8% and 42.6%, respectively), followed by cyclosporine (37.1%) and biologic therapy (17.3%) ( $p < 0.001$ ) (Table 2).

Almost half (44.2%) of participating dermatologists do not order SARS-CoV-2 PCR test before initiating biologics/immunosuppressive therapy during the pandemic (Figure 1). Other changes in the prescription pattern during the pandemic are demonstrated in Figure 2.

TABLE 1 Delay of initiation of treatment of psoriasis by dermatologists during COVID-19 (N = 197)

Delay initiating	TNF- $\alpha$ blockers	IL-17 inhibitors	IL-12/IL23 inhibitors	IL-23 inhibitors	Methotrexate	Cyclosporine	Phototherapy
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
In patients infected/ suspected of COVID-19 only	15 (7.6)	17 (8.6)	14 (7.1)	17 (8.6)	29 (14.7)	23 (11.7)	20 (10.2)
In patients with high risk of COVID-19 infection	7 (3.6)	10 (5.1)	3 (1.5)	5 (2.5)	16 (8.1)	20 (10.2)	5 (2.5)
For most patients unless therapy is urgently needed	46 (23.4)	43 (21.8)	45 (22.8)	41 (20.8)	85 (43.1)	72 (36.5)	24 (12.2)
For all patients	17 (8.6)	19 (9.6)	18 (9.1)	18 (9.1)	12 (6.1)	20 (10.2)	28 (14.2)
No delay	7 (3.6)	11 (5.6)	6 (3.0)	6 (3.0)	44 (22.3)	45 (22.8)	106 (53.8)
Not using this type of therapy for my patients	105 (53.3)	97 (49.2)	111 (56.3)	110 (55.8)	11 (5.6)	17 (8.6)	14 (7.1)

P value=<0.001 using Chi-squared test.

Abbreviations: IL, interleukin, N, Number, TNF, tumor necrosis factor.

TABLE 2 Discontinuation of psoriasis treatment by dermatologists during COVID-19 (N = 197)

Discontinuation of therapy	Biological therapy	Methotrexate	Cyclosporine	Phototherapy
	N (%)	N (%)	N (%)	N (%)
In patients infected/suspected of COVID-19 only	24 (12.2)	37 (18.8)	35 (17.8)	21 (10.7)
In patients with high risk of COVID-19 infection	10 (5.1)	20 (10.2)	17 (8.6)	5 (2.5)
For most patients unless therapy is urgently needed	23 (11.7)	40 (20.3)	43 (21.8)	25 (12.7)
For all patients	13 (6.6)	6 (3.0)	10 (5.1)	24 (12.2)
No	34 (17.3)	84 (42.6)	73 (37.1)	106 (53.8)
Not using this type of therapy for my patients	93 (47.2)	10 (5.1)	19 (9.6)	16 (8.1)

P value=<0.001 using Chi-squared test, N, number.

### 3.2 | Dermatologists' attitude toward changes in the healthcare delivery to psoriasis patients

Interval between face-to-face follow-up visits was prolonged by 71.6% of dermatologists. This delay affected patients psychologically (34.4%), interfered with drug compliance (40.4%), and worsened psoriasis manifestations (23.8%) as observed by participating dermatologists.

Overall, 60% of participating dermatologists used some form of teledermatology during the pandemic. Using teledermatology was reported by 41.6% and 60.9% of participating dermatologists for the first consultation and follow-up consultations, respectively. The most common method of teledermatology used was phone calls and photographs (Figure 3).

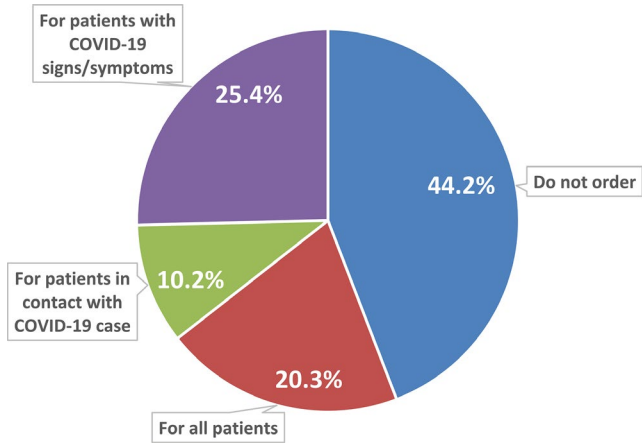
There was a significant relation between delaying face-to-face follow-up visits and teledermatology use ( $p = 0.004$ ). Two-third of participants who used any form of teledermatology delayed their face-to-face follow-up visits. More than half of the dermatologists

(57.1%) not using teledermatology did not delay their face-to-face follow-up visits.

### 3.3 | Observation of psoriasis patients by dermatologists during COVID-19

Three quarters (150, 76.1%) of dermatologists reported that none of their psoriasis patients developed COVID-19 infection. Type of psoriasis therapy among patients who developed COVID-19 is shown in Figure 4 as observed by participants.

Most dermatologists agreed that the COVID-19 negatively affected psoriasis patients and that appointments and phototherapy sessions were more frequently canceled by patients during the pandemic (Table 3). The attitude toward the use of hydroxychloroquine as COVID-19 treatment or prophylaxis for psoriasis patients was mixed as listed in Table 3. More than half of dermatologists (122,

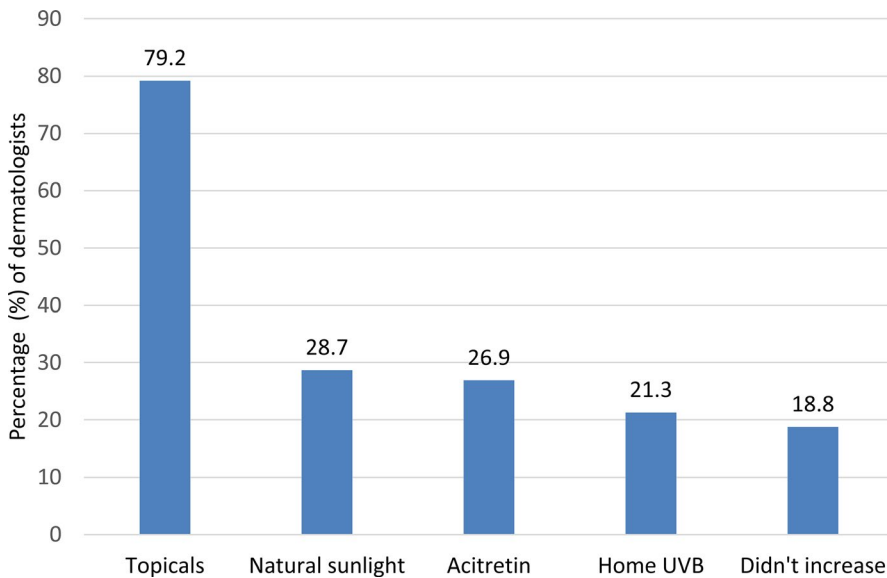


**FIGURE 1** SARS-CoV2 PCR workup by dermatologists before biological or immunosuppressive therapy initiation during the pandemic

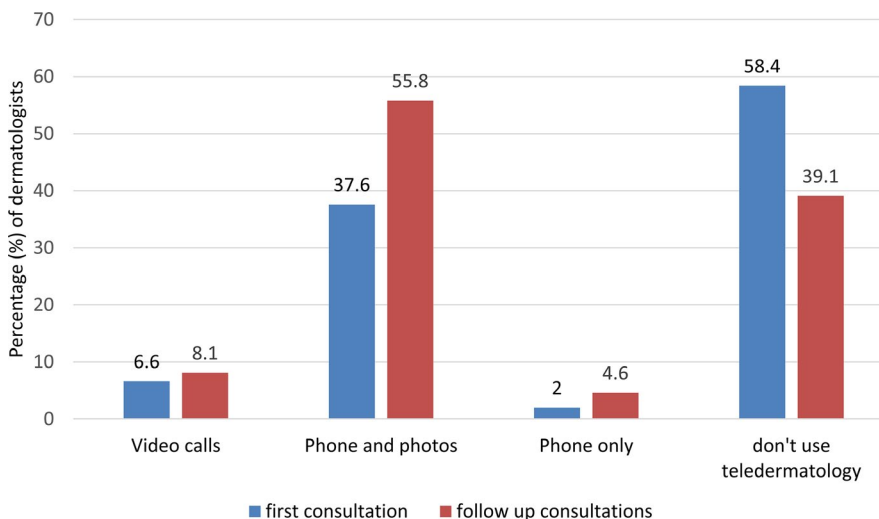
61.9%) reported that patients discontinued treatment without medical recommendation. The most common cause was financial reasons (32.5%), followed by fear of receiving treatment (31%) and lack of accessibility to treatment (25.9%).

#### 4 | DISCUSSION

With the COVID-19 outbreak, recommendations entailed limitation of dermatology practice to emergencies and postponing non-urgent consultations.<sup>10</sup> Besides, the lockdown limited the accessibility to medical service and treatment, which particularly affected patients with chronic diseases including psoriasis.<sup>4</sup> With psoriasis patients being a vulnerable group, requiring special attention during the pandemic, we hereby report the impact of COVID-19 on psoriasis healthcare delivery and management, where most participating



**FIGURE 2** Percentage of dermatologists reporting an increased prescription of topical medications, natural sunlight, acitretin, and home UVB during the pandemic



**FIGURE 3** Percentage of dermatologists reporting the use of teledermatology during COVID-19

dermatologists concurred that the COVID-19 pandemic had a negative impact, clinically and psychologically, on psoriasis patients.

Uncertainty about the appropriate use of biologics and immunosuppressive therapy for psoriasis during the COVID-19 exists. On one hand, the possibility of increased risk of infection with these medications cannot be ignored.<sup>11</sup> On the other hand, there are concerns regarding psoriasis flare with unnecessary drug discontinuation and diminished response associated with biologics reintroduction. Generally, the use of biological therapy is limited in Egypt for financial reasons. This explains the response by around half of dermatologists that they are not using biologics for their patients. Nonetheless, most dermatologists were cautious about initiating biologics and immunosuppressive drugs for psoriasis patients during the pandemic except when urgently needed for the patient. This reflects the judgment of each case independently based on a benefit-risk ratio. Similarly, prescriptions of methotrexate, cyclosporine, and biologics were reduced in the overall dermatology practice during COVID-19 in other parts of the world.<sup>12</sup> Alternatively, for patients already receiving biologics or immunosuppressive treatment, most dermatologists favored continuation of therapy. Discontinuation of

immunomodulatory treatment temporarily was recommended only if the patient is infected or suspected of COVID-19<sup>13-15</sup>

During the pandemic, the dermatologists' preference to initiate/continue phototherapy that we report here highlights the importance of rescheduling, adequate sterilization, and safety precautions to avoid crowding and long waiting times, thus maintaining safe phototherapy sessions for psoriasis patients.<sup>14,15</sup>

There is no consensus on routine SARS-CoV-2 PCR screening before initiating immunosuppressive therapy for psoriasis patients. In the current survey, 44.2% of dermatologists do not order PCR tests before initiating immunosuppressive therapy, while 20.3% order PCR for all patients, 25.4% if the patient has COVID-19 symptoms, and 10.2% if the patient was in contact with a COVID-19 case. This reflects the urgent need for a consensus regarding COVID-19 testing before initiation of biological or immunosuppressive therapy for psoriasis patients.

Dermatologists increased prescription of topical medications, natural sunlight, acitretin, and home UVB during the pandemic; trusting the safety of these options; however, this may not be suitable for all cases and such increased tendency can be inadequate and should not be generalized.

Old age and comorbidities were associated with higher prevalence and worse outcome of COVID-19 in psoriasis patients.<sup>15-17</sup> Three-quarters of dermatologists reported that none of their psoriasis patients developed COVID-19. However, this response is limited by COVID-19 stigma where patients may deny having COVID-19. Interestingly, among psoriasis patients who developed COVID-19 infection, 76% were on active treatment, and 24% were on off treatment in comparison with the PsoProtect registry where only 12.1% were on off treatment at the time of writing this manuscript.<sup>18</sup>

The use of hydroxychloroquine for treatment or prophylaxis of COVID-19 infection is contradictory.<sup>19</sup> Exacerbation of psoriasis was reported following treatment of COVID-19 with hydroxychloroquine.<sup>20</sup> In the current survey, a controversy was evident among dermatologists regarding the use of hydroxychloroquine for treatment/prophylaxis of COVID-19 in patients suffering from psoriasis. Notably, the national psoriasis foundation recommends avoiding

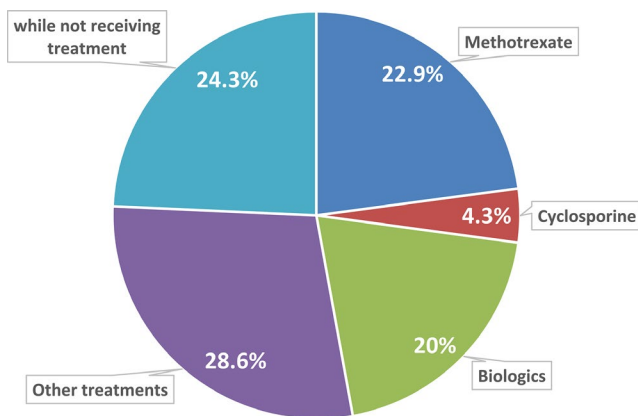


FIGURE 4 Treatment received by psoriasis patients who tested positive for COVID-19 as reported by participating dermatologists

TABLE 3 Responses by participating dermatologists to the Likert scale questions (n = 197)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
	N (%)	N (%)	N (%)	N (%)	N (%)
I advise my psoriasis patients to avoid hydroxychloroquine as COVID-19 treatment	15 (7.6)	54 (27.4)	78 (39.6)	41 (20.8)	9 (4.6)
I advise my psoriasis patients to avoid hydroxychloroquine as COVID-19 prophylaxis	37 (18.8)	74 (37.6)	61 (31.0)	21 (10.7)	4 (2.0)
Appointments and phototherapy sessions were more frequently canceled by patients during pandemic	31 (15.7)	113 (57.4)	33 (16.8)	16 (8.1)	4 (2.0)
There was unusual exacerbation of psoriasis in your patients during the pandemic period	10 (5.1)	51 (25.9)	92 (46.5)	43 (21.8)	1 (0.5)
COVID-19 pandemic has a negative impact on psoriasis patients (clinically and/or psychologically)	47 (23.9)	105 (53.3)	34 (17.3)	10 (5.1)	1 (0.5)

hydroxychloroquine for the prophylaxis or treatment for COVID-19 in psoriasis patients.<sup>14,15</sup>

Among the general population, the pandemic was associated with increased stress, anxiety, and smoking, and decreased physical activity,<sup>21</sup> all are known exacerbating factors for psoriasis.<sup>6</sup> However, almost half (46.5%) of dermatologists were neutral whether there was an unusual exacerbation of psoriasis during the COVID-19 pandemic. Although this may be attributed to infrequent visits made by psoriasis patients during this period, mental and physical consequences of the COVID-19 era may differ between regions/ethnicities.

Around three-quarters of dermatologists reported spacing of face-to-face follow-up visits. This delay interfered with drug compliance, affected patients psychologically, and was associated with worsening of psoriasis. More than half of participants also agreed that appointments and phototherapy sessions were more frequently canceled by patients. In general, the dermatology practice was negatively affected by the COVID-19 with a reduction in visits and the quality of care.<sup>12</sup> In Egypt, the number of patients attending the dermatology outpatient clinic was markedly reduced in the public and private sectors during the lockdown,<sup>3</sup> taking into account that psoriasis may represent 1.3% of patients attending the dermatology outpatients in the country.<sup>22</sup>

During this pandemic, teledermatology was a safe alternative to face-to-face visits.<sup>3,23</sup> In this survey, 60% of dermatologists used some sort of teledermatology in place of face-to-face visits to follow-up their patients with photographs (store and forward) and phone calls significantly more frequently than video consultations. On first assessment, however, more than half of dermatologists (58.4%) did not use teledermatology and preferred face-to-face consultation. Although teledermatology is convenient and helpful for psoriasis patients' follow-up, whenever it is unsatisfactory, for example, in case of new or flaring disease, personal visits are advised.<sup>15</sup>

More than half of the participating dermatologists reported that psoriasis patients discontinued their medications without consultation during the pandemic for financial reasons, fear of receiving medications, and/or lack of accessibility to treatment. Based on a questionnaire directed to patients, Wang et al<sup>24</sup> also reported non-compliance to treatment among psoriasis patients during the pandemic which was associated with psoriasis exacerbation, stress, depression, and anxiety. On the contrary, few psoriasis patients reported interrupting their biological therapy for fear of COVID-19 risk in Italy.<sup>25</sup> Although we did not have data regarding treatment discontinuation prior to the COVID-19 era, still this emphasizes the importance of providing easily accessible medical care, education, and support for psoriasis patients during the pandemic.

In conclusion, our results demonstrate that COVID-19 had a dire effect on psoriasis healthcare delivery. For the dermatologists involved in psoriasis management during this pandemic, awareness should be raised regarding: (1) the benefits versus risks of using immunosuppressive and biological therapies, (2) the hazards of hydroxychloroquine on psoriasis and its limited benefits in the management of COVID-19, (3) the usefulness of teledermatology for

psoriasis patients, not only for physical disease follow-up, but also for compliance monitoring and psychological support. Management of psoriasis patients during COVID-19 should be individualized. The severity of psoriasis, associated comorbidities, feasibility of adequate safer treatment options, pandemic regional state, and ability to maintain safety precautions are all factors to be considered.

## ACKNOWLEDGMENTS

The authors would like to thank all the dermatologists who responded to this questionnaire.

## CONFLICT OF INTEREST

The authors have no conflict of interest to declare.


## AUTHOR CONTRIBUTIONS

All authors [Mohamed H. M. EL-Komy], [Asmaa Abdelnaby], and [Mona El-Kalioby] contributed to the study conception, design, material preparation, data collection, and analysis. Asmaa Abdelnaby performed the statistical analysis of the work. The first draft of the manuscript was written by Mona El-Kalioby, Mohamed HM EL-Komy, and Asmaa Abdelnaby. All authors revised and commented on previous versions of the manuscript. All authors read and approved the final manuscript.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are included in the manuscript and supplementary materials. More details are available from the corresponding author upon request.

## ORCID

Mohamed H.M. EL-Komy  <https://orcid.org/0000-0002-9653-2938>

Asmaa Abdelnaby  <https://orcid.org/0000-0003-2730-9385>

Mona El-Kalioby  <https://orcid.org/0000-0002-9208-2458>

## REFERENCES

1. World Health Organization. Timeline: WHO's COVID-19 response. Available from. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline/#1>. Accessed December 22, 2020.
2. Worldometer. COVID-19 Coronavirus pandemic Update. 2020. Available from <https://www.worldometers.info/coronavirus/> Accessed December 22, 2020.
3. Mostafa PIN, Hegazy AA. Dermatological consultations in the COVID-19 era: is teledermatology the key to social distancing? an Egyptian experience. *J Dermatolog Treat*. 2020;7:1-6. <https://doi.org/10.1080/09546634.2020.1789046>.
4. Palmer K, Monaco A, Kivipelto M, et al. The potential long-term impact of the COVID-19 outbreak on patients with non-communicable diseases in Europe: consequences for healthy ageing. *Aging Clin Exp Res*. 2020;32:1189-1194.
5. Provenzano DA, Sitzman BT, Florentino SA, et al. Clinical and economic strategies in outpatient medical care during the COVID-19 pandemic. *Reg Anesth Pain Med*. 2020;45:579-585.
6. Zeng J, Luo S, Huang Y, Lu Q. Critical role of environmental factors in the pathogenesis of psoriasis. *J Dermatol*. 2017;44(8):863-872.

7. Denova-Gutiérrez E, Lopez-Gatell H, Alomia-Zegarra JL, et al. The association between obesity, type 2 diabetes, and hypertension with severe COVID-19 on admission among Mexicans. *Obesity*. 2020;28(10):1826-1832.
8. Conforti C, Giuffrida R, Dianzani C, Di Meo N, Zalaudek I. COVID-19 and psoriasis: Is it time to limit treatment with immunosuppressants? A call for action. *Dermatol Ther*. 2020;33(4):e13298.
9. Sachdeva M, Mufti A, Maliyar K, Lytvyn Y, Yeung J. Hydroxychloroquine effects on psoriasis: a systematic review and a cautionary note for COVID-19 treatment. *J Am Acad Dermatol*. 2020;83(2):579-586.
10. Kwatra SG, Sweren RJ, Grossberg AL. Dermatology practices as vectors for COVID-19 transmission: a call for immediate cessation of nonemergent dermatology visits. *J Am Acad Dermatol*. 2020;82(5):e179-e180.
11. Kansal NK. COVID-19, syphilis, and biologic therapies for psoriasis and psoriatic arthritis: a word of caution. *J Am Acad Dermatol*. 2020;82(6):e213.
12. Leis M, Fleming P, Lynde CW. Impacts of COVID-19 on dermatologic practice, disease presentation, and immunomodulator prescriptions. *J Cutan Med Surg*. 2021;25(1):106-108. <https://doi.org/10.1177/1203475420960437>.
13. Ricardo JW, Lipner SR, Shari Lipner CR. Considerations for safety in the use of systemic medications for psoriasis and atopic dermatitis during the COVID-19 pandemic. *Dermatol Ther*. 2020;33(5):e13687.
14. Gelfand JM, Armstrong AW, Bell S, et al. National psoriasis foundation COVID-19 task force guidance for management of psoriatic disease during the pandemic: version 1. *J Am Acad Dermatol*. 2020;83(6):1704-1716.
15. Gelfand JM, Armstrong AW, Bell S, et al. National Psoriasis Foundation COVID-19 Task Force guidance for management of psoriatic disease during the pandemic: Version 2-Advances in psoriatic disease management, COVID-19 vaccines, and COVID-19 treatments. *J Am Acad Dermatol*. 2021;7(21):16.
16. Lima XT, Cueva MA, Lopes EM, Alora MB. Severe COVID-19 outcomes in patients with psoriasis. *J Eur Acad Dermatology Venereol*. 2020;34(12):e776-e778.
17. Mahil SK, Dand N, Mason KJ, et al. Factors associated with adverse COVID-19 outcomes in patients with psoriasis – insights from a global registry-based study. *J Allergy Clin Immunol*. 2020;147(20):60-71.
18. PsoProtect team. Current Data – PsoProtect. Available from <https://psoprotect.org/current-data/>. Accessed February 16, 2021.
19. Almazrou SH, Almalki ZS, Alanazi AS, Alqahtani AM, Alghamd SM. Comparing the impact of Hydroxychloroquine based regimens and standard treatment on COVID-19 patient outcomes: A retrospective cohort study. *Saudi Pharm J*. 2020;28(12):1877-1882. <https://doi.org/10.1016/j.jsps.2020.09.019>.
20. Kutlu Ö, Metin A. A case of exacerbation of psoriasis after oseltamivir and hydroxychloroquine in a patient with COVID-19: Will cases of psoriasis increase after COVID-19 pandemic? *Dermatol Ther*. 2020;33(4):e13383.
21. Salari N, Hosseinian-Far A, Jalali R, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Global Health*. 2020;16(1):57.
22. El-Komy MHM, Mashaly H, Sayed KS, et al. Clinical and epidemiologic features of psoriasis patients in an Egyptian medical center. *JAAD Int*. 2020;1(2):81-90.
23. Villani A, Scalvenzi M, Fabbrocini G. Teledermatology: a useful tool to fight COVID-19. *J Dermatolog Treat*. 2020;31(4):325.
24. Wang Q, Luo Y, Lv C, et al. Nonadherence to treatment and patient-reported outcomes of psoriasis during the covid-19 epidemic: A web-based survey. *Patient Prefer Adherence*. 2020;14:1403-1409.
25. Talamonti M, Galluzzo M, Chiricozzi A, et al. Management of biological therapies for chronic plaque psoriasis during COVID-19 emergency in Italy. *J Eur Acad Dermatology Venereol*. 2020;34:e770-e772.

#### SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

**How to cite this article:** EL-Komy MH, Abdelnaby A, El-Kalioby M. How does COVID-19 impact psoriasis practice, prescription patterns, and healthcare delivery for psoriasis patients? A cross-sectional survey study. *J Cosmet Dermatol*. 2021;20:1573–1579. <https://doi.org/10.1111/jocd.14104>