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# COVID-19 Pandemic Impact on Severe Alopecia Areata Patients

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**Keywords**
Alopecia areata · COVID-19 · Anxiety

**Abstract**
***Introduction:*** The pandemic of COVID-19 has several implications for patients with chronic stress-sensitive diseases such as alopecia areata (AA). On the other hand, the vulnerability of AA patients using immunosuppressives to a more severe infection is in the shadow of ambiguity. This teledermatology study aimed to evaluate the course and outcome of AA in patients during this challenging period. ***Methods:*** Patients with AA who had previously received systemic therapy included in this study. Information about demographic data, AA history, characteristics, and treatments, hair loss progression, Corona Disease Anxiety Scale (CDAS), adherence to protective measures against the COVID-19, possible infection, and its features obtained via a telephone call. ***Results:*** A total of 57 patients participated. The majority (84.2%) of the participants had mild anxiety assessed by CDAS. Two patients (3.5%) had got infected with COVID-19. Twenty-one (36.8%) participants experienced hair loss progression. Hair loss progression correlated with drug dose reduction (OR: 46.09, 95% CI 5.48–387.14, $p < 0.001$) although it did not influence by the level of anxiety evaluated by the CDAS ($p > 0.05$). ***Conclusion:*** The anxiety perceived by severe AA patients about COVID-19 is mild; however, many experience hair loss progressions owing to their drug dose reduction.



## Introduction

Alopecia areata (AA) is an autoimmune nonscaring alopecia with a recurrent nature. Current therapeutic approaches cannot provide a cure in many severe cases [1, 2]. Life events and emotional stress play a major role in development, course, therapeutic management, and disease recurrence. Psychiatric problems such as anxiety and mood disorders have a reciprocal interaction with AA [3].

During the current pandemic of COVID-19 several issues are to be considered in patients with autoimmune diseases such as AA [4]. The psychological burden of social distancing, lock-down, limited job and recreational activities, and economic recession may impose extreme anxiety on AA patients as well as other individuals [5, 6].

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Additionally, the fear of a more severe outcome in case of infection with SARS-CoV-2 may discourage patients from consuming immunosuppressive treatments [7].

On the other hand, it is unclear if patients on immunosuppressive medications are susceptible to a more severe COVID-19; therefore, dermatologists may discontinue these treatments in nonlife-threatening diseases such as AA. It has been proposed that receiving high doses and/or multiple immunomodulatory drugs are among the risk factors of a more severe COVID-19 [8]. Increased incidence of severe infection has been demonstrated in immunosuppressed patients in previous outbreaks of coronavirus, MERS, and SARS [7].

The risk and severity of COVID-19 in patients with AA as well as the likelihood of their disease progression or recurrence during this challenging condition have not yet been elaborated. This teledermatology study is designed to obtain information about the course and outcome of AA in a cross-sectional survey.

## Materials and Methods

This teledermatology study was conducted in the Shahid Beheshti University of Medical Sciences in May 2020 (2 months after the COVID-19 outbreak in Iran). After approval by the institutional review board and Ethics Committee, we reviewed the electronic file of the patients with AA and included those who had received systemic therapy between January 2018 and February 2020.

In this telemedicine study, we contacted the patients by telephone to fill the pre-constructed data-sheets containing demographic data, comorbidities, duration, type, and severity of AA assessed by the Severity of Alopecia Tool (SALT) score [9], current and previous treatments, dose reduction or discontinuation of treatments, and hair loss progression during the pandemic, Corona Disease Anxiety Scale (CDAS) (preliminarily validated in the Iranian sample) and patient adherence to protective measures in the face of the pandemic. The patients were asked to send their photos from different angles via WhatsApp messenger to verify their SALT scores.

CDAS is a brief mental health screener to identify probable cases of dysfunctional anxiety associated with the COVID-19 crisis with acceptable validity and reliability [10]. If patients had developed COVID-19, we asked them about symptoms, signs, laboratory data, treatment protocol, probable drug interactions, and risk factors for severe disease as well the need for hospitalization. The patients were excluded if they did not tend to take part in a telephone interview.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) software (version 25.0; Armonk, NY, USA: IBM Corp.). Descriptive statistics (mean, frequency, percentage, and standard deviation) were used to describe the results. $\chi^2$ and Fisher's exact tests were used to compare qualitative data. Binary logistic regression was used to determine correlations. $p$ value <0.05 was considered significant.

**Table 1.** Factors associated with anxiety score

| Anxiety score | Mild, *n* | Moderate, *n* | Severe, *n* |
|---|---|---|---|
| Type of alopecia | | | |
| Areata | 3 | 1 | 1 |
| Totalis | 9 | 3 | 0 |
| Universalis | 36 | 3 | 1 |
| Current treatment | | | |
| Prednisolone | 5 | 2 | 0 |
| Methotrexate | 1 | 0 | 0 |
| Tofacitinib | 11 | 4 | 0 |
| >1 drug | 5 | 1 | 1 |
| No systemic treatment | 26 | 0 | 1 |

## Results

A total of 57 patients (31 women [54.4%] and 26 men [45.6%]) with an average age of 30.95 years were included in the current study. Forty (70.2%) patients had a history of alopecia universalis, while 12 (21%) had alopecia totalis and 5 (8.8%) multiple-patch type of AA.

Nail involvement was present in 12 (21%) patients and 39 (68.5%) patients had body hair loss. The mean disease duration was 14.09 ± 9.26 months. Among the participants, 30 (52.6%) patients were still receiving systemic treatment at the time of the study. Sixteen patients (28.1%) had reduced the dose of their medications.

With regard to CDAS, 84.2% of the participants had mild, 12.3% had moderate, and 3.5% had severe anxiety. Age, gender, marital status, education, occupation, and comorbidities were not correlated with this anxiety score ($p > 0.05$). Smoking and alcohol consumption did not influence the anxiety score ($p > 0.05$). Concerning preventive measures, the higher anxiety score was not significantly correlated with better adherence to mask and glove usage, washing hands, using disinfectants, etc. Additionally, no significant correlation was found between CDAS and the age at the beginning of the disease ($p = 0.952$), and disease duration ($p = 0.613$). The relationship between anxiety score and severity of hair loss, the severity of body hair loss, the severity of nail involvement, and compliance to immunosuppressive drug intake were not statistically significant. Nevertheless, patients' type of alopecia and current treatment was significantly correlated with the anxiety score ($p = 0.020$, $p = 0.031$). Notably, most of the patients who received various types of immunosuppressive drugs also experienced mild to moderate anxiety (Table 1).

**Table 2.** Characteristics of COVID-19 patients

| Patient number | 1 | 2 |
|---|---|---|
| Age | 27 | 56 |
| Sex | Female | Male |
| Marital status | Single | Married |
| Smoking | No | No |
| Education | Bachelor | Diploma |
| Occupation | Employed | Employed |
| Comorbodities | Asthma/rheumatoid arthritis | No |
| Alcohol consumption | Yes | No |
| Age of disease onset | 14 | 42 |
| Severity of hair loss | S1 (<25% hair loss) | S1 (<25% hair loss) |
| Previous treatment | Prednisolon/methotrexate/diphencyprone | Prednisolon/minoxidil |
| Current treatment | Minoxidil/diphencyprone | Intralesional triamcinolone/minoxidil |
| Preventive behaviors | Yes except using the gloves | Yes |
| Progression of hair loss | Yes | Yes |
| Dose reduction | No | No |
| Infected relatives | Brother | No |
| COVID-19 related symptoms | Fever/myalgia/dry couph/dyspnea/decreasing sense of smelling and tasting | Fever/couph/dyspnea |
| Diagnostic method | CT scan | CT scan |
| COVID-19 treatment regimen | Supportive | Hospitalized/antibiotic therapy/ supportive |

**Table 3.** Characteristics of patients at risk of getting infection from their relatives

| Patients number | Sex | Infected individual | Contact | Current treatment | Change in drug dose | Anxiety score | Confirmed COVID-19 |
|---|---|---|---|---|---|---|---|
| 1 | Female | Husband | Household | Tofacitinib | No | Mild | No |
| 2 | Female | Father + mother + brother | Household | Tofacitinib | 1 month stop | Mild | No |
| 3 | Female | Brother | Household | Topical | – | Mild | Yes |
| 4 | Male | Far relatives | No | None for previous 3 years | – | Severe | No |
| 5 | Female | Far relatives | No | None for previous 1.5 years | – | Mild | No |
| 6 | Female | Far relatives | No | Topical and supplement | – | Mild | No |
| 7 | Female | Sister and her husband | Yes | None for previous 1 year | – | Mild | No |

All of the patients who participated in the current study took wearing mask and gloves, and frequent hand washing (>20 times a day) seriously. Also, they avoided crowded places. Fifty-five patients (96.5%) were aware of the importance of avoiding touching their faces. Forty-seven patients (82.5%) frequently used disinfectants for home surfaces and groceries. Four patients (7%) took supplements wishing to enhance thier immunity against COVID-19.

Of the total of 57 patients, only 2 patients (3.5%) had got infected with COVID-19. The characteristics of these patients are depicted in Table 2. Seven patients (12.3%) had an infected individual in their relatives. Of these 4 were in close contact with the infected person (Table 3).

Twenty-one (36.8%) participants experienced hair loss progression. Binary logistic regression revealed that the odds of hair loss progression was significantly higher in those with altered drug dose than in those with no change in the dosage of drugs (OR: 46.09, 95% CI 5.48–387.14, $p < 0.001$). However, surprisingly patients using supplements were at significantly increased risk of hair loss progression (OR: 40.47, 95% CI 2.63–621.52, $p = 0.008$). As for anxiety, the odds of progression of hair loss were not influenced by the level of anxiety evaluated by the CDAS ($p > 0.05$).

## Discussion

In this study, we used teledermatology to evaluate disease status, Corona Disease Anxiety Scale (CADS), adherence to health advice, and the rate of COVID-19 infec-

tion among AA patients with a history of severe disease. The psychological burden related to the COVID-19 pandemic may be exaggerated in many stress-triggered skin conditions with chronic courses that require immunosuppressive medications such as pemphigus, psoriasis, atopic dermatitis, chronic urticaria, and AA [6, 11–13].

The role of psychological factors in the pathogenesis of AA has been remained controversial. While some authors have denied any participation of psychological factors in the onset or recurrence of AA, others have concluded a substantial role in its initiation or precipitation [14]. Increasing cases of AA have been previously reported after the COVID-19 outbreak in Turkey [12]. Rinaldi et al. [15] in a study of 389 patients with AA, in whom 34% had got infected with COVID-19, reported an increased relapse rate of AA among infected patients compared to the non-infected patients (44% vs. 12%). They considered higher rate of AA relapse in the COVID-19 pandemic to be related to the stress of quarantine and the inflammation induced by infection [15].

In contrast with these observations, our study showed that anxiety perceived by progressed cases of AA was mild in the great majority and was not related to the disease duration and current severity. However, the relationship between anxiety scores and receiving systemic medications was statistically significant. Patients' concerns about the immunosuppressive nature of their drugs that could cause susceptibility to more severe disease in the case of SARS-CoV-2 infection could explain their higher anxiety score.

On the other hand, hair loss progression was not influenced by the level of anxiety. As expected, the progression of alopecia correlated with drug dosage reduction. Therefore, the external cause of hair loss progression was a reduction in the drug dosage due to the anxiety induced by COVID-19, not COVID-induced-anxiety itself.

Immunosuppressive therapies may raise concerns about a severe infection; however, it is impossible to draw a conclusion based on the present data [8]. Wide immunosuppression with immunosuppressive therapies across multiple cytokine axes may potentially increase susceptibility, persistence, and reactivation of viral infections [16].

In this study, 2 patients got infected with the COVID-19 albeit with a mild course without any serious complications. None of these cases were currently on the immunosuppressive therapy; so, their vulnerability was like other people in the community. However, their alopecia progressed concurrently. It is noteworthy that none of the patients receiving immunosuppressants got involved. This finding is compatible with the recent studies suggesting that outcomes of patients on systemic immunomodulatory therapies infected with SARS-CoV-2 are similar to the general population [17]. One recent survey carried out by telemedicine on patients using systemic immunomodulatory medications including biologics, JAK inhibitors, and traditional immunosuppressives demonstrated similar risk of both COVID-19 and poor outcomes to the general population [18]. However, same as our study, their participants took care of exposure risks to a large degree; breaking down the viral transmission cycle successfully. It seems reasonable to advise patients on immunosuppressant therapy to adhere to protective measures without any rationale to deprive them of therapy.

The limitation of our study was the cross-sectional and telemedicine design as well as the small sample size due to the limited number of patients available in this rapidly evolving dilemma. Although it may be infeasible, prospective surveys on patients with chronic dermatologic diseases such as AA with accurate screening for SARS-CoV-2 could more precisely clarify the AA outcome and infection vulnerability.


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## Statement of Ethics

This study protocol was reviewed and approved by the ethics committee of Shahid Beheshti University of medical sciences, approval number (IR.SBMU.SRC.REC. 1399.008). Due to the COVID-19 pandemic, all patients were contacted by telephone and were asked at the beginning of the telephone call about their willingness to participate in this study; however, no written consent form was obtained. The patients were excluded if they did not agree to take part in a telephone interview.

## Conflict of Interest Statement

The authors have no conflicts of interest to declare.


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## Author Contributions

The followings are the author's contributions: Mehdi Gheisari: article ideation and design, supervision of the project, writing and editing the final version of the manuscript. Khatere Zahedi: data gathering, writing the manuscript in consultation with Mehdi Gheisari and Sahar Dadkhahfar. Zohreh Tehranchinia, Hamideh Moravvej, and Fahimeh Abdollahimajd: data gathering, critical revision of the manuscript. Sahar Dadkhahfar: writing and editing of the final draft of the manuscript, article submission.

## Data Availability Statement

The data that support the findings of this study are not publicly available due to their containing information that could compromise the privacy of research participants but are available from the corresponding author upon reasonable request.

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