


ORIGINAL ARTICLE

Adherence to systemic therapy in patients with psoriasis during the COVID-19 pandemic: A multicenter study

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Abstract

Background: Adherence to treatment is important in chronic dermatological diseases. There are limited data regarding the adherence to treatment in patients with psoriasis during the COVID-19 pandemic.

Aims: We aimed to determine the rates of adherence to systemic treatments in patients with psoriasis and to identify the causes of non-adherence during the COVID-19 pandemic.

Methods: We conducted a cross-sectional multicenter study from May 2021 to August 2021. A questionnaire including items regarding sociodemographic characteristics of the patients, disease-related characteristics, and treatment-related characteristics were filled out by the physicians. The Psoriasis Area Severity Index (PASI), Hospital Anxiety, and Depression Scale, and the Dermatology Life Quality Index were calculated. The rate of adherence and non-adherence to treatment and reasons for non-adherence to treatment were examined.

Results: A total of 342 patients with psoriasis were included (182 male/160 female) in the study. The mean age of the patients was 45.9 ± 14.2 years. The average duration of psoriasis was 192 ± 134.7 months. While the rate of adherence to treatment was 57.6%, the rate of non-adherence to treatment was 42.4%. There were no significant differences with respect to adherence to treatment in comparison with oral and injection-therapy groups. The most frequent reasons for non-adherence to treatment were inability to go to the hospital (19.2%), concern about the COVID-19 infection (16.3%), discontinuation of the treatment by the doctor (13.7%), inability to reach the doctor (7.3%), and inability to have access to the medication (7.3%).

Conclusion: Adherence to oral and injection therapies was fairly high among our patients with psoriasis during the COVID-19 pandemic. Psoriasis severity and duration of medication use had a negative impact on adherence to treatment.

KEYWORDS

adherence, psoriasis, COVID-19, adherence, psoriasis, COVID-19

1 | INTRODUCTION

Psoriasis is a chronic, immune-mediated disease. Long-term therapy in chronic skin disorders such as psoriasis is important regarding effective treatment outcomes, the management of the disease, and a better quality of life.¹⁻³ These are achieved with adherence to treatment. Adherence is the extent to which a patient takes medication as prescribed by his/her healthcare professional.⁴ Generally to speak, this is often poor in patients with psoriasis, especially in those who are using topical treatment compared those who are using systemic treatment.⁵ Recently, adherence to biological agents in psoriatic patients has been evaluated in different studies.^{6,7} However, there are limited data about adherence to systemic therapies during the COVID-19 pandemic. Since it is thought that immunotherapeutics can negatively affect normal immune functioning and increase the risk of infection, with the onset of the COVID-19 outbreak, concern about the status of the patients with chronic dermatological diseases who are receiving immunosuppressant and biological treatment has arisen.⁸ After the beginning of the COVID-19 pandemic, interruptions have occurred in the treatment of many chronic diseases. Some patients have discontinued systemic treatments due to several factors such as concern about COVID-19 infection and immunosuppressive effects of the medications, inability to go to hospital and inability to have access to the medication. Some of the physicians have suspended or changed their patients' medication. Thus, due to these factors, adherence to treatment in patients with psoriasis has become a complicated issue.⁹

In this study, we aimed to determine the rates of adherence to systemic treatments in patients with psoriasis and to identify the causes of non-adherence to treatment during the COVID-19 pandemic.

2 | METHODS

2.1 | Participants, survey, and data collection

In this cross-sectional descriptive study, we included patients aged 18 years and above, who were diagnosed with psoriasis and followed up in 8 different dermatology clinics from May 2021 to August 2021. The patients who did not receive systemic therapy and those who did not completely answer the questionnaire were excluded.

The questionnaire included items regarding sociodemographic characteristics of the patients (age, gender, marital status, smoking, alcohol use, and concomitant disorders), disease-related characteristics (type of psoriasis, duration of the disease, sites of involvement, the presence of psoriatic arthritis, and previous treatments), treatment-related characteristics (duration of treatment, whether the treatment continues, reasons for discontinuation). If the patient discontinued the treatment whether there was an increase of psoriatic lesions, degree of increase by visual analogue scale [VAS]) was filled out by the physician. The questions included in the questionnaire are shown in Table 1. Additionally, the Psoriasis Area Severity

What is "already known"

Psoriasis is a chronic dermatologic condition that has a huge impact on patients' quality of life and requires long-term treatment for disease management. Before the COVID-19 pandemic rates of adherence to treatment ranged from 27% to 92% in psoriasis. However there are limited data about adherence to systemic therapies during the COVID-19 pandemic. This study aimed to determine the rates of adherence to systemic treatments in patients with psoriasis and to identify the causes of non-adherence to treatment during the COVID-19 pandemic

What this article adds

A total of 342 patients with psoriasis were enrolled in the study. The rate of adherence to systemic therapy was 57.6%. There were no significant differences between the injection-therapy group and the oral-therapy group with respect to adherence to the treatment. The most frequent reasons for non-adherence to treatment were inability to go to the hospital (19.2%), concern about the COVID-19 infection (16.3%), and discontinuation by the doctor (13.7%). Psoriasis severity and duration of medicine use had a negative effect on adherence to treatment in the present study.

Index (PASI), Hospital Anxiety and Depression Scale (HADS), and the Dermatology Life Quality Index (DLQI) were calculated. Patients were subdivided into the following two subgroups, according to age: the young adult group <50 years of age and the elderly group >50 years of age.

For oral therapy, the patient was evaluated as non-adherent to treatment if he or she reduced the dosage of the medication, stopped treatment completely, or discontinued the medication temporarily for more than 2 weeks. For injection therapy, if the patient did not administer the injection more than one dose, the patient was evaluated as a non-adherent patient.

The study was approved by the medical ethics committee of the Clinical Ethics Committee (approval number: 22/04/2021-97). All participants gave written informed consent to participate in the study.

2.2 | Data analysis and statistics

SPSS software (ver. 17; SPSS Inc.) was used for statistical analyses. The descriptive analysis was presented in tables as mean (SD) and median (minimum-maximum) for numeric data and frequency (n) and percent (%) for categorical data. The chi-squared test and Fisher's exact test were used to assess associations between categorical variables. The Mann-Whitney U test was used to compare numerical variables. Statistical significance was set at $p < 0.05$.

TABLE 1 Questions in the questionnaire

Questions about the sociodemographic characteristics
Age, gender, marital status, education level, monthly income
Did you work during the pandemic?
Do you have comorbidities?
Do you use medication for your comorbidities?
Do you use cigarettes or alcohol?
Questions about the disease-related characteristics
Disease duration
Clinical types
Location of the lesions (nail, scalp, genital area, face, intertriginous area)
Current PASI
Current DLQI
HAD score
Questions about the treatment
Current treatment
Treatment duration
Questions about adherence to treatment
Have you ever discontinued to your treatment during the COVID-19 pandemic?
If yes, how have you discontinued?
I have stopped the medication completely
I have reduced my dose
I have extended to dose of interval
If yes, how many days did you not take your medication or, how many dosages did you not receive your injections?
Why did you discontinue your treatment?
Inability to go to the hospital
Inability to access to the doctor
Inability to obtain medication
Concern about COVID-19 infection
Due to COVID-19 infection
Other
When you discontinued to your treatment, did your lesions increase?
If yes, slightly, moderate, severe, or more severe
If yes, VAS score at that time

3 | RESULTS

A total of 342 patients with psoriasis were enrolled in the study (182 male [53.2%], 160 female [46.8%]). The mean age of the patients was 45.9 ± 14.2 (SD: 16–81) years. Demographic characteristics are presented in Table 2.

Most patients had plaque psoriasis (95.3%). Clinical types are shown in Table 2. The average duration of psoriasis was 192 ± 134.7 months (SD: 6–588). While the rate of patients who used oral therapy was 23% (79 patients), the rate of patients who used injection therapy was 76.9% (263 patients). The most commonly used injectable medications were secukinumab (76 patients–17.2%) and

methotrexate (64 patients–18.7%), while the most commonly used oral medications were acitretin (59 patients–17.2%) and methotrexate (12 patients–5.7%), respectively (Table 2).

The mean duration of treatment was 20.7 ± 19.6 months. The mean PASI and DLQI scores were 5.3 ± 5.9 (0–46) and 8.8 ± 7.4 (7–32), respectively. Of the patients, 66 (19.3%) had ≥ 10 PASI scores and 127 (37.1%) had ≥ 10 DLQI scores.

Of the patients, 157 (45.9%) discontinued medications completely, 21 (6.1%) did not use medications occasionally, 164 (48%) did not discontinue. 110 patients (32.2%) reported that they were never missed a dosage of the medication, 62 patients (18.1%) extended to the time of administering the medication, and 6 patients (1.8%) reduced the dosage of the medication (Table 3).

While the rate of adherence to treatment was 57.6% (197 patients), the rate of non-adherence to treatment was 42.4% (145 patients). Main reasons for non-adherence to treatment were inability to go to the hospital (19.2%), concern about the COVID-19 infection (16.3%), discontinuation of the medication by the doctor (13.7%), inability to reach the doctor (7.3%), inability to have access to the medication (7.3%), and having a COVID-19 infection (5.8%). The other reasons are shown in Table 4.

Of the 150 patients (43.9%) reported that their lesions increased when the treatment was discontinued. While 14.3% (49 patients) of the patients experienced a severe increase in lesions, 12% (41 patients) of the patients experienced a moderate increase in lesions and 10.5% (36 patients) of the patients experienced a mild increase in lesions. There was a positive correlation between VAS score and severity of lesions ($r = 0.777$; $p < 0.001$).

The mean VAS score was 3.4 ± 3.5 (0–10). The mean VAS scores were higher in non-adherent patient group than adherent patient group ($p < 0.001$).

There were no significant differences between younger patients (<50 years of age) and older patients (>50 years of age), married and single patients, patients with comorbidities and patients without comorbidities, patients who used concomitant medications, and patients who did not use concomitant medication in terms of adherence ($p > 0.05$). Also, the rates of adherence showed no significant difference in terms of educational status and monthly income ($p > 0.05$).

There was no significant relationship between adherence and disease duration with Mann-Whitney U test, but there was a correlation between the duration of taking medication and adherence. The duration of taking medication was longer in the non-adherent patient group when compared to the adherent patient group with Mann-Whitney U test ($p < 0.001$).

When the patients were compared with respect to involvement areas, the rate of adherence in patients who did not have nail, scalp, genital, skin-fold, hand, and facial lesions was higher than patients who had nail, scalp, genital, skin-fold, hand, and facial lesions (Table 5).

We found that the rate of adherence was higher in patients with PASI <10 than patients with PASI ≥ 10 . Also, a higher adherence rate was observed in patients who had DLQI score <10 when compared

TABLE 2 Demographic characteristics of the patients

	Number (n)	Percent
Age		
Min-Max	16–81	
Mean ± SD	45.9 ± 14.2	
Gender		
Male	182	53.2
Female	160	46.8
Marital status		
Married	268	78.4
Single	74	21.6
Education level		
Non-literate	13	3.8
Primary or Middle School	167	48.8
High school	127	37.1
University or higher	35	10.2
Working status		
No	190	55.6
Yes	152	44.4
Monthly income level ^a		
\$285	70	20.5
\$285–714	203	59.3
>\$714	69	20.2
Comorbidities		
Present	159	46.5
Absent	183	53.5
Concomitant medication usage		
Present	127	37.1
Absent	215	62.8
Clinical types		
Plaque	326	95.3
Arthropathic	27	7.8
Palmoplantar	24	7
Guttat	18	5.2
Inverse	9	2.6
Generalized pustular	8	2.3
Erythrodermic	7	2
Localized pustular	5	1.4
Nail involvement	151	44.2
Scalp involvement	191	55.8
Facial involvement	70	20.5
Genital involvement	54	15.8
Hand involvement	140	40.9
Skin-fold involvement	80	23.4
PASI		
≥10	66	19.3
<10	276	80.7

(Continues)

TABLE 2 (Continued)

	Number (n)	Percent
DLQI		
≥10	127	37.1
<10	215	62.9
The oral therapy group (n = 79)		
Acitretin	59	17.2
Cyclosporine	8	2.3
Methotrexate	12	5.7
The injection-therapy group (n = 263)		
Secukinumab	76	22.2
Methotrexate	64	18.7
Adalimumab	38	11.1
Ustekinumab	37	10.8
Ixekizumab	25	7.3
Etanercept	9	2.6
Certolizumab	8	2.3
Infliximab	4	1.1
Rizankizumab	2	0.5
Anxiety		
Present	130	38
Absent	212	62
Depression		
Present	166	48.5
Absent	176	51.5

^aIncome level was calculated based on the exchange rate at the time of the study.

to the patients who had DLQI ≥10 ($p < 0.001$, Table 5). As the scores of PASI and DLQI increased, adherence decreased according to the Mann-Whitney U test ($r = 0.407/r = 0.233/p < 0.001$).

Regarding adherence, there were no significant differences between patients who had anxiety or depression and patients who did not have anxiety or depression ($p > 0.05$).

The proportions of patients with anxiety were 1.8% in the oral-therapy group and 43.5% in the injection-therapy group. The rates of depression were 37.1% and 51.5%, respectively. The mean anxiety and depression scores were higher in the injection-therapy group than the oral-therapy group ($p = 0.034$, $p = 0.037$) (Figure 1).

The rate of adherence was 21.3% in the oral-therapy group, while the rate of adherence was 84% in the injection-therapy group, but there were no significant differences between the two therapy groups with respect to adherence. ($p = 0.320$ /OR [95% CI] [0.46–1.3]) (Figure 2).

Secukinumab (14%), acitretin (11%), and methotrexate (10%) were the medications showing the highest adherence among all medications (Figure 3). The medications with the highest adherence rate were acitretin among oral treatments (45.7%) and secukinumab among injection treatments (17.9%).

TABLE 3 Characteristics of interruptions during the medication use

	N (%)
Have you ever discontinued your treatment during the COVID-19 pandemic?	
Yes, completely	157 (45.9)
No	164 (48)
Sometimes	21 (6.1)
If yes, how have you discontinued?	
I have stopped the medication completely	110 (32.2)
I have reduced my dose	6 (1.8)
I have extended to the dose of interval.	62 (18.1)

TABLE 4 Reasons for non-adherence

Reasons	n (%)
Inability to go to the hospital	67 (19.2)
Concern about COVID-19 infection	56 (16.3)
Discontinuation by the doctor	47 (13.7)
Inability to reach the doctor	25 (7.3)
Inability to have access to the medication	25 (7.3)
Having a COVID-19 infection	20 (5.8)
Due to COVID-19 vaccine	13 (3.8)
Adverse events	6 (1.7)
Forgetfulness	3 (0.8)
Financial problems	2 (0.5)
Improvement in psoriatic lesions	2 (0.5)
Secondary ineffectiveness	1 (0.2)

4 | DISCUSSION

Adherence to systemic therapy is important in patients with moderate-severe psoriasis. Discontinuation or temporary withdrawal of therapy may result in exacerbation of lesions and, thus may influence the progression of the disease. Increased disease activity and relapses lead to deterioration of the patient's quality of life and complexity in treatment.¹⁰

Before the COVID-19 pandemic, patients' adherence to biological therapy has been extensively studied and a variety of determinants were identified. Doshi et al. examined 2707 patients initiating biological therapy; during 12-month follow-up, they detected that 38% of patients were adherent to treatment and 46% of patients discontinued treatment. Being female and having low income were correlated with non-adherence to treatment in this study.¹¹ Contrary to this study, adherence to biological therapies was very high in patients with psoriasis in another study. A total of 93.5% of all patients had very good adherence to treatment.¹²

Adherence to subcutaneous methotrexate treatment in patients with plaque-type psoriasis has been investigated by Vidal et al. The authors thought that self-administered subcutaneous treatments can induce pain and itching at the injection site, thus

adherence may decrease, but 6 months after starting subcutaneous methotrexate treatment, 83 patients (81%) remained on treatment. The main cause for treatment discontinuation was voluntary withdrawal due to improvement of the psoriatic symptoms in eight patients (40%).¹³

Armstrong et al. evaluated 82,621 patients with psoriasis. In this study, 16,000 patients who received oral systemic treatment and 21,087 patients received biologic treatment. The rate of adherence was 45.2% in the oral treatment group and 53.1% in the biological treatment group. The most common reason for discontinuation of biologics was loss of efficacy; the most common reason for discontinuation of oral medications was side effects.¹⁴

After the beginning of the COVID-19 pandemic, concerns about the safety of administration of immunosuppressive drugs have been raised by physicians and patients for the treatment of psoriasis. Since there were not enough data regarding the safety of systemic and biological agents used in psoriasis at beginning of the COVID-19 pandemic, it was unclear whether biologics and conventional treatments suppress the immune system and increase the risk of COVID-19 infection. Hence, systemic therapies were discontinued by some patients and physicians.¹⁵

In the following period of the COVID-19 pandemic, various clinical trials and observations were reported. Some case reports demonstrated successful treatment of complicated psoriatic patients who were also affected by COVID-19, with anti-TNF- α agents.¹⁶

A recent study has evaluated nine case reports of patients with chronic dermatological diseases treated with systemic agents. The authors showed that the severity of COVID-19 in patients with dermatological diseases treated with biological agents was not more than in the general population.¹⁷

After these observations and reports, the anxiety of doctors and their patients was alleviated. Biological and conventional medicines were started to be used more easily. The rate of adherence was lower in patients with severe psoriasis in our study population. Most of these patients have been administered biological and conventional immunosuppressive drugs. Although patients with severe disease and long disease duration generally tend to adhere to their treatment more than those with mild disease, non-adherence to treatment in our patients may be related to concerns arisen during the early period of the pandemic. There were uncertainty and unknowns about the COVID-19 for both health professionals and also patients. Thus, most dermatologists had to discontinue especially systemic treatments or patients discontinued their treatments by themselves.

In a systematic review, it was mentioned that the most important issue is the way of treatment management in patients undergoing immunosuppressive therapy during the COVID-19 pandemic. The authors stated that non-infected, non-at risk patients do not need any change in their therapeutic protocols, but patients at risk or who are suspected of being infected (like having suggestive symptoms) need to change the drug regimen as dose reduction, increase dose interval or transiently stop the drug for at least 2 weeks.¹⁷ 157 of our patients discontinued the treatment completely. Some patients

	Adherent n (%)	Non-adherent n (%)	<i>p</i> ^a	OR (95%CI)
Nail involvement				
Present	75 (21.9)	76 (22.2)	0.009	1.7 (1.2–2.8)
Absent	120 (35.0)	71 (20.7)		
Scalp involvement				
Present	97 (28.4)	94 (27.5)	0.005	1.8 (1.2–2.9)
Absent	99 (28.9)	52 (15.2)		
Facial involvement				
Present	28 (8.2)	42 (12.3)	0.001	2.5 (1.4–4.2)
Absent	169 (49.4)	103 (30.1)		
Hand involvement				
Present	63 (18.4)	77 (22.5)	< 0.001	2.3 (1.5–3.7)
Absent	134 (39.1)	68 (19.9)		
Genital involvement				
Present	24 (7)	30 (8.8)	0.035	1.8 (1–3.4)
Absent	172 (50.3)	116 (33.9)		
Skin-fold involvement				
Present	38 (11.1)	42 (12.3)	0.039	1.7 (1–2.8)
Absent	158 (46.2)	104 (30.4)		
PASI				
≥10	17 (5)	49 (14.3)	< 0.001	5.4 (2.9–9.9)
<10	180 (52.6)	96 (28.1)		
DLQI				
≥10	56 (16.4)	71 (20.8)	<0.001	2.4 (1.5–3.8)
<10	141 (41.2)	74 (21.6)		
Anxiety				
Present	69 (20.2)	61 (17.8)	0.185	1.3 (0.8–2.1)
Absent	128 (37.4)	84 (24.6)		
Depression				
Present	92 (26.9)	74 (21.6)	0.4	1.2 (0.8–1.8)
Absent	105 (30.7)	71 (20.8)		

Abbreviations: DLQI, Dermatology Life Quality Index; PASI, Psoriasis Area Severity Index.

^aChi-squared test.

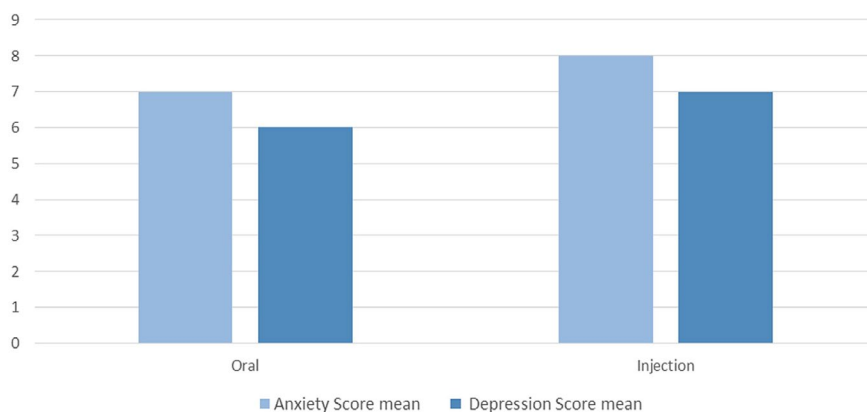


FIGURE 1 Mean of anxiety and depression scores in oral and injection-therapy groups

changed their treatment by methods such as extending the dosage interval or reducing the dosage.

Several studies have analyzed the discontinuation of biologics during the COVID-19 pandemic. Georgakopoulos et al. conducted a

study to understand the impact that COVID-19 has had on the use of biologics for the treatment of moderate to severe psoriasis. Of 1390 patients on a biologic agent for psoriasis treatment, 7 (0.5%) discontinued treatment temporarily due to COVID-19 concerns. Of

FIGURE 2 Rates of adherence and non-adherence in oral and injection-therapy groups

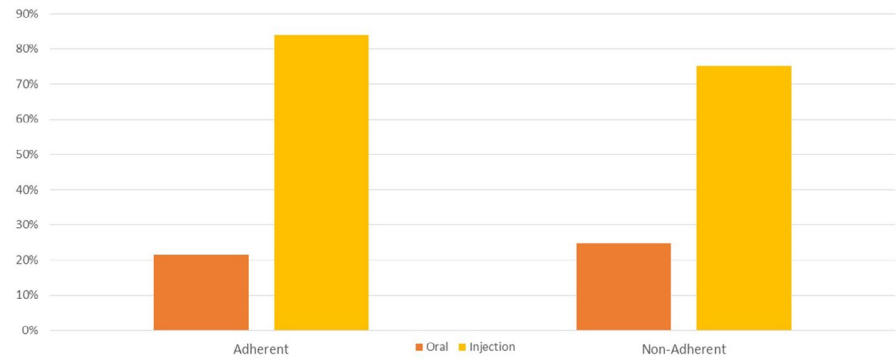
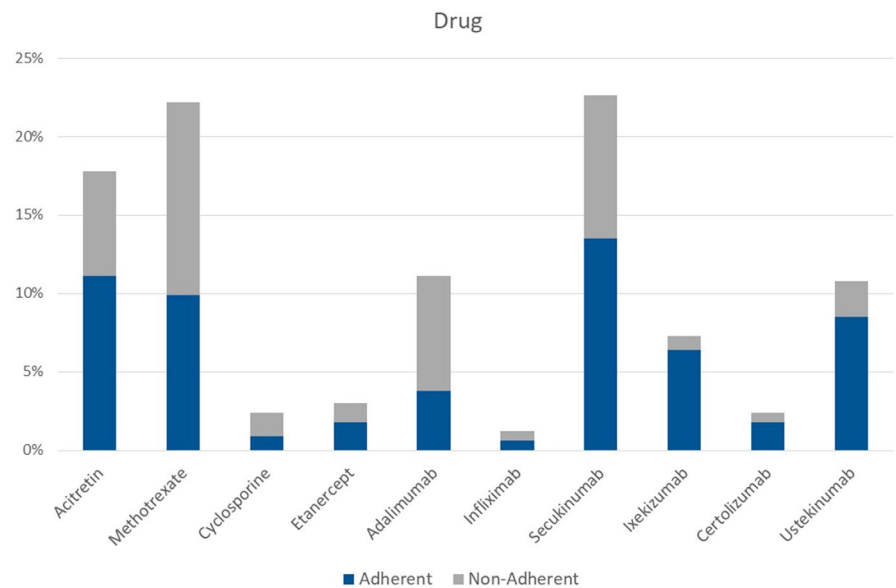


FIGURE 3 Rates of adherence and non-adherence according to drugs



the 7 patients who discontinued treatment, 5 (71.4%) were male and 1 (14.2%) patient also had psoriatic arthritis. 199 patients received biological therapy in our study. Among these patients, the rate of non-adherence was 36.1% (73 patients).¹⁸ We did not find an association between gender or comorbidities and adherence.

Ekinci et al analyzed the impact of the COVID-19 pandemic on patients with psoriasis receiving biologic therapy. During the first 3 months of the pandemic, 52 patients (39%) suspended their biological therapies for short ($n = 33$) or long ($n = 19$) periods without medical advice due to reasons of fear, worry, and anxiety. 126 patients (63.9%) who used biological therapy were adherent to their biological treatment in the current study.¹⁹ Even though some patients had fear of COVID-19 infection, most of the patients continued their treatment.

A cross-sectional study among Chinese patients with psoriasis investigated the associations of non-adherence to treatment through a web-based questionnaire during the COVID-19 pandemic. The authors suggested that a total of 634 (68.5%) patients reported non-adherence to treatment, and worst adherence was found among patients receiving systemic and topical treatments compared to biological treatments.⁹ Although the rate of adherence was higher in the injection-therapy group (84%) than the oral-therapy group (21.3%) in our patient population, there were no significant

differences between the two groups with regard to adherence. We found that the adherence ratio was 63.9% in the biological therapy group while it was 14.3% in the methotrexate therapy group. Adherence rates were fairly high in the biological treatment group similar to the pre-pandemic period. In the biological therapy group, secukinumab was the drug showing the highest rate of adherence (17.9%). For oral and injectable forms of methotrexate, the rate of adherence was 5.3% and 10.9%, respectively. Adherence was twice as much in injectable forms.

Non-adherence to treatment was significantly associated with deterioration of psoriasis, perceived stress, and symptoms of anxiety and depression in the Chinese study.⁹ Similar to this study, we found that the rate of adherence was higher in patients with mild-to-moderate psoriasis (PASI <10, DLQI <10) compared to those with severe psoriasis (PASI \geq 10, DLQI \geq 10), but contrary to the Chinese study, anxiety and depression did not affect adherence to treatment in our study. There were no significant differences between patients who had anxiety or depression and patients who did not have anxiety or depression in terms of adherence.

A study that included 210 subjects has evaluated patients treated with biologics for psoriasis in terms of compliance, safety concerns, and anxiety during the COVID-19 pandemic. The distribution of patients regarding an anxiety score (HADS-A) of \geq 8 was 24.8% for

patients on biologics, 19.1% for patients on conventional systemic treatment, and only 6.5% on topical therapy as detected. Treatment safety concerns were found to be significantly higher in patients on the biologics treatment when compared to the conventional systemic therapy and topical therapy groups. The authors emphasized that psychological factors, such as depression or anxiety and treatment safety, are important factors in terms of treatment compliance and continuation of therapy.²⁰ In the current study, the proportions of anxiety were 1.8% in the oral-therapy group and 43.5% in the injection-therapy group. The rates of depression was 37.1% and 51.5%, respectively. The mean anxiety and depression scores were higher in the injection-therapy group than the oral-therapy group ($p = 0.034$, $p = 0.037$, respectively), but we did not detect a correlation between anxiety or depression and adherence.

In another observational study, 237 psoriatic patients were interviewed about their adherence to medication and reasons for non-adherence through phone calls. This study suggested that most patients (76.4% vs 23.6%) continued to take their medications, but patients with more than three comorbidities were 6 times more likely to not to adhere to their treatment. Age, type of treatment, or any particular type of comorbidity did not appear to influence the therapeutic routine of psoriatic patients during the COVID-19 outbreak. Drug discontinuation seemed to be mainly due to concerns regarding the potential for being infected with COVID-19.²¹ In our study, we evaluated the patients by direct examination. Totally, 342 patients were examined with respect to adherence. Among these patients, 57.6% were found as adherent. There were no significant differences between patients with comorbidities and patients without comorbidities in terms of adherence. The most commonly observed reason for non-adherence to treatment were inability to go to the hospital. The rate of concern about COVID-19 was 16.3%.

In total, 20 patients (5.8%) had a COVID-19 infection in our study population. In the pandemic, adherence to personal and social hygiene strategies, social isolation and social distancing are required to protect patients with psoriasis using systemic therapies from COVID-19 infection. If COVID-19 infection developed in patients under a systemic medication, it was recommended that the patient's current medications be stopped until symptoms improve.¹⁷

The major concern in chronic diseases during the pandemic period was the increase in lesions after withdrawal of treatment. We found that 43.9% of our patients who discontinued treatment had an increase in their lesions. The rate of patients with a severe increase was 14.3%. There was a positive correlation between VAS score and severity of lesions.

We did not find any relationship between age, marital status, educational status, monthly income, taking additional medications, having comorbidities, and adherence. Interestingly, the rate of adherence in patients who had involvements such as nails and scalp was not higher than those who did not these involvements, but most of the patients were adherent to treatment independent from these involvements.

To our knowledge, this is the first study assessing adherence to all systemic medications in psoriasis during the COVID-19 era. The

limitations of the present study are the small number of patients in some groups; hence, analysis of differences was not possible. In addition, the severity of the lesions at the time of discontinuation of the medications could not be evaluated by PASI.

5 | CONCLUSION

In conclusion, adherence to oral and injection therapies was fairly high among our patients with psoriasis during the COVID-19 pandemic, and adherence was not associated with the most demographic factors, anxiety, and depression, however the severity of psoriasis and duration of taking medication had a negative effect on adherence.

It is of paramount importance to follow-up the patients with psoriasis by ways such as telephone, e-mail during the pandemic. Using systemic medications regularly and making treatment modifications when necessary are essential measures which should be taken by the physicians.

CONFLICT OF INTEREST

None.

AUTHOR CONTRIBUTIONS

İlteris Oguz Topal: Conceptualization; visualization; and writing-original draft. Asude Kara Polat: Conceptualization and data curation. İlkin Zindancı: Conceptualization and data curation. İlkur Kıvanç Altunay: Conceptualization; data curation; supervision; and editing. Tuğba Özkök Akbulut, Eylem Ceren Arıkan, Filiz Topaloğlu Demir, Onur Sivaz: Data curation and supervision. Ayşe Serap Karadağ: Conceptualization; data curation; supervision.

ETHICS STATEMENT

The study was approved by the medical ethics committee of the Clinical Ethics Committee. (approval number: 22/04/2021-97).

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