Impact of the COVID-19 Pandemic on Adult Patients with Atopic Dermatitis

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ABSTRACT Atopic dermatitis (AD) is a chronic, inflammatory, itchy dermatosis with periods of remissions and exacerbations. Social isolation and lockdown measures may cause increased stress which in turn may affect the skin condition of patients with AD. We aimed to investigate the impact of the COVID-19 pandemic on the course of AD and the mental health of adult patients with AD. The study was based on an anonymous online questionnaire. A total of 91 adult patients with AD participated in this survey. The study population consisted of 77 (84.6%) female and 14 (15.4%) male patients. The average age of patients was 28.3 years. Fifty-four respondents out of 91 (59.3%) noticed a worsening in the course of AD. Patients with worsened AD most often indicated exacerbating itching of the skin (92.6% of 54). Only 54 (59.3%) patients continued treatment as directed by the attending physician. Of those that did not, 13 (14.3%) took or applied fewer medications and 24 (26.4%) stopped taking or applying medications altogether. Of all respondents, 60 (65.9%) believed that their mental health had deteriorated and 11 (12.1%) patients developed suicidal thoughts during the COVID-19 pandemic. The results indicate that the COVID-19 pandemic had a negative impact on the course of AD among adult patients. Forced life changes, increased stress, and poor adherence to treatment may have been contributing factors. Increased stress may have also worsened the mental health of patients with AD, which in turn may have exacerbated AD.

KEY WORDS: atopic dermatitis, COVID-19, stress, mental health

INTRODUCTION

Atopic dermatitis (AD) is a recurrent, chronic, inflammatory, itchy dermatosis, which mainly affects the pediatric population with a frequency of up to 20%, but also occurs in up to 3% of adults (1). Clinically, AD is characterized by pruritus, dryness, erythema, papules, and exudative lesions with a specific location that varies with the age of the patient (2). The pathophysiology of the disease is complex, multifactorial, and not fully understood. It consists of epidermal barrier defects, genetic disorders, altered immune response, IgE-mediated hypersensitivity, and environmental factors (3). AD may be exacerbated by

several triggers, including stressful life events, some allergens, infections, and irritant substances which include soaps and disinfectants(4).

In December 2019, Wuhan became the center of an outbreak of coronavirus disease-2019 (COVID-19) (5), and on March 11, 2020 the World Health Organization (WHO) officially declared a pandemic (6). One of the recommended measures against the SARS-CoV-2 virus was frequent handwashing and disinfecting of hands, which may have contributed to epidermal barrier damage and resulted in a flare-up of the disease in patients with AD (7). Social isolation and lockdown measures may have been associated with increased stress and anxiety, which, may have consequently affected not only the skin condition of patients with AD but also their mental health (7,8). Increased use of teledermatology and decreased in-person consultations, which was the major change in medical practice, could also have had an impact on patients with AD (9).

Therefore, we aimed to investigate the impact of the COVID-19 pandemic on the course of AD and the mental health of adult patients with AD.

PATIENTS AND METHODS

The study was created using Google Forms and posted on Facebook groups for patients with AD. The questionnaire was anonymous and did not require any personal data. All patients reported that their diagnosis of AD preceded the COVID-19 pandemic. All patients were asked about basic demographic data including gender, age, place of residency, and educational level. The remaining questions of the survey were related to changes in the course of AD and mental health, the treatment used during the COVID-19 pandemic, and changes in AD during SARS-CoV-2 infection. Data collection took place in the period from January 2022 to March 2022. All answers were self-reported, and participation was voluntary. The results were analyzed in Microsoft Excel 2016 and presented on a percentage scale. The study was approved by the Independent Bioethics Committee for Scientific Research at the Medical University of Gdansk (NKBBN/232/2022).

Table 1. The demographic profile of patients

	Total, N=91
Women, N (%)	77 (84.6%)
Men, N (%)	14 (15.4%)
Age average, years	28.3 (18-50)
Place of residence, N (%)	
Village	27 (29.7%)
City up to 50,000 habitants	9 (9.9%)
City 50,000-150,000 habitants	9 (9.9%)
City 150,000-500,000 habitants	17 (18.7%)
City over 500,000 habitants	29 (31.9%)
Education, N (%)	
Vocational	1 (1.1%)
Primary	2 (2.2%)
Secondary	35 (38.5%)
Higher	53 (58.2%)

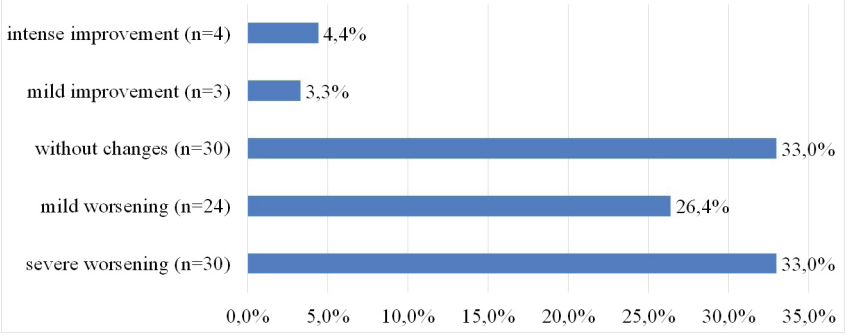
RESULTS

Ninety-one patients with AD completed the questionnaire. The study population consisted of 77 (84.6%) female and 14 (15.4%) male patients. The average age of patients was 28.3 years, and the majority of them lived in a city (70.3%).

The demographic profile of patients is summarized in Table 1.

We asked participants if they noticed any change in the course of AD during the COVID-19 pandemic. 54 respondents out of 91 (59.3%) noticed a worsening of the course of AD, with mild and severe worsening in 26.4% and 33.0% of patients, respectively (Figure 1). Patients with worsened AD most commonly indicated worsening itching of the skin (92.6%) (Figure 2).

Fig. 1. Changes in AD activity during the Covid-19 pandemic relative to pre-pandemic as assessed by patients (n=91).



Among all the respondents, 89 (97.8%) reported using topical treatment, 23 (25.3%) additionally used systemic therapy, and 8 (8.8%) used phototherapy. Regarding topical therapy, 82 (90.1%), 74 (81.3%), and 9 (9.9%) applied emollients, steroid ointments, and topical calcineurin inhibitors, respectively. With respect to systemic therapy, 17 (18.7%), 4 (4.4%), 4 (4.4%), 2 (2.2%), 1 (1.1%), and 1 (1.1%) used oral steroids, cyclosporin A, oral antihistamines, dupilumab, mycophenolate mofetil, and methotrexate, respectively. Notably, 23 (25.3%) patients used immunosuppressive therapy, including oral steroids, cyclosporin A, mycophenolate mofetil, and methotrexate.

Only 54 (59.3%) patients reported that they had continued treatment as directed by the attending physician. Of those that did not, 13 (14.3%) took or applied fewer medications, and 24 (26.4%) stopped taking or applying medications altogether. Treatment interruption and reducing the medication dose were due to the decision of the attending physician only in 1 (1.1%) and 2 (2.2%) of cases, respectively.

The reasons for stopping and reducing therapy are presented in Table 2.

All respondents were asked if they had undergone a swab test for SARS-CoV-2. 35 patients (38.5%) reported that they had tested positive. Among them, 16 patients (45.7%) temporarily experienced exacerbation of AD symptoms during infection. 17 patients (48.6%) did not notice any change in the activity of AD, no patients reported improvement, and 2 patients (5.7%) could not specify. One person required hospitalization due to COVID-19 infection.

Among all the respondents, 79 (86.8%) reported that they had experienced many negative feelings due to the COVID-19 pandemic. The most common were anxiety and fear (65.9%), depressed mood (52.7%), irritability (50.5%), worrying about their health (47.3%), and pessimism (46.2%). 46.2% and 37.4% of respondents noticed sleep disturbances and difficulty concentrating, respectively. Importantly, 11 (12.1%) patients reported the development of suicidal thoughts during the COVID-19 pandemic. Moreover, 27 (29.7%) respondents reported an increase in smoking and alcohol consumption. Furthermore, of all respondents, 60 (65.9%) believed that their mental health had deteriorated during the pandemic with mild and severe worsening in 50.5% and 15.4%, respectively (Figure 3).

Table 2. The reasons for stopping and reducing therapy

	Total, N=91
Stopped therapy	24 (26.4%)
By patient decision	23 (25.3%)
By attending physician's decision	1 (1.1%)
Reasons for stopping therapy	
Limited access to a doctor	7 (7.7%)
Fear of being more prone to COVID-19 infection	4 (4.4%)
Ineffectiveness of therapy	14 (15.4%)
Disease remission	7 (7.7%)
Side-effects	9 (9.9%)
Others	1 (1.1%)
Reduced the dose of medication	13 (14.3%)
By patient decision	11 (12.1%)
By attending physician's decision	2 (2.2%)
Reasons for reducing the dose	
Limited access to a doctor	5 (5.5%)
Fear of being more prone to COVID-19 infection	1 (1.1%)
Ineffectiveness of therapy	5 (5.5%)
Disease remission	6 (6.6%)
Side-effects	2 (2.2%)
Continued therapy	54 (59.3%)

Other; "giving up in the fight against atopic dermatitis"; multiple answers were possible

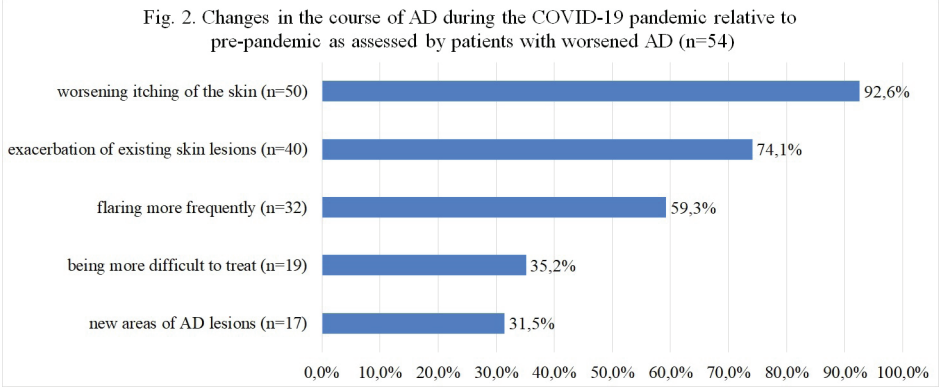
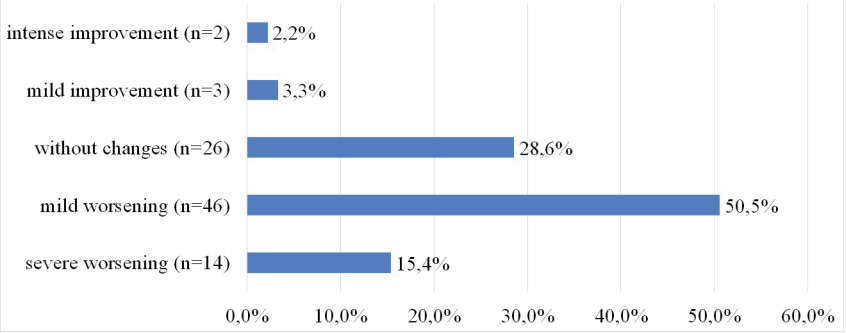


Fig. 2. Changes in the course of AD during the COVID-19 pandemic relative to pre-pandemic as assessed by patients with worsened AD (n=54)

Fig. 3. Changes in the mental health during the Covid-19 pandemic relative to pre-pandemic as assessed by patients (n=91).



DISCUSSION

A few studies have investigated the impact of the COVID-19 pandemic on the course of AD.

A web-based survey conducted in Colombia showed that 75% of patients experienced flare-up symptoms of AD during the time of the pandemic (10).

The results of our study, which showed that 59.3% of patients experienced exacerbation symptoms, also confirm the negative impact of the pandemic on the course of AD.

The COVID-19 outbreak has represented a novel experience for most people worldwide. Worries about health, job loss, financial problems, social isolation, and changes in everyday life may have potentially led to emotional tension and affected the mental health and well-being of patients with AD. In our study, numerous patients reported that they had experienced many negative feelings due to the pandemic, which in turn might have influenced disease exacerbation. Stress is one of the well-known triggering and aggravating factors of AD (4). It has been reported that AD exacerbations are preceded by stressful situations in up to 70% of patients (11). Moreover, stress has been found to impair the skin's epidermal barrier function by negatively influencing permeability barrier homeostasis as well as also stratum corneum integrity and cohesion (11). Additionally, patients in our study with worsening AD most commonly complained about increased itching sensation, which may have been caused by increased psychological distress due to the COVID-19 pandemic. Previous studies confirmed that psychological stress can correlate with an increased perception of itching in AD (12). According to clinical examinations, up to 81% of patients with AD reported their pruritus to be aggravated by emotional stress (13).

Furthermore, our study showed that 29.7% of the patients reported an increase in smoking and alcohol consumption, which may have been a response to stress as a coping mechanism. It is well-known that using both substances can increase in response to stress (14,15). On the other hand, increased alcohol consumption may have also contributed to intensifying pruritus in patients with AD (16). Additionally, itching leads to scratching, which causes damage to epithelial cells in the skin. As a result, itching factors are released and re-bind to the proprioceptive nerves, triggering the desire to continue scratching, which further aggravates dermatitis. This vicious cycle is named the "itch-scratch cycle" (17,18).

There is evidence that the COVID-19 pandemic has contributed to a burden on mental health worldwide and increased the prevalence and severity of anxiety, depression, and PTSD (8). Additionally, it has been reported that people with allergic diseases experienced a higher negative psychological impact than healthy controls due to the pandemic (19). The results of our study revealed that more than half of the patients noticed a deterioration in their mental health. Atopic dermatitis is associated with several mental health comorbidities (20), and the pandemic may have exacerbated the psychological problems of these patients, or, in some cases, may have contributed to their development. Up to 12.1% of participants in our study reported that they had developed suicidal thoughts during the pandemic.

The continuation of systemic therapy during the pandemic was recommended by the European Task Force on Atopic Dermatitis (ETFAD) (21); despite this, discontinued treatment and reduced medication doses due to personal decisions as a result of fear of being more susceptible to COVID-19 infection were present in 4.4 % and 1.1% of cases, respectively. Cessation of treatment might have caused a sudden flare of the disease. An Italian web-based survey of patients with AD treated with dupilumab showed that

6.3% interrupted treatment due to personal concerns (22).

The personal interactions between patients and specialists were significantly limited during the time of the pandemic, which in turn may have affected the patient trust in the attending physician and led to worse treatment compliance . A review of literature on dermatological treatment compliance showed that a good doctor-patient relationship is the strongest predictor of adherence to skin-care treatment in AD (23). In our study population, a number of patients discontinued (7.7%) or reduced their medication (5.5%) and reported limited access to a dermatologist as the reason, which may indirectly indicate a poor patient-doctor relationship during the pandemic. Additionally, a large proportion of patients modified their treatment without consulting a doctor for various other reasons, such as therapy ineffectiveness, side-effects, or disease remission. What is most important is that the resolution of AD symptoms should not be a reason for treatment cessation. Due to the chronic nature of the disease, maintenance therapy should be continued (24), but 7.7% of studied patients interrupted treatment completely due to the clearing of symptoms.

Previous studies also highlighted the importance of frequent follow-up visits, which may result in improvement in topical treatment adherence of patients with AD. It has been reported that adherence to topical therapy increases significantly around the time of follow-up appointments (25). Unfortunately, the number of in-person consultations in dermatological practice decreased during the pandemic (9), which may have influenced treatment adherence in patients with AD. Furthermore, poor adherence to treatment for atopic dermatitis is a significant barrier to the successful treatment of the disease (26).

The results from a case-control study in the All of Us research program found that AD was associated with an increased risk of COVID-19 infection (27). The large population-based study also found a small increase in risk of contracting COVID-19 in adult patients with AD (28), but another study suggested that AD was not an independent risk factor for COVID-19 severity or complications (29). Due to the character of our study, we were unable to evaluate whether this risk was increased in our patients, but results showed that 38.5% of patients were positive for SARS-CoV-2, and nearly half of them experienced a temporary exacerbation of AD symptoms.

Our study has some limitations. The study was conducted almost 2 years after the outbreak of the pandemic, and the questions were asked retrospectively. Some of them were related to the period before the COVID-19 pandemic, so recall bias was possible. Given that the study was conducted via a survey, there is a possibility that not all the questions were correctly understood. Additionally, the assessment of the change in the activity of atopic dermatitis and mental health was based on the subjective assessment of particiapnts. Moreover, our study population may not be representative of all patients with AD, as patients participating in AD Internet groups typically have more severe AD.

CONCLUSION

The results of our study showed that the COVID-19 pandemic had a negative impact on the course of AD. Forced life changes, increased stress, and poor adherence to treatment may have contributed. Increased stress may also have worsened the well-being and mental health of patients with AD. Additionally, mental disorders can cause further flare-up symptoms of this dermatosis (30). Importantly, the psychological effects of the COVID-19 pandemic may be long-lasting. Our results revealed the weak points and causes of AD exacerbation during the pandemic, which could be avoided in the future if the proper prevention and education is performed.

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References:

1. Nutten S. Atopic dermatitis: global epidemiology and risk factors. Ann Nutr Metab. 2015;66 Suppl 1:8-16.
2. Avena-Woods C. Overview of atopic dermatitis. Am J Manag Care. 2017;23(8 Suppl):S115-S123.
3. David Boothe W, Tarbox JA, Tarbox MB. Atopic dermatitis: Pathophysiology. Adv Exp Med Biol. 2017;1027:21-37.
4. Morren MA, Przybilla B, Bamelis M, Heykants B, Reynaers A, Degreef H. Atopic dermatitis: triggering factors. J Am Acad Dermatol. 1994;31(3 Pt 1):467-73.
5. Phelan AL, Katz R, Gostin LO. The novel coronavirus originating in Wuhan, China: Challenges for global health governance. JAMA. 2020;323:709-10.
6. Pollard CA, Morran MP, Nestor-Kalinoski AL. The COVID-19 pandemic: a global health crisis. Physiol Genomics. 2020;52(11):549-57.

7. Patruno C, Nisticò SP, Fabbrocini G, Napolitano M. COVID-19, quarantine, and atopic dermatitis. Med Hypotheses. 2020;143:109852.
8. Xiong J, Lipsitz O, Nasri F, Lui LMW, Gill H, Phan L, *et al.* Impact of COVID-19 pandemic on mental health in the general population: A systematic review. J Affect Disord. 2020;277:55-64.
9. Bhargava S, McKeever C, Kroumpouzos G. Impact of COVID-19 pandemic on dermatology practices: Results of a web-based, global survey. Int J Womens Dermatol. 2021;7:217-23.
10. Hernández N, Sanclemente G, Tamayo L, López Á, Seidel A, Colombian Atopic Dermatitis Research Group Members. Atopic dermatitis in the COVID-19 era: Results from a web-based survey. World Allergy Organ J. 2021;14:100571.
11. Arndt J, Smith N, Tausk F. Stress and atopic dermatitis. Curr Allergy Asthma Rep. 2008;8(4):312-7.
12. Mollanazar NK, Smith PK, Yosipovitch G. Mediators of chronic pruritus in atopic dermatitis: Getting the itch out? Clin Rev Allergy Immunol. 2016;51:263-92.
13. Heyer G, Ulmer FJ, Schmitz J, Handwerker HO. Histamine-induced itch and alloknesis (itchy skin) in atopic eczema patients and controls. Acta Derm Venereol. 1995;75:348-52.
14. Revell AD, Warburton DM, Wesnes K. Smoking as a coping strategy. Addict Behav. 1985;10:209-24.
15. Anthenelli R, Grandison L. Effects of stress on alcohol consumption. Alcohol Res Curr Rev. 2012;34:381-2.
16. Ständer S, Steinhoff M. Pathophysiology of pruritus in atopic dermatitis: an overview. Exp Dermatol. 2002;11:12-24.
17. Yosipovitch G, Berger T, Fassett MS. Neuroimmune interactions in chronic itch of atopic dermatitis. J Eur Acad Dermatol Venereol. 2020;34:239-50.
18. Mack MR, Kim BS. The Itch-Scratch Cycle: A neuroimmune perspective. Trends Immunol. 2018;39:980-91.
19. Gonzalez-Diaz SN, Martin B, Villarreal-Gonzalez RV, de Lira-Quezada CE, Macouzet-Sanchez C, Macias-Weinmann A, *et al.* Psychological impact of the COVID-19 pandemic on patients with allergic diseases. World Allergy Organ J. 2021;14:100510.
20. Silverberg JI, Gelfand JM, Margolis DJ, Boguniewicz M, Fonacier L, Grayson MH, *et al.* Symptoms and diagnosis of anxiety and depression in atopic dermatitis in U.S. adults. Br J Dermatol. 2019;181:554-65.
21. Wollenberg A, Flohr C, Simon D, Cork MJ, Thyssen JP, Bieber T, *et al.* European Task Force on Atopic Dermatitis statement on severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) infection and atopic dermatitis. J Eur Acad Dermatol Venereol. 2020;34:e241-e242.
22. Grieco T, Chello C, Sernicola A, *et al.* Impact of COVID-19 on patients with atopic dermatitis. Clin Dermatol. 2021;39:1083-7.
23. Serup J, Lindblad AK, Maroti M, Muharremi R, Michelini S, Paolino G, *et al.* To follow or not to follow dermatological treatment--a review of the literature. Acta Derm Venereol. 2006;86:193-7.
24. Sidbury R, Tom WL, Bergman JN, Cooper KD, Silverman RA, Berger TG, *et al.* Guidelines of care for the management of atopic dermatitis: Section 4. Prevention of disease flares and use of adjunctive therapies and approaches. J Am Acad Dermatol. 2014;71:1218-33.
25. Sokolova A, Smith SD. Factors contributing to poor treatment outcomes in childhood atopic dermatitis. Australas J Dermatol. 2015;56:252-7.
26. Patel NU, D'Ambra V, Feldman SR. Increasing adherence with topical agents for atopic dermatitis. Am J Clin Dermatol. 2017;18:323-32.
27. Fan R, Leasure AC, Damsky W, Cohen JM. Association between atopic dermatitis and COVID-19 infection: A case-control study in the All of Us research program. JAAD Int. 2022;6:77-81.
28. Wu JJ, Martin A, Liu J, Thatiparthi A, Ge S, Egeberg A, *et al.* The risk of COVID-19 infection in patients with atopic dermatitis: A retrospective cohort study. J Am Acad Dermatol. 2022;86:243-5.
29. Rakita U, Kaundinya T, Guraya A, Nelson K, Maner B, Manjunath J, *et al.* Atopic dermatitis is not associated with SARS-CoV-2 outcomes. Arch Dermatol Res. 2022;314:999-1002.
30. Xie QW, Dai X, Tang X, Chan CHY, Chan CLW. Risk of mental disorders in children and adolescents with atopic dermatitis: A systematic review and meta-analysis. Front Psychol. 2019;10:1773.