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Change in dermatology practice during crisis and normalization periods after the COVID-19 pandemic and potential problems awaiting us

COVID-19 sonrası kriz ve normalleşme süreçlerinde değişen dermatoloji pratiği ve bizi bekleyen olası sorunlar

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Abstract

Background and Design: This study aimed to reveal the effects of the crisis period and normalization process after the Coronavirus disease-2019 (COVID-19) pandemic on dermatology practice to anticipate future health problems.
Materials and Methods: All patients were enrolled from the dermatology outpatient clinics between February and July 2020 (pre-COVID-19 period, crisis period, and normalization period). Data such as age, sex, application dates, diagnoses, and treatment methods were received from the electronic registration database.
Results: The number of patients in the normalization period (32.3%) increased relative to that in the crisis period (11.5%), and it was significantly lower than that before the pandemic (56.2%). Remarkably, the change in the distribution of stress-related diseases, such as idiopathic generalized pruritus, alopecia areata, and herpes zoster, stably paralleled each other and the increase and decrease trends during the crisis and normalization periods, respectively. The increase in the frequency of contact dermatitis, which was not reflected in the crisis period, became evident in the normalization period ($p<0.001$). No significant change was found in the rate of scabies ($p=0.276$). However, the number of patients with scabies was remarkably decreased.
Conclusion: The decrease in stress-related diseases indicates that social stress started to decrease with normalization. Scabies and venereal diseases, which concern public health, should not be neglected. Disease rates and the number of patients provide an idea about potential problems after the pandemic. Understanding the trends in dermatological diseases and the changing health system during the pandemic will aid in solving future problems.
Keywords: COVID-19, pruritus, herpes zoster, alopecia areata, scabies

Öz

Amaç: Koronavirüs hastalığı-2019 (COVID-19) sonrası kriz dönemi ve normalleşme sürecinin dermatoloji pratiğine etkisini ortaya koymayı ve böylece gelecekte karşılaşılabilecek olası sağlık problemlerine işaret etmeyi amaçladık.
Gereç ve Yöntem: Şubat ve Temmuz 2020 tarihleri arasında (COVID-19 öncesi, kriz dönemi ve normalleşme süreci) dermatoloji polikliniklerine başvuran tüm hastalar çalışmaya dahil edildi. Yaş, cinsiyet, başvuru tarihleri, teşhisler ve tedavi yöntemleri gibi veriler elektronik veri tabanından alındı.
Bulgular: Normalleşme sürecindeki hasta sayısı (%32,3) kriz dönemine göre (%11,5) artarken, pandemi öncesine göre (%56,2) hala anlamlı derecede daha düşüktü. İdiyopatik jeneralize pruritus, alopesi areata ve herpes zoster gibi strese bağlı hastalıkların dağılımındaki değişimin istikrarlı bir şekilde birbirine paralel seyretmesi ve kriz döneminde ve normalleşme sürecinde sırasıyla artma ve azalma eğiliminde olması dikkat

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çekiciydi. Kriz dönemine yansımayan kontakt dermatit sıklığındaki artış normalleşme sürecinde belirginleşmişti (p<0,001). Uyuz oranında anlamlı bir değişiklik yoktu (p=0,276). Ancak uyuz hastalarının sayısındaki kayda değer azalma dikkat çekiciydi.
Sonuç: Strese bağlı hastalıklardaki azalma, sosyal stresin normalleşme ile azalmaya başladığını göstermektedir. Halk sağlığını ilgilendiren uyuz ve zührevi hastalıklar ihmal edilmemelidir. Hastalıkların oranları ve hasta sayısı, pandemi sonrasında karşılaşabileceğimiz sorunlar hakkında fikir vericidir. Pandemi sırasında dermatolojik hastalıkların eğilimlerini ve değişen sağlık sistemini anlamak, gelecekte karşılaşılabilecek olası sorunların çözümünü sağlayacaktır.
Anahtar Kelimeler: COVID-19, pruritus, herpes zoster, alopesi areata, skabiyez

Introduction

The Coronavirus disease-2019 (COVID-19), which emerged in China in December 2019 and our country on March 11, 2020, has deeply affected areas such as social life, economy, and health worldwide within a very short time[1]. After the announcement of the pandemic, the government introduced some regulations such as curfews, closure of schools and common social organizations, and flexible working schedules in public institutions including hospitals. Through the effective measures taken, the number of daily cases decreased after peaking, and after about 2.5 months, the normalization process began exactly on 1 June.

Considering our country's conditions and hospitals, dermatologists had to actively take measures in all fields, from outpatient clinics to intensive care units related to COVID-19, after the pandemic. Until the normalization period, we continued to run our polyclinics to a quite limited extent, like all other medical departments. During the normalization period, the weakening of the measures and lack of attention to social distance due to burials, weddings, and holidays resulted in the re-increasing number of cases at the early weeks of August. After August 15, the number of dermatology outpatient clinics has reduced by approximately 80% in all departments, and affected physicians have been re-located to COVID-19-related units of pandemic hospitals[2]. Considering the uncertainty of the process and the disrupted emergency and polyclinic services, we should think about future difficulties in the field of dermatology. This study aimed to reveal the effects of the crisis and normalization periods after COVID-19 on dermatology practice and to anticipate future health problems.

Materials and Methods

All patients were enrolled from the department of dermatology and venereology between February 15 and July 09, 2020, consisting of 120 workdays. The months within these dates were organized into 4 weeks consisting of 20 workdays, except for weekends and public holidays. Thus, a 24-week period comprised the 8-week period (group 1, pre-pandemic) before the COVID-19 pandemic and 16-week period (groups 2 and 3, crisis and normalization periods, each consisting of 8 weeks, respectively) after the first confirmed case. Given the uncertainty and dynamism of the pandemic, the profile and number of patients who presented to outpatient clinics are constantly changing. To exclude the effects of confounders in the transition period (at the beginning of the crisis and normalization periods) and to increase the reliability of the results, the 4-week periods in which the number of patients settled on a certain axis for each period were compared statistically. This decision was based on the data provided in Figure 1, which shows the daily change of the number of patients.

Data such as age, sex, dates, first three of the International Classification of Diseases-10th (ICD-10) Revision codes, and treatment methods were received from the electronic registration database. These data were anonymized, providing that individual uniqueness was kept in applications to polyclinics. Patients with repeated presentations for control or follow-up were distinguished. Then, recurrent applications with the corresponding diagnosis within 10 days after the first medical examination were excluded.

The wide diagnostic spectrum, lack of ICD-10 code and a myriad of its subgroups corresponding to each diagnosis, and the personal style of each physician in using ICD-10 codes in dermatology practice raised the need for the standardization of diagnostic data within a framework. Therefore, the first three ICD-10 codes for patients were re-evaluated by each patient's physician, based on the disease classification. For the same patient, separate diagnoses associated with each other were attempted to be displayed as a single origin diagnosis (e.g., xerosis + dermatitis = xerotic eczema, pruritus + psoriasis =

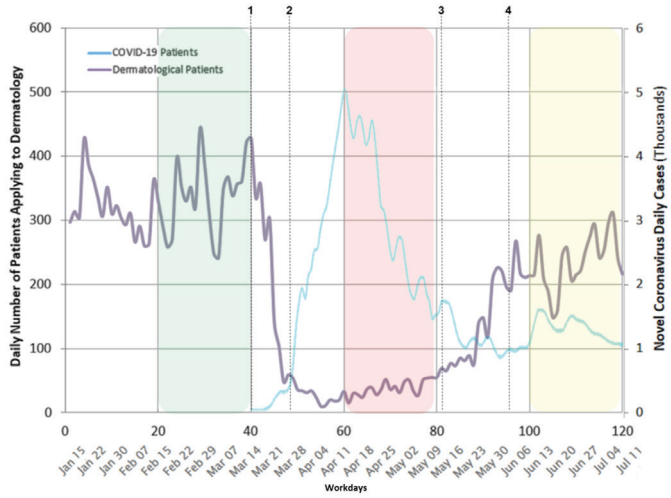

Figure 1. Change in daily dermatological and Coronavirus disease-2019 (COVID-19) patient throughout the process

The number of patients with dermatological disorders and COVID-19 was obtained from our hospital and across the country, respectively. The graph of "novel coronavirus daily cases in Turkey" was adapted from Worldometer, a reference website that provides real-time world statistics. The green (pre-pandemic), red (crisis), and yellow (normalization process) rectangles correspond to the regions where statistical comparison was made.

1: (March 11): The first COVID-19 case was confirmed in Turkey, and the World Health Organization has declared a pandemic, 2: (March 23): Flexible schedules and shift work were implemented for hospital personnel, like other public personnel, 3: (May 11): The first steps of the normalization process were taken. Within this scope, shopping malls and hairdressers were the first businesses to be put into service, 4: (June 1): Restrictions on inter-city travel, public places (gardens, association centers, facilities, museums, etc.), tourism areas, schools, kindergartens, and similar places were removed with certain rules. The flexible working practice was terminated for all public employees, including hospital personnel

psoriasis, etc). Patients without an additional dermatological diagnosis other than pruritus were evaluated as having "idiopathic pruritus and dysesthesia." A few patients who applied for consultation only or had no significant complaints were grouped under "undetermined reason for examination and observation (ICD-10=Z04.9)." Only the first ICD-10 codes were considered for patients with multiple irrelevant diagnoses. Given this framework, some diagnoses were grouped, and 372 distinct ICD-10 codes, including subgroups of raw data, were reduced to 17 main headings and 82 subgroups.

This single-center cross-sectional retrospective study was approved by the University of Health Sciences Turkey, Erzurum Regional Training and Research Hospital Local Ethics Committee (approval number: 2020/14-158) and the Ministry of Health Scientific Research Platform (application form no: 2020-07-01T21_52_34). This study was conducted according to the latest version of the Helsinki Declaration and Guidelines for Good Clinical Practice. Informed patient consent was not required on condition that data such as name and citizenship numbers were anonymized with the permission of the ethics committee.

Statistical Analysis

All statistical procedures were performed using IBM SPSS Statistics® 21.0 (IBM Corp., Armonk, NY, USA) and MS-Excel® 2010 (Microsoft Corporation, CA, USA). Python™ 3.7.5 program (released in October 2019, Python Software Foundation, DE, USA) was used in determining the control and follow-up groups and classifying the data.

Pearson's chi-squared test was used for categorical variables. In chi-squared tests with a degree of freedom >1, pairwise comparisons (post-hoc) were conducted using the z-test. After checking the normality distribution of scale variables by the Shapiro-Wilk test, Independent samples were compared with appropriate significance tests (Kruskal-Wallis H test or Mann-Whitney U test). Results were presented as the median (interquartile range) or number of patients (percentage). The daily numbers of newly diagnosed COVID-19 cases and of patients who presented to our dermatology outpatient clinic were presented in a graph with single "scatter with straight lines." The change in the weekly diagnostic distribution of some remarkable diseases was also displayed in this graph. Two-sided p-values of <0.05 were considered significant. Correction for alpha inflation (Bonferonni style) was applied as post-hoc test after the Kruskal-Wallis H and chi-squared tests.

Results

Of the 23,530 patients who applied to the dermatology outpatient clinics in the 24-week period, excluding control examinations, 13218 (56.2%) had applied in the last 8 weeks before the COVID-19 pandemic. The time after the declaration of the COVID-19 pandemic was examined in two separate periods of 8 weeks each, i.e., crisis period and normalization period. Accordingly, 2714 (11.5%) patients during the crisis period and 7598 (32.3%) patients after the early days of the normalization period were evaluated in our outpatient clinics. The daily number of COVID-19 cases in Turkey and of patients with dermatological disorders who presented to our outpatient clinics before and after the pandemic are presented in Figure 1. Accordingly, while 300-400 patients were cared for in our dermatology outpatient clinic before the pandemic, <50 patients presented to our clinic during the crisis period. Approximately 2 weeks after the start of the normalization period, >100 patients were examined daily for the first time, and after about 1 month, 200-300 patients were recorded. In this study, to reveal the effects of the crisis and normalization processes in dermatology practice more clearly, the transition periods (Figure 1) with hard breaks in the curves (up or down) were ignored in the statistical comparisons. Table 1 and 2 show the change in the demographic characteristics and diagnostic distribution of patients who applied to the dermatology outpatient clinics during the periods when the number of patients examined daily remained relatively stable. The expanded form of Table 2, which includes all diagnoses, is presented in Table S1 (Supplementary material, available via Mendeley at https://data.mendeley.com/datasets/5fb4jzn6yb/1). The weekly change in the frequency of some diseases with significant changes in the distribution is presented in Figure 2. Remarkably, the change in the distribution of stress-related diseases, such as idiopathic generalized pruritus, alopecia areata, and shingles, stably paralleled each other and the increase and decrease trends during the crisis and normalization periods, respectively (Figure 2A).

Discussion

A recent study reported an increase in the frequency of "idiopathic generalized pruritus, pityriasis rosea, alopecia areata, bacterial skin/mucosa diseases, and shingles/post-zoster neuralgia" during the peak period of the outbreak. It also revealed that patients applied to outpatient clinics less frequently because of diseases such as verruca vulgaris, hyperpigmentation, skin tag, melanocytic nevus, and seborrheic keratosis/solar lentigo[2]. Similarly, other studies have reported an increase in the number of patients presenting with alopecia areata, shingles, and pityriasis rosea after the pandemic[3,4]. While the increases in the frequency of diseases reflected in polyclinics under ordinary conditions primarily indicate an increase in incidence, in such extraordinary situations, these changes may be due to the following in addition to the incidence: Effects on the quality of life, fear of an unknown interesting disease, desire not to interrupt treatment, perception of COVID-19 risk, asymmetric difficulty in consultation to alternative medical departments, and diseases with easier diagnosis and treatment.

Dermatological diseases are important problems for adolescence[5]. This study presented that the frequency of children aged 11-18 years decreased significantly during the crisis period relative to the pre-pandemic period and increased during the normalization period. This displays that the diseases seen in school-aged children were more frequently neglected and that the accumulated patient burden increased after normalization. Considering that the number of patients has increased relative to the crisis period but still does not return to its previous level, solutions of the dermatological problems in childhood and adolescence awaits us after complete normalization.

Diseases with a change in frequency are listed in Table 2, and possible reasons were evaluated under five headings: Seasonal, COVID-19-related anxiety, hygiene measures, diseases that do not seriously impair the quality of life and whose treatment can be delayed, and a shift from other medical departments. The frequency of pityriasis rosea, which was reported to increase during the crisis period, was similar to the frequency during the pre-pandemic period because of seasonal reasons[2,3]. Hyperpigmented diseases, which are thought to

Table 1. Evaluation of the frequency of application, age, gender, and treatment methods before and after COVID-19

		Before COVID-19	After COVID-19		p-value
		Normal period	Crisis period	Normalization process	
		Last 4 weeks (5-8 weeks)	2nd 4 weeks (13-16 weeks)	4th 4 weeks (21-24 weeks)	
Number of children patients aged ≤10 years (n=1066)		618 (9.1%)	60 (7.8%)	388 (8.4%)	0.256
Number of children patients aged 11-18 years (n=1826)		982 (14.4%)	78 (10.1%)	766 (16.5%)	**<0.001**[a,b,c]
Number of adult patients aged 19-64 years (n=8637)		4848 (71.1%)	595 (77.1%)	3224 (69.4%)	**<0.001**[a,c]
Number of elderly patients aged ≥65 years (n=672)		372 (5.5%)	38 (4.9%)	262 (5.7%)	0.709
Number of applications to the dermatology† (n=12216)		6820 (55.7%)	771 (6.3%)	4650 (37.9%)	**<0.001**[a,b,c]
Age [year, median (IQR)]		24 (21)	29 (23)	25 (20)	**<0.001**[a,c]
Gender	Male	2949 (43.2%)	385 (49.9%)	1920 (41.4%)	**<0.001**[a,c]
	Female	3871 (56.8%)	386 (50.1%)	2715 (58.6%)	
Treatment methods‡	Follow-up (only)	162 (2.4%)	9 (1.2%)	91 (2.0%)	**0.042**[a]
	Medical therapy (oral, sc, iv, intralesional)	5793 (86.3%)	719 (94.1%)	4111 (88.8%)	**<0.001**[a,b,c]
	Cryotherapy	685 (10.2%)	29 (3.8%)	375 (8.1%)	**<0.001**[a,b,c]
	Dermato-surgery	73 (1.1%)	7 (0.9%)	50 (1.1%)	0.908
Diagnostic method	Skin patch test (n)	55	0	21	-
	Skin prick test (n)	117	1	59	-

Data are expressed as the number of applications to the outpatient clinic (percentage). Kruskal-Wallis-H and Pearson's chi-squared tests were used. Bonferroni correction was applied as post-hoc (Mann-Whitney-U and z-test, respectively) after Kruskal-Wallis-H and chi-squared tests. Significant values were shown in bold.
†: Repeated applications within 10 days after the first application were excluded, ‡: The phototherapy unit is not active in our center, [a]: Adjusted p-value <0.05 for the difference between the "last 4 weeks before COVID-19" and "2nd 4 weeks after COVID-19", [b]: Adjusted p-value <0.05 for the difference between the "last 4 weeks before COVID-19" and "4th 4 weeks after COVID-19", [c]: Adjusted p-value <0.05 for the difference between "2nd 4 weeks after COVID-19" and "4th 4 weeks after COVID-19", IQR: Interquartile range, sc: Subcutaneous, iv: Intravenous, COVID-19: Coronavirus disease-2019

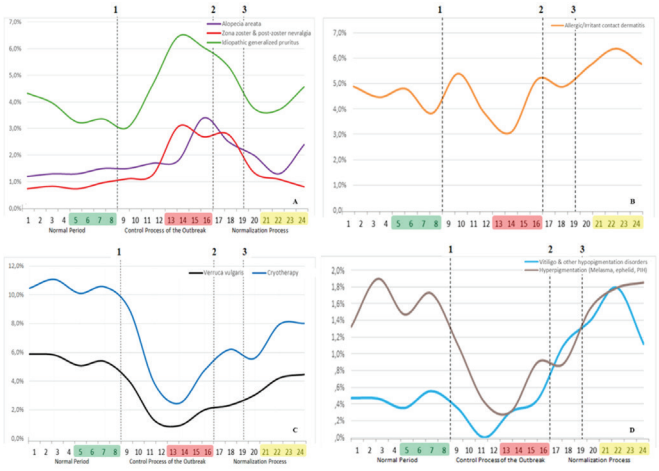

Figure 2. Weekly frequency of some diseases with a significant change in frequency before and after Coronavirus disease-2019 (COVID-19)
1: The first COVID-19 case was confirmed in Turkey, 2: The first steps of the normalization process were taken, 3: A process of social normalization started exactly. The green, red, and yellow rectangles on the time axis correspond to the regions where statistical comparison was made. **(A)** Change in the frequency of the diseases presumed to be triggered by COVID-19-related anxiety: Idiopathic generalized pruritus, shingles, and alopecia areata, **(B)** Change in the frequency of contact dermatitis assumed to be associated with hygiene, **(C)** Change in the frequency of cryotherapy indications and verruca vulgaris, which is its most common indication, **(D)** Change in the frequency of pigmentation-related diseases

be neglected and decreased in frequency during the crisis period, increase significantly in summer with the frequency of vitiligo. The significant decrease in diseases such as alopecia areata, shingles, and idiopathic pruritus, which are thought to increase in frequency because of the high levels of stress associated with COVID-19 during the crisis period, indicates that the COVID-19 risk perception or social stress has started to decrease with the normalization period[2,4,6]. A possible reason for the expected increase in the frequency of contact dermatitis during the crisis period compared with that during the pre-pandemic period was that these patients improved their complaints with easy, reachable, and alternative solutions[2]. Although the expected increase in eczema during the crisis period was not reflected in our outpatient clinics, recent survey studies have revealed that the risk of contact dermatitis increased 3.5-5.5 times in healthcare professionals during the crisis period[7,8]. Indeed, per the report of Gao et al.[9], a significant frequency of presentations after the normalization process was composed of contact dermatitis, which increased compared with the values during the pre-pandemic and crisis periods. The frequency of conditions such as warts, callus, seborrheic keratosis, and skin tag, which decreased significantly during the crisis period and for which we preferred cryotherapy, reached similar rates to the pre-pandemic period, except for callus. Although cryotherapy, skin patch, and prick tests are used frequently in dermatology practice, they were rarely used after the pandemic. The damage caused by not using such equipment, which has certain costs and shelf lives, should be considered. The service plan must be sustainable and cost effective.

In Turkey, the increase in the frequency of scabies that started in the second half of 2019 became more pronounced in the last quarter[10].

Table 2. Diseases showing changes in the diagnostic distribution in the dermatology outpatient clinic before and after COVID-19

Diseases	Before COVID-19	After COVID-19		p-value	Possible relationship/cause
	Normal period	Crisis period	Normalization process		
	Last 4 weeks (n=6820)	2nd 4 weeks (n=771)	4th 4 weeks (n=4650)		
Pityriasis rosea	43 (0.6%)	12 (1.6%)	37 (0.8%)	**0.017**[a]	Seasonal
Pityriasis versicolor	76 (1.1%)	8 (1.0%)	81 (1.8%)	**0.014**[b]	
Xerosis cutis and xerotic eczema	363 (5.3%)	46 (6.0%)	151 (3.3%)	**<0.001**[b,c]	
Polymorph light eruption	7 (0.1%)	2 (0.3%)	65 (1.4%)	**<0.001**[b,c]	
Vitiligo and other hypopigmentation disorders	31 (0.5%)	3 (0.4%)	65 (1.4%)	**<0.001**[b]	
Hyperpigmentation (melasma, ephelid, PIH)	109 (1.6%)	5 (0.6%)	84 (1.8%)	**0.043**[a,c]	
Alopecia areata	95 (1.4%)	21 (2.7%)	88 (1.9%)	**0.008**[a]	COVID-19-related anxiety
Shingles and post-zoster neuralgia	58 (0.9%)	22 (2.9%)	43 (0.9%)	**<0.001**[a,c]	
Idiopathic generalized pruritus	225 (3.3%)	48 (6.2%)	194 (4.2%)	**<0.001**[a,b,c]	
Allergic/irritant contact dermatitis	294 (4.3%)	33 (4.3%)	279 (6.0%)	**<0.001**[b]	Hygiene measures
Verruca vulgaris	357 (5.2%)	12 (1.6%)	201 (4.3%)	**<0.001**[a,c]	Diseases that do not seriously impair the quality of life and whose treatment can be delayed
Corn and callus	106 (1.6%)	6 (0.8%)	35 (0.8%)	**<0.001**[b]	
Skin tags	55 (0.8%)	0 (0.0%)	30 (0.6%)	**0.033**[a]	
Seborrheic keratosis and solar lentigo	53 (0.8%)	1 (0.1%)	23 (0.5%)	**0.044**[a]	
Melanocytic nevus	64 (0.9%)	1 (0.1%)	33 (0.7%)	**0.038**[a]	
Bacterial skin/mucosa diseases	185 (2.7%)	39 (5.1%)	144 (3.1%)	**0.001**[a,c]	A shift from others†
Scabies	138 (2.0%)	20 (2.6%)	83 (1.8%)	**0.276**	

Data are expressed as the number of patients (column percentage). Pearson's chi-squared and Fisher's exact tests were used. Bonferroni correction was applied as a post-hoc (z-test) after chi-squared tests. Significant values were shown in bold. See Table SI in the supplementary file for the full list.
†: From departments such as infectious diseases and internal medicine, which are at the forefront of the fight against COVID-19, were implied, [a]: Adjusted p-value <0.05 for the difference between the "last 4 weeks before COVID-19" and "2nd 4 weeks after COVID-19", [b]: Adjusted p-value <0.05 for the difference between the "last 4 weeks before COVID-19" and "4th 4 weeks after COVID-19", [c]: Adjusted p-value <0.05 for the difference between "2nd 4 weeks after COVID-19" and "4th 4 weeks after COVID-19", COVID-19: Coronavirus disease-2019, PIH: Post-inflammatory hyperpigmentation

While the rate of scabies reported in the first quarter of 2019 was 0.64%, it was approximately 2% in the same period of 2020 corresponding to the pre-pandemic[2,10]. Scabies and venereal diseases, which concern public health, should not be neglected. Therefore, in such a period when polyclinic services have been minimized, the number of applications was below the expected rather than the rate of such diseases, as this indicates that many patients postpone seeking treatment. Considering that scabies is still a public health problem in Turkey and that many people cannot get appropriate treatment after the outbreak, much more significant increases in the frequency of scabies will be recorded after the COVID-19 pandemic. Given our current patient profile, we could not statistically demonstrate this situation for other diseases such as venereal diseases, autoimmune bullous diseases, and severe psoriasis. Based on the patient burden and morbidity, in the future, these diseases will be included in other studies enrolling a sufficient number of patients. We think that the epidemiological follow-up of venereal diseases and an increase social awareness should be given attention.

Despite promising progress in vaccine development studies, the lack of large-scale vaccination in the near future and the shift of doctors from their fields to the COVID-19 field will make it difficult to manage some diseases. Many authors, including us, think that teledermatology can be an available, important step for physicians and patients who are facing new standards in the field of dermatology, enabling them to solve problems quickly and effectively[11-13]. Recently, Lee et al.[14] published a guideline on the adaptation of teledermatology to dermatology practice during the pandemic. They suggested that patients with the highest risk or with emergency conditions should be enlisted and referred primarily for telemedicine visits[14]. The public health risks posed by venereal diseases such as scabies and syphilis must be considered, and these patients should be primarily encouraged to reach teledermatology platforms when available.

Study Limitations

This single-center study was conducted in a COVID-19 hospital, though the changing dermatology practice after COVID-19 is comprehensively discussed. In our center, no evidence-based assessment could be made on these issues due to the lack of cosmetic applications and the scarcity of chronic skin diseases (such as psoriasis and autoimmune bullous diseases) and venereal diseases such as syphilis and anogenital herpes infection. The reason why we encounter these diseases less than expected is not due to pandemic conditions, but due to sociodemographic, geographic, and hospital conditions.

Conclusion

Significant changes have occurred in dermatology practice after the declaration of the COVID-19 pandemic. Increases in the frequency of some anxiety-related diseases and significant decreases in the number

of applications to outpatient clinics and procedural dermatological approaches have been observed. We anticipate that dermatological disorders such as scabies and venereal diseases, which are especially related to public health, may cause future problems because of delays in seeking treatment. Considering the uncertainty of the ongoing pandemic, various solutions such as teledermatology should be developed. A better understanding of the trends of dermatological diseases and the changing health system during the pandemic will help develop solutions of future problems.

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Ethics

Ethics Committee Approval: This single-center cross-sectional retrospective study was approved by the University of Health Sciences Turkey, Erzurum Regional Training and Research Hospital Local Ethics Committee (approval number: 2020/14-158).

Informed Consent: No patient consent was required, on condition that the data such as name and citizenship numbers were anonymized by the IT team and with the permission of the ethics committee.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Ç.T., Ü.Ö., N.M., Concept: Ç.T., Design: Ç.T., Data Collection or Processing: Ç.T., Ü.Ö., N.M., Analysis or Interpretation: Ç.T., Literature Search: Ü.Ö., N.M., Writing: Ç.T., Ü.Ö., N.M.

Conflict of Interest: No conflict of interest was declared by the authors.

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Table Supplement 1. The diagnoses of patients applied to dermatology outpatient clinics				
Diseases	**Before COVID-19**	**After COVID-19**		**p-value**
	Normal period	**Crisis period**	**Normalization process**	
	The last 4-weeks (n=6820)	**2nd 4-weeks (n=771)**	**4th 4-weeks (n=4650)**	
1. Pruritus & dysesthesia				
a. Idiopathic generalized pruritus	225 (3.3%)	48 (6.2%)	194 (4.2%)	**<0.001[a,b,c]**
b. Idiopathic pruritus ani, scroti, vulva & paresthesia	3 (<0.1%)	0 (0.0%)	7 (0.2%)	N/A
2. Papulosquamous & eczematous diseases & drug reactions				
a. Psoriasis (all types)	103 (1.5%)	16 (2.1%)	73 (1.6%)	0.489
b. Lichen planus & other lichenoid dermatoses	36 (0.5%)	0 (0.0%)	21 (0.5%)	0.124
c. Lichen simplex chronicus	49 (0.7%)	5 (0.6%)	22 (0.5%)	0.268
d. Pityriasis lichenoides (acute & chronic)	3 (<0.1%)	2 (0.3%)	3 (0.1%)	N/A
e. Pityriasis rosea	43 (0.6%)	12 (1.6%)	37 (0.8%)	**0.017[a]**
f. Atopic dermatitis	227 (3.3%)	29 (3.8%)	158 (3.4%)	0.813
g. Seborrheic dermatitis	287 (4.2%)	44 (5.7%)	191 (4.1%)	0.124
h. Allergic/Irritant contact dermatitis	294 (4.3%)	33 (4.3%)	279 (6.0%)	**<0.001[b]**
i. Pompholyx	6 (0.1%)	1 (0.1%)	11 (0.2%)	0.121
j. Diaper dermatitis	14 (0.2%)	1 (0.1%)	5 (0.1%)	0.438
k. Xerosis cutis & xerotic eczema	363 (5.3%)	46 (6.0%)	151 (3.3%)	**<0.001[b,c]**
l. Other dermatitis & morbiliform drug reactions	295 (4.3%)	33 (4.3%)	193 (4.2%)	0.876
3. Urticaria, erythema & purpuras				
a. Urticaria & angioedema	301 (4.4%)	34 (4.4%)	203 (4.3%)	0.983
b. Erythema multiforme (minor & major)	13 (0.2%)	1 (0.1%)	14 (0.3%)	0.408
c. Vasculitis (small & medium vessel)	6 (0.1%)	1 (0.1%)	6 (0.1%)	N/A
d. Sweet syndrome & figurate erythemas	6 (<0.1%)	0 (<0.1%)	1 (<0.1%)	N/A
e. Spontaneous purpura & ecchymosis	6 (0.1%)	1 (0.1%)	8 (0.8%)	N/A
4. Autoimmune vesiculobullous diseases				
a. Pemphigus, pemphigoid, dermatitis herpetiformis	5 (0.1%)	1 (0.1%)	6 (0.1%)	N/A
5. Adnexal diseases				
a. Acne	1775 (26.0%)	194 (25.2%)	1139 (24.6%)	0.131
b. Rosacea & associated diseases	98 (1.4%)	6 (0.8%)	75 (1.6%)	0.202
c. Follicular occlusion triad†	26 (0.4%)	4 (0.5%)	16 (0.3%)	0.753
d. Regional hyperhidrosis	26 (0.4%)	0 (0.0%)	16 (0.3%)	0.229
e. Miliaria	8 (0.1%)	1 (0.1%)	1 (<0.1%)	N/A
6. Rheumatologic disorders				
a. Behçet's diseases	20 (0.3%)	1 (0.1%)	9 (0.2%)	0.450
b. RA, SLE, Scleroderma & associated diseases	2 (<0.1%)	1 (0.1%)	4 (0.1%)	N/A
7. Genodermatosis				
a. Ichthyosis, neurofibromatosis & others	10 (0.1%)	0 (0.0%)	3 (0.1%)	N/A
8. Pigmentary disorders				
a. Vitiligo & other hypopigmentation disorders	31 (0.5%)	3 (0.4%)	65 (1.4%)	**<0.001[b]**
b. Hyperpigmentation (melasma, ephelid, PIH)	109 (1.6%)	5 (0.6%)	84 (1.8%)	**0.043[a,c]**
9. Hair disorders & nail disorders & mucous membranes				
a. Telogen effluvium	176 (2.6%)	14 (1.8%)	122 (2.6%)	0.413
b. Androgenic alopecia	37 (0.5%)	1 (0.1%)	36 (0.8%)	0.065

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c. Alopecia areata	95 (1.4%)	21 (2.7%)	88 (1.9%)	**0.008**[a]
d. Trichotillomania	2 (<0.1%)	1 (0.1%)	0 (0.0%)	N/A
e. Cicatricial alopecia	2 (<0.1%)	0 (0.0%)	6 (0.1%)	N/A
f. Hirsutism & hypertrichosis	9 (0.1%)	0 (0.0%)	3 (0.1%)	N/A
g. Ingrown toenail	26 (0.4%)	2 (0.3%)	16 (0.3%)	0.842
h. Nail dystrophies & others	48 (0.7%)	1 (0.1%)	16 (0.3%)	0.315
i. Oral candidiasis, glossodynia, stomatitis & cheilitis	36 (0.5%)	2 (0.3%)	15 (0.3%)	0.155
j. Recurrent aphthous stomatitis	45 (0.7%)	6 (0.8%)	27 (0.6%)	0.755
k. Mucocel	2 (<0.1%)	1 (0.1%)	3 (0.1%)	N/A
10. Infections & infestations & bites				
a. Bacterial skin/mucosa diseases & thrombophlebitis	185 (2.7%)	39 (5.1%)	144 (3.1%)	**0.001**[a,c]
b. Tinea capitis & kerion	34 (0.5%)	3 (0.4%)	14 (0.3%)	0.263
c. Pityriasis versicolor	76 (1.1%)	8 (1.0%)	81 (1.8%)	**0.014**[b]
d. Anogenital candidiasis & erythema intertrigo	49 (0.7%)	2 (0.3%)	23 (0.5%)	0.115
e. Other superficial fungal skin/nail infections	332 (4.9%)	38 (4.9%)	245 (5.3%)	0.822
f. Molluscum contagiosum	22 (0.3%)	1 (0.1%)	18 (0.4%)	0.507
g. Herpes simplex infections (genital & non-genital)	53 (0.8%)	8 (1.0%)	36 (0.8%)	0.726
h. Varicella	7 (0.1%)	2 (0.3%)	0 (0.0%)	N/A
i. Shingles & post-zoster nevralgia	58 (0.9%)	22 (2.9%)	43 (0.9%)	**<0.001**[a,c]
j. Verruca vulgaris	357 (5.2%)	12 (1.6%)	201 (4.3%)	**<0.001**[a,c]
k. Anogenital warts	47 (0.7%)	4 (0.5%)	36 (0.8%)	0.584
l. Gonorrhea & syphilis	1 (<0.1%)	0 (0.0%)	2 (<0.1%)	N/A
m. Other viral diseases (defined & undefined)	10 (0.1%)	0 (0.0%)	3 (0.1%)	N/A
n. Scabies	138 (2.0%)	20 (2.6%)	83 (1.8%)	0.276
o. Pediculosis	5 (0.1%)	0 (0.0%)	9 (0.2%)	N/A
p. Insect bite	16 (0.2%)	2 (0.3%)	22 (0.5%)	0.088
11. Physical agents related disorders				
a. Polymorph light eruption	7 (0.1%)	2 (0.3%)	65 (1.4%)	**<0.001**[b,c]
b. Burns (sun, thermal, etc)	9 (0.1%)	1 (0.1%)	8 (0.2%)	0.858
c. Erythema ab igne	5 (0.1%)	0 (0.0%)	1 (<0.1%)	N/A
d. Corn & callus	106 (1.6%)	6 (0.8%)	35 (0.8%)	**<0.001**[b]
12. Langerhans cells & macrophage associated diseases				
a. Xanthomas & xanthelasmas & non-infectious granulomas	5 (0.1%)	1 (0.1%)	5 (0.1%)	N/A
13. Atrophies & dermal connective tissue diseases				
a. Morphea & lichen sclerosus et atrophicus	3 (<0.1%)	0 (0.0%)	6 (0.1%)	N/A
b. Hypertrophic scars & keloids	29 (0.4%)	0 (0.0%)	13 (0.3%)	0.101
c. Skin tags	55 (0.8%)	0 (0.0%)	30 (0.6%)	**0.033**[a]
d. Connective tissue atrophies (striae, anetoderma, etc)	8 (0.1%)	0 (0.0%)	5 (0.1%)	N/A
14. Panniculitis	1 (<0.1%)	6 (0.8%)	8 (0.2%)	NA
15. Vascular disorders				
a. Raynaud's syndrome	2 (<0.1%)	0 (0.0%)	1 (<0.1%)	N/A
b. Pernio	6 (0.1%)	1 (0.1%)	0 (0.0%)	N/A
c. Chronic skin ulcers	2 (<0.1%)	0 (0.0%)	2 (<0.1%)	N/A
d. Peripheral vascular diseases & lymphedema	1 (<0.1%)	2 (0.3%)	8 (0.2%)	N/A
e. Pyogenic granuloma	12 (0.2%)	2 (0.3%)	9 (0.2%)	0.875
16. Neoplasms				
a. Melanocytic nevus	64 (0.9%)	1 (0.1%)	33 (0.7%)	**0.038**[a]

b. Basal cell carcinoma	10 (0.1%)	0 (0.0%)	3 (0.1%)	N/A
c. Squamous cell carcinoma	0 (0.0%)	1 (0.1%)	0 (0.0%)	N/A
d. Epidermal cyst	39 (0.6%)	4 (0.5%)	26 (0.6%)	0.978
e. Lipoma	8 (0.1%)	0 (0.0%)	5 (0.1%)	N/A
f. Seborrheic keratosis, solar lentigo	53 (0.8%)	1 (0.1%)	23 (0.5%)	**0.044**[a]
g. Actinic keratosis	30 (0.4%)	2 (0.3%)	14 (0.3%)	0.415
h. Hemangiomas	9 (0.1%)	1 (0.1%)	4 (0.1%)	N/A
i. Mastocytosis	1 (<0.1%)	0 (0.0%)	1 (<0.1%)	N/A
17. Undetermined reason for examination and observation	97 (1.4%)	7 (0.9%)	58 (1.3%)	0.411

Data are expressed as the number of patients (column percentage). Pearson's chi-square test was used. Bonferroni correction was applied as a post-hoc (z-test) after chi-square tests. Significant values were shown in bold. RA: Rheumatoid arthritis, SLE: Systemic lupus erythematosus, PIH: Post-inflammatory hyperpigmentation, N/A: Not applicable, †: Hidradenitis suppurativa, acne conglobata, dissecting cellulitis of the scalp, [a]: Adjusted p-value <0.05 for the difference between "the last 4-weeks before Coronavirus disease-2019 (COVID-19)" and "2nd 4-weeks after COVID-19", [b]: Adjusted p-value <0.05 for the difference between "the last 4-weeks before COVID-19" and "4th 4-weeks after COVID-19", [c]: Adjusted p-value <0.05 for the difference between "2nd 4-weeks after COVID-19"; and "4th 4-weeks after COVID-19"