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Multicenter study evaluating the impact of COVID-19 outbreak on dermatology outpatients in Turkey

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Abstract

COVID-19 pandemic has a significant impact on public health, whether directly or indirectly. The first case was seen in Turkey on March 11, and the World Health Organization (WHO) declared a pandemic on March 12, 2020. The study aimed to document the effect of pandemic on dermatology outpatient clinics in Turkey. Fifteen tertiary hospitals from 13 provinces were included in the study, which was conducted between January 12 and May 12, 2020. The International Codes of Diseases (ICD-10) categories and patients' characteristics were evaluated before and after the pandemic. A total of 164 878 patients, 133 131 before and 31 747 after the pandemic, were evaluated. The daily hospital applications were found reduced by 77%. The three of the most frequent diagnoses; dermatitis, acne, and psoriasis remained unchanged after the pandemic. While the frequency of herpes zoster, scabies,

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urticaria, pityriasis rosea and sexually transmitted diseases increased significantly; allergic and irritant contact dermatitis decreased after the pandemic. The applications regarding cutaneous neoplasms were considerably reduced during the pandemic, and this effect was more pronounced in cities with higher COVID incidence. The pandemic caused a noteworthy reduction in the number of patients accessing dermatological care. The pandemic caused significant changes in the frequency of a wide range of dermatological diseases. The application of cutaneous neoplasms is considerably reduced after the pandemic, and this effect was more pronounced in cities where pandemics are frequent. Therefore, the pandemic has resulted on numerous impacts on many critical issues in dermatology and dermatological care.

KEYWORDS

COVID-19, dermatology outpatients, pandemic

1 | INTRODUCTION

Coronavirus disease (COVID) was first identified in late 2019 in Wuhan, China. As the disease has worldwide spread, the COVID-19 outbreak affected more than 10 million individuals as of July 2020 since it was first reported.[1,2] The first case was seen in Turkey on March 11 and the World Health Organization (WHO) declared the outbreak a pandemic on March 12 2020.[3] The rapid increase of the infected count created the necessity to take precautions to restrict the spread of the infection and the government imposed curfew restrictions for youngsters, people more than 65-years-old and those with chronic illness. Although routine dermatology outpatient care was not stopped, individuals were asked to avoid visits in non-emergency conditions, and clinics restricted the total count of applications.[4,5] Many patients have stopped or hesitated to attend to the hospitals either because of the warnings or because they were afraid of the risk of exposure. Increased anxiety might be predicted especially in patients who need regular hospital visits.[6,7] Dermatology patients and dermatology practice are inevitably affected by the COVID-19 pandemic.[8] It would be noteworthy to investigate the patients applied to hospitals even during the pandemic. The change, if any, needed to be documented after the pandemic. Indeed, a few short-term single-center studies with limited number of patients have been published recently.[9-11]

In Turkey, some cities affected much more severely by the coronavirus outbreak. The goal of this multicenter study was to determine whether dermatology admissions differ significantly before and after the pandemic in Turkey and whether there is an additional difference between groups with higher and lower COVID incidence provinces.

2 | MATERIAL AND METHODS

This multicenter study was conducted between January 12 and May 12, 2020, and dermatology departments of 15 tertiary hospitals from 13 provinces were included in the study. The hospitals were from eight regions out of 12 identified in the Turkish "Nomenclature of Territorial Units for Statistics" (NUTS). The regions and cities (in parentheses) of the hospitals are as follows; Aegean (Izmir, Aydın), East Marmara (Bursa, Kocaeli), West Anatolia (Ankara), Mediterrean (Antalya, Hatay, Mersin), Central Anatolia (Kayseri), West Black Sea (Samsun), Central East Anatolia (Elazıg) and Istanbul region. As the first case identified was from Istanbul, three centers represented the city due to its importance of being at the highest risk of an outbreak. Number of cities with higher and lower risk of COVID outbreak was balanced.

Demographic characteristics and diagnoses of patients admitted to dermatology outpatient clinics were collected from the electronic registration databases. Data were analyzed independently for two consequent 2-month periods before and after March 12. The patients were divided into following age groups: 0 to 18, 19 to 44, 45 to 64; and ≥65 years. The diagnoses were listed based on the primary and digit categories of ICD-10 (International Classification of Diseases-10th Revision) codes. Category codes with three characters including code letter and following two numerical digits were used, and subcategories were collected under its category. For example; L40.0-L40.9 were all collected in L40.

The research project was approved by the Ethics Committee of Ankara Diskapi Yildirim Beyazit Research and Training Hospital. The data obtained in this study were analyzed by SPSS 21 package program. In the comparison of the frequency of diseases according to different parameters, Chi-Square analysis was used. $P = .05$ was used as the level of significance.

3 | RESULTS

A total of 133 131 patients applied to 15 dermatology centers from January 12 to March 11; and 31 747 patients from March 12 to May 12 were reviewed. There were 57 169 male and 75 962 female records with mean ages of 40.93 ± 21.05 and 39.05 ± 19.22 before the pandemic; and 15 274 male and 16 473 female records with mean

ages of 39.84 ± 18.06 and 38.09 ± 17.73 after the pandemic; respectively. The most common age group were 18 to 44 (54%) followed by 45 to 64 (28.1%), ≥65 (9.2%), and 0 to 18 years (8.6%) after the pandemic. The daily average number of patients decreased by 71.6% (227.8-64.8) in centers with higher COVID incidence; 80% (192.3-36.9) in centers with lower COVID and 77% in total centers (206.4-48) after the pandemic ($P < .001$). Figure 1 shows the timeline of hospital applications weekly. The distribution and demographic characteristics of patients according to cities with higher and lower COVID incidence are summarized in Table 1.

There was a significant decrease in hospital applications after the pandemic in the age groups of 0 to 18 (11.6%-8.6%) and ≥65 (13.7%-9.2%) ($P < .0001$, $P < .0001$ respectively). Female patient applications to hospitals significantly decreased (57.1%-51.9%; $P < .0001$) and the female/male ratio changed from 1.33 to 1.07, shifting in favor of male gender after the pandemic. The demographic characteristics of the patients and centers are shown in Table 2.

3.1 | The pattern of diagnoses

The most common diagnoses before the pandemic were dermatitis (17.27%); acne (13.43%); psoriasis (9.77%); pruritus (4.60%); and urticaria (4.47%) in total of 164 878 diagnoses. The most frequent ICD codes after the pandemic remained almost the same with minor changes as follows; dermatitis (19.15%); acne (14.59%); psoriasis (10.15%), urticaria (6.43%) and pruritus (6.23%). The diagnosis of urticaria significantly increased after the pandemic ($P < .001$). Categories of ICD-10 codes of the patients who applied to the dermatology centers before and after the outbreak and the significance of the change in diagnostic distribution was analyzed and summarized in Table 2.

The frequency of the following diseases increased significantly after the pandemic are; anogenital warts, herpes zoster, dermatophytosis, scabies, post zoster neuralgia, cutaneous infection diseases, contact dermatitis, lichen simplex chronicus, dermatitis, pityriasis rosea, urticaria, pyoderma gangrenosum, connective tissue diseases and insect bites. The diseases significantly decreased after the pandemic are as follows; viral warts, benign in situ and malignant neoplasms, neoplasms with uncertain behavior, endocrine and metabolic diseases, diseases of the circulatory system including diseases of capillaries, bullous diseases, allergic and irritant contact dermatitis, drug eruptions, pruritus, lichen planus, actinic keratosis, nail disorders, androgenetic alopecia, other nonscarring hair loss including telogen effluvium, pigmentation disorders, seborrheic keratosis, corns, xerosis cutis, keratoderma unspecified, morphea, pyogenic granuloma and cutaneous amyloidosis (Table 2).

Categories of ICD-10 codes of the patients applied to the dermatology centers before and after the outbreak and the significance of the change in diagnostic distribution was analyzed and summarized in Table 3. The frequency of acne and dermatophytosis were found significantly increased and dermatitis decreased in the centers with lower COVID incidence. The frequency of dermatitis was unchanged, and pruritus and in situ neoplasms or neoplasms with uncertain behavior were found decreased in the centers with high COVID incidence. Psoriasis, urticaria, scabies, and herpes zoster increased in both centers with higher and lower COVID incidence after the pandemic (Table 3).

3.2 | Distribution of diagnoses according to age and gender

The change in the frequency of different diagnosis before and after the pandemic was evaluated according to age groups. The statistically significant changes were as follows (a) Scabies and atopic dermatitis increased in pediatric age; (b) Scabies, dermatophytosis, urticaria and pityriasis rosea increased, and malign neoplasms decreased in 18 to 44 years age; (c) Scabies, atopic dermatitis, seborrheic dermatitis, other dermatitis, pityriasis rosea, urticaria, and acne increased, allergic contact dermatitis, irritant contact dermatitis, pruritus, lichen planus, bullous diseases, and neoplasms with uncertain behavior decreased in 45 to 64 years age; and (d) Dermatophytosis, atopic dermatitis, other

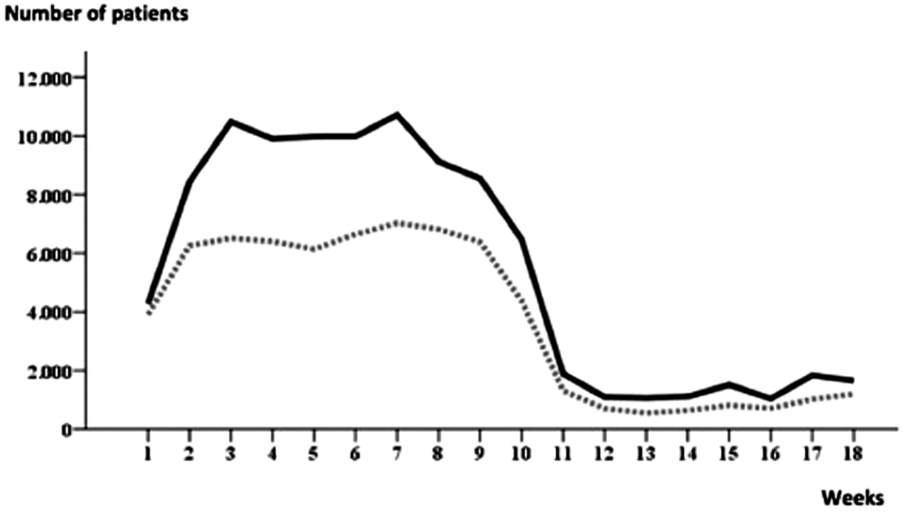


FIGURE 1 The weekly number of applications. The continuous line shows the centers with higher COVID incidence, and dashed line shows centers with lower COVID incidence. Week 9 corresponds to the declaration of pandemic. The decrease of the applications in both groups after the pandemic expressed a similar curve

TABLE 1 Distribution and demographic characters of patients according to provinces with higher and lower COVID incidence

		Before pandemic		After pandemic		Difference	
		n	%	n	n	%	*P* value
Provinces with higher covid incidence	Istanbul 1	12 680	9.52	2809	8.85	−7.1	.0001*
	Istanbul 2	9866	7.41	3276	10.32	39.2	.0001*
	Istanbul 3	12 955	9.73	3867	12.18	25.2	.0001*
	Ankara	23 560	17.70	6260	19.72	11.4	.0001*
	İzmir	2557	1.92	1178	3,71	93.2	.0001*
	Kocaeli	3545	2.66	1305	4.11	54.4	.0001*
	Bursa	1803	1.35	357	1.12	−17.0	.0001*
Provinces with lower covid incidence	Antalya	7668	5.76	1884	5.93	3.0	.231
	Aydın	25 859	19.42	3595	11.32	−41.7	.0001*
	Kayseri	6005	4.51	1043	3.29	−27.2	.0001*
	Elazığ	5492	4.13	1641	5.17	25.3	.0001*
	Hatay	3731	2.80	1006	3.17	13.1	.0001*
	Mersin	6364	4.78	1471	4.63	−3.1	.269
	Samsun	5178	3.89	1199	3.78	−2.9	.351
	Denizli	5868	4.41	856	2.70	−38.8	.0001*
	Total	133 131	100.0	31 747	100.0		
Distribution according to age groups	Below 18	15 404	11.6	2746	8.6	−25.2	.0001*
	18-44 years	63 566	47.7	17 139	54.0	13.1	.0001*
	45-64 years	35 920	27.0	8929	28.1	4.2	.321
	65 and over	18 241	13.7	2933	9.2	−32.6	.0001*
	Total	133 131	100.0	31 747	100.0		
Distribution according to gender	Male	57 169	42.9	15 274	48.1	12.0	.0001*
	Female	75 962	57.1	16 473	51.9	−9.1	.0001*
	Total	133 131	100.0	31 747	100.0		

Note: *$P < .005$ significantly different by Chi-Square.

dermatitis, urticaria increased, malignant neoplasms, neoplasms with uncertain behavior, bullous diseases, lichen planus decreased in 65 years and over age group. Among females, scabies, lichen simplex chronicus, dermatitis, pityriasis rosea, urticaria and acne were found increased (Table 4).

The change in the frequency of sexually transmitted diseases, including anogenital warts, anogenital herpes infection, syphilis, gonorrhea, and chlamydia. There was a significant increase in the 18 to 44 and 45 to 64 age groups, and in males ($P = .000$ for each).

4 | DISCUSSION

The COVID pandemic has a significant impact on dermatologic practice. Hospital applications decreased in COVID affected countries as a result of precautions taken against the outbreak.[12] Our study documented that dermatology applications decreased by 77%, shortly after the declaration of the pandemic in Turkey. Interestingly, the decrease in applications was more pronounced in the centers with lower COVID incidence than in those with higher ones (80% vs 71%). The psychological impact of the pandemic might be uncorrelated with the local COVID incidence. Not only the number, but the gender and the age distribution differences among hospital applications and the proportion of some diagnoses were seen significantly changed after the pandemic. A significant decrease was observed in the frequency of application of the pediatric and geriatric population. During the pandemic, curfew was imposed for the pediatric and geriatric population; however, the ones who scheduled a hospital appointment were exempted. The concern of COVID transmission during hospital visits might have resulted in this decrease besides the dissuasiveness of the curfew. Indeed, hospitals, especially outpatient clinics, can be vectors for COVID-19, and patients might have refrained from applying to hospitals due to the warnings.[13] Female dominance was found to have shifted in favor of male gender in the pandemic, which might give information about the difference in risk perception of the pandemic between these genders.

The most common diagnoses were reported as miscellaneous eczema, atopic dermatitis, and tinea pedis in Japan.[14,15] The pattern of skin disease in any country is affected by many factors. Therefore, the distribution of diagnoses before the pandemic needs to be

TABLE 2 Distribution of diagnoses before and after the pandemic

Categories	Before pandemic n, %	After pandemic n, %	% change	*P*-value
(A00-B99) Certain infections and parasitic diseases				
Bacterial				
A18 Tuberculosis A46 Erysipelas A51 Early syphilis A52 Late syphilis A53 Unspecified syphilis	90, 0.07%	22, 0.07%	2.51	.996
Viral				
A60 Anogenital Herpes A63 Anogenital warts B00 Herpes simplex, B01 Varicella B02 Herpes zoster B07 Viral warts B08,B09 Other viral infections	5431, 4.08%	1402, 4.42%	8.25	.209
A63 Anogenital warts	743, 0.56%	299, 0.94%	69	.000*
B02 Herpes zoster	451, 0.34%	248, 0.78%	131	.000*
B07 Viral warts	3536, 2.66%	680, 2.14%	−19	.000*
Mycosis				
B35 Dermatophytosis B36 Pityriasis versicolor B37 Candidiasis	5514, 4.14%	1574, 4.96%	19.71	.000*
B35 Dermatophytosis	4843, 3.64%	1340, 4.22%	16	.002*
Protozoal				
B55 Leishmaniasis	57, 0.04%	30, 0.09%	120.71	.001*
Parasitic				
B85 Pediculosis and phthriasis B86 Scabies	1608, 1.21%	650, 2.05%	69.51	.000*
B86 Scabies	1577, 1.18%	643, 2.03%	71	.000*
(C00-D48) Neoplasms				
Malign neoplasms				
C43 Malign melanoma C44 Cutaneous other neoplasms C46 Kaposi sarcoma C84, C85, C96 NK/T-cell lymphoma, non-Hodgkin Lymphoma and other hematopoietic neoplasms	2108, 1.58%	374, 1.18%	−25.60	.000*
In situ neoplasms				
D03 Melanoma in situ D07 Carcinoma in situ of other and unspecified genital organs	16, 0.01%	2, 0.01%	−47.58	N/A
Benign neoplasms				
D10,D17,D18 Benign neoplasm of mouth, adipose tissue land ymphangioma D21 Benign soft tissue neoplasms D22 Melanocytic naevi D23 Other benign neoplasms of skin	1641, 1.23%	250, 0.79%	−36.11	.000*
D48 Neoplasms with unknown/ uncertain behavior	508, 0.38%	64, 0.20%	−47.17	.000*
(D50-D89) Diseases of blood and certain disorders involving immune mechanism				
D50, D51, D52 Iron, B12, Folate deficiency anemias D64 Other anemias D69 Purpura D86 Sarcoidosis	366, 0.27%	93, 0.29%	6.56	.584
(E00-E90)Endocrine nutritional and metabolic diseases				
E53, E55, E56,E60, E61 Vitamin B, D, zinc and other nutrient deficiencies E85 Amyloidosis E80 Disorders of bilirubin metabolism	700, 0.53%	131, 0.41%	−21.52	0.000*
(F00-F99) Diseases of mental and behavioral disorders				
F63 Trichotillomania	12, 0.01%	4, 0.01%	39.78	NA
(G00-G99) Diseases of nervous system				
G53 Cranial nerve disorders classified elsewhere (eg, post zoster neuralgia)	29, 0.02%	15, 0.05%	116.91	.000*
(I00-I99) Diseases of circulatory system				
I73 Peripheral vascular diseases I78 Diseases of Capillaries I83 Varicose veins of lower extremities	1189, 0.89%	87, 0.27%	−69.32	.000*
(K00-K93) Diseases OF digestive system				
K12 Stomatitis, related lesions (eg, recurrent oral aphthae) K13 Other diseases of lip and oral mucosa (eg, cheilitis, leukoplakia) K14 Diseases of tongue	887, 0.67%	221, 0.66%	−0.24	.974

(Continues)

TABLE 2 (Continued)

Categories	Before pandemic n, %	After pandemic n, %	% change	*P*-value
(L00-L99) Cutaneous and subcutaneous disorders				
Cutaneous and Subcutaneous Infectious Diseases				
L00 Staphylococcal scalded skin syndrome L01 Impetigo L02 Cutaneous abscess, furuncle L03 Cellulitis L04 Acute lymphadenitis L05 Pilonidal cyst L08 Other local infections		653, 2.06%	36.37	.000*
Bullous diseases				
L10 Pemphigus L11 Other acantholytic disorders L12 Pemphigoid L13 Other bullous diseases (eg, dermatitis herpetiformis)	2669, 2.00%	552, 1.74%	−13.27	.002*
L10 Pemphigus	1531 1.15%	347 1.09%	−4.96	.391
Dermatitis				
Total	37 351, 28.06%	8403, 26.47%	−5.66	.052
L20 Atopic dermatitis	1741, 1.31%	458, 1.44%	10	.061
L21 Seborrheic dermatitis	2812, 2.11%	713, 2.25%	6	.139
L22 Diaper dermatitis	4, 0.0%	3, 0.1%	215	NA
L23 Allergic contact dermatitis	760, 0.57%	128, 0.40%	−29	.000*
L24 Irritant contact dermatitis	373, 0.28%	0, 0.0%	−100	.000*
L25 Unspecified contact dermatitis	706, 0.53%	210, 0.66%	25	.005*
L26 Exfoliative dermatitis	83, 0.06%	26, 0.08%	31	.273
L27 Dermatitis due to substances taken internally	102, 0.08%	9, 0.03%	−63	.004*
L28 Lichen simplex chronicus	831, 0.62%	255, 0.80%	29	.000*
L29 Pruritus	6127, 4.60%	1343, 4.23%	−8	.004*
L30 Other dermatitis	22 991, 17.27%	6079, 19.15%	11	.000*
Papulosquamous diseases				
L40 Psoriasis L41 Parapsoriasis L42 Pityriasis rosea L43 Lichen planus L44 Other	15 170, 11.39%	3667, 11.55%	1.37	.433
L40 Psoriasis	13 011, 9.77%	3221, 10.15%	4	.146
L42 Pityriasis rosea	379, 0.28%	164, 0.52%	81	.000*
L43 Lichen planus	1254, 0.94%	214, 0.67%	−28	.000*
Urticaria and Erythema				
L50 Urticaria L51 Erythema multiforme L52 Erythema nodosum L53 Other erythematous conditions L54 Erythema not classified	6244, 4.69%	2153, 6.78%	44.60	.000*
L50 Urticaria	5946, 4.47%	2042, 6.43%	44	.000*
Radiation related disorders				
L55 Sunburn L56 Other acute skin changes due to UV radiation L57 Skin changes due to chronic exposure to nonionizing radiation (actinic keratosis) L58 Radiodermatitis L59 Other	689, 0.52%	122, 0.38%	−25.75	.000*
L57 (actinic keratosis)	619, 0.46%	105, 0.33%	−29	.001*
Disorders of skin appendages				
Total	28 047, 21.07%	6789, 21.38%	1.51	.213
L60 Nail disorders L62 Nail disorders other	1371, 1.03%	244, 0.77%	−25	.000*
L63 Alopecia areata	2672, 2.01%	616, 1.94%	−3	.444
L64 Androgenetic alopecia	783, 0.59%	114, 0.36%	−39	.000*
L65 Other non-scarring hair loss (telogen effluvium)	2086, 1.57%	416, 1.31%	−16	.001*
L66 Cicatricial alopecia	469, 0.35%	96, 0.30%	−14	.137
L67 Hair color and shaft abnormalities L68 Hypertrichosis	8, 0.01%	2, 0.01%	5	N/A
L70 Acne	17 882, 13.43%	4631, 14.59%	9	.065
L71 Rosacea	1769, 1.33%	399, 1.26%	−5	.312

TABLE 2 (Continued)

Categories	Before pandemic n, %	After pandemic n, %	% change	*P*-value
L72,L73 Follicular cysts of skin and other tissue	972, 0.73%	262, 0.83%	13	.077
L74 Eccrine 75 Apocrine sweat disorders	35, 0.03%	9, 0.03%	8	.841
Other disorders of skin and subcutaneous tissue				
Total	9967, 7.49%	2110, 6.65%	−11.22	.000*
L80 Vitiligo	1136, 0.85%	267, 0.84%	−1	.831
L81 Other disorders of pigmentation	1048, 0.79%	208, 0.66%	−17	.015*
L82 Seborrheic keratosis L83 Acanthosis nigricans	662, 0.5%	108, 0.34%	−32	.000*
L84 Corns and callosities	1133, 0.85%	193, 0.61%	−29	.000*
L85 Other epidermal thickening (eg, xerosis cutis)	2947, 2.21%	655, 2.06%	−7	.101*
L86 Keratoderma in diseases classified elsewhere	97, 0.07%	9, 0.03%	−61	.007*
L87 Transepidermal elimination disorders	15, 0.01%	5, 0.02%	40	.568
L88 Pyoderma gangrenosum	41, 0.03%	48, 0.15%	391	.000*
L89 Decubitus ulcer and pressure area	10, 0.01%	1, 0.00%	−58	.702
L90 Atrophic L91 Hypertrophic disorders of skin	428, 0.32%	82, 0.26%	−20	.068
L92 Granulomatous disorders of skin	313, 0.24%	60, 0.19%	−20	.121
L93 Lupus erythematosus	453, 0.34%	128, 0.40%	18	.089
L94 Other localized connective tissue disorders (eg, morphea, poikiloderma)	408, 0.31%	65, 0.2%	−33	.002*
L95 Vasculitis limited to skin, not elsewhere classified	345, 0.26%	94, 0.30%	14	.251
L97 Ulcer of lower limb, not elsewhere classified	43, 0.03%	15, 0.05%	46	.267
L98 Other skin disorders (pyogenic granuloma, sweet syndrome wells syndrome) L99 other (eg, macular and lichen amyloidosis)	888, 0.67%	172, 0.54%	−19	.012*
(M00-M99)Diseases of musculoskeletal system and connective tissue				
M30, M31 Polyarteritis nodosa and other vasculopathy M32 Systemic lupus erythematosus M33 Dermatopolymyositis M34 Systemic sclerosis M35 Other (Behcet's Disease) M36 not classified	817, 0.61%	272, 0.86%	39.61	.000*
M79 Other soft tissue disorders (panniculitis)	218, 0.16%	70, 0.22%	34.65	.000*
(O00-O99)Pregnancy, childbirth ABD the puerperium				
O26 Skin conditions related to pregnancy	3, 0.00%	0		N/A
(Q00-Q99)Congenital malformations deformations and chromosomal abnormalities				
Q80 Congenital ichthyosis Q81 Epidermolysis bullosa Q82,Q84 Other Q85 Phacomatoses	204, 0.15%	50, 0.16%	2.78	.862
(R00-R99)Symptoms signs abnormal clinical and laboratory findings not elsewhere classified				
R20 Disturbances of skin sensation R21 Nonspecific skin eruption R22 Localized swelling R23 Other R61 Hyperhidrosis	4196, 3.15%	857, 2.70%	−14.35	.000*
(S00-T98)Injury poisoning and certain other consequences of external causes				
T30,T31 Burn and corrosions T69 Other effects of reduced temperature (chilblain, etc.)	222, 0.17%	43, 0.14%	−18.77	.211
(V01-Y98)External causes of morbidity and mortality				
W57 Bitten by insect and other arthropods	48, 0.04%	21, 0.07%	83.47	.000*
Others				
Z00-Z13 Persons encountering health services for examination and investigation	5122, 3.85%	1076, 3.39%	−11.91	.000*
Total	**133 131**	**31 747**		

Note: *$P < .005$ significantly different by Chi-Square.
Abbreviation: N/A, not applicable.

investigated. According to our results, dermatitis, acne, psoriasis, pruritus, and urticaria were the most common five diagnoses before the pandemic, respectively. The frequency of dermatitis, acne, and psoriasis remained unchanged, while the diagnosis of urticaria significantly increased after the pandemic and became the fourth of the most common five diagnoses. Although the number of patients

TABLE 3 The change in the frequency of the most common disorders in centers with higher and lower COVID incidence

	Centers with higher COVID incidence						Centers with lower COVID incidence					
	Before pandemic		After pandemic		Difference		Before pandemic		After pandemic		Difference	
	n	%	n	%	%	*P*	n	%	n	%	%	*P*
Dermatitis	21 250	31.73	5869	30.81	−2.92	.051	1741	2.63	210	1.65	−37.13	.000*
Acne	10 528	15.72	3034	15.92	1.29	.497	7354	11.11	1597	12.58	13.18	.000*
Psoriasis	5570	8.32	1702	8.93	7.40	.007*	7441	11.25	1519	11.97	6.40	.019*
Dermatophytosis	2854	4.26	825	4.33	1.60	.681	1989	3.01	515	4.06	34.95	.000*
Urticaria	2425	3.62	959	5.03	39.00	.000*	3521	5.32	1083	8.53	60.31	.000*
Pruritus	6037	9.02	1319	6.92	−23.20	.000*	90	0.14	24	0.19	38.98	.187
Scabies	802	1.20	435	2.28	90.65	.000*	775	1.17	208	1.64	39.88	.000*
Herpes zoster	286	0.43	138	0.72	69.61	.000*	165	0.25	110	0.87	247.45	.000*
In situ neoplasms and neoplasms with uncertain behavior	510	0.76	63	0.33	−56.58	.000*	15	0.02	4	0.03	38.99	.532

Note: *$P < .005$ significantly different by Chi-Square.

decreased, the frequency of herpes zoster, scabies, dermatophytoses, pityriasis rosea, leishmaniasis and sexually transmitted diseases like syphilis, anogenital warts increased significantly after the pandemic. The increase in urticaria and herpes zoster might be related to psychological stress during the pandemic, and the high rate of hospital applications with these complaints during the pandemic show their negative effect on the quality of life.[16] On the other hand, herpes zoster has been proposed to be an indicator or complication of COVID-19 infection. It can be seen as a first sign or during COVID-19 infection.[17,18] Our findings revealed an increased frequency of herpes zoster, which might support such previous observations. The reason for this increase might because of the high morbidity of the disease as compared to other dermatological diseases. Pityriasis rosea, which was reported among the cutaneous findings of COVID-19, exhibited a significant increase during the pandemic in our study. It was speculated that SARS-CoV-2 might reactivate latent infections like HHV-6/7 and herpes zoster by acting as a transactivator agent.[19,20] In addition, the pandemic emerged in the spring in Turkey. The high frequency of pityriasis rosea in this season might also have affected this result. The significant increase in the frequency of scabies is not surprising because of the ongoing scabies outbreak in Turkey that has been documented and reported recently.[21] The increasing rates of patients with scabies and urticaria during the pandemic have also been reported in other studies from Turkey.[10,11] During the period corresponding to the lockdown in Italy; dermatitis, infections including scabies, herpes zoster, psoriasis and urticaria were reported as the most common diagnoses, similar to our results.[22]

The frequency of the sexually transmitted diseases including anogenital herpes infection, syphilis, gonorrhea, chlamydia and anogenital warts were found increased after the pandemic. Their negative impact on the quality of life and treatment necessity might have caused this increase. The diagnosis of acne vulgaris was found to be significantly increased in females and in the 45 to 64 age group, otherwise not increased significantly after the pandemic. In a single-center study following diagnoses were found to be increased after pandemic; generalized pruritus, pityriasis rosea, alopecia areata, and zona zoster.[11] In the same study, the frequency of diagnoses of verruca vulgaris, hyperpigmentation, skin tag, melanocytic nevus, seborrheic keratosis/solar lentigo was found decreased, and acne was reported as unchanged.

In our study, in addition to acute complaints such as infectious diseases and insect bites; an increase in chronic systemic inflammatory diseases such as autoimmune connective tissue diseases, and pyoderma gangrenosum were found after the pandemic. Patients with systemic inflammatory diseases require long-term monitoring, including regular investigations for a-newly-emerging systemic involvement or potential side effects of systemic treatments might have caused this increase.

The frequency of psoriasis was found unchanged, and it remained one of the most seen three diagnoses after the pandemic. Psoriasis is a chronic disease that has a well-known negative effect on the quality of life and psoriasis patients generally require regular follow-up visits. Our results show their high compliance with treatment. Unlike other bullous diseases, pemphigus vulgaris remained unchanged after the pandemic. The group of bullous diseases decreased otherwise. Pemphigus vulgaris is generally more severe than other bullous diseases and patients use generally immunosuppressive drugs. They should be followed with regular hospital visits despite the concerns regarding lowered immune response to Sars-Cov-2.

Atopic dermatitis was found significantly increased in our study, which might have an association with hygienic concerns According to our results, the application to hospitals with complaints of irritant dermatitis decreased after the pandemic. This finding is similar to a study published recently.[11] On the other hand, a single center study with limited number of patients have reported increased hospital application with the complaint of irritant dermatitis after the pandemic.[10]

TABLE 4 The change in the frequency of common diagnoses according to age groups and gender

	Males		Female		0-18 years		18-44 years		45-64 years		65 years and above	
	%	*P*	%	*P*	%	*P*	%	*P*	%	*P*	%	*P*
Herpes zoster	184.6	.000*	81.6	.000*	40.24	.487	300.71	.000*	113.96	.000*	104.99	.000*
Dermatophytosis	24.86	.000*	0.67	.888	21.34	.141	28	.000*	10	.051	18	.041*
Scabies	70.99	.000*	62.61	.000*	88.04	.000*	96	.000*	51	.000*	−7	.732
Malign neoplasms	−7.86	.267	−42.46	.000*	−18.19	N/A	−26.45	.006*	4.13	.125	−39.41	.000*
In situ neoplasms	−100.00	.136	84.45	.363	–	N/A	−100.0	N/A	34.09	N/A	55.48	N/A
Benign neoplasms	−30.42	.000*	−40.35	.000*	−15.33	.445	−48.84	.000*	−30.36	.002*	−1.33	.943
Neoplasms with uncertain behavior	−36.88	.005*	−61.72	.000*	−64.94	N/A	−38.75	.051	−49.16	.002*	−31.93	.000*
Atopic dermatitis	12.75	.098	6.00	.441	30.30	.002*	−3	.692	30	.025*	91	.001*
Seborrheic dermatitis	10.48	.065	−4.00	.531	−17.66	.141	2	.727	24	.023*	23	.184
Allergic contact dermatitis	−28.86	.011*	−30.50	.007*	66.21	.101	−29	.008*	−43	.004*	−36	.136
Irritant contact dermatitis	−100	.000*	−100	.000*	−100	.054	−100	.000*	−100	.000*	−100	.097
Lichen simplex chronicus	24.76	.061	35.13	.019*	−33.02	.358	30	.007*	35	.012*	−19	.524
Pruritus	−5.70	.161	−10.84	.001*	2.47	.745	−7	.057	−22	.000*	−41	.003*
Other dermatitis	9.90	.000*	11.42	.006*	1.44	.751	4	.031*	23	.000*	20	.000*
Psoriasis	−1.52	.536	6.10	.000*	8.12	.391	6	.047*	0	.949	−6	.356
Pityriasis rosea	153.12	.000*	34.50	.036*	40.24	.309	72	.000*	93	.000*	107	.336
Lichen planus	−12.73	.243	−34.12	.028*	−53.25	.283	−19	.001*	−20	.043*	−51	.000*
Urticaria	50.07	.000*	45.97	.000*	21.34	.166	37	.000*	43	.000*	46	.000*
Acne	0.84	.763	17.27	.000*	1.03	.793	2	.222	53	.000*	1	1.000

Note: *$P < .005$ significantly different by Chi-Square.
Abbreviation: N/A, not applicable.

Hygienic concerns led to the frequent use of soap or disinfectant, which might cause skin irritation. However, the media broadcasts emphasizing the importance of using barrier creams were probably enough to educate people in taking precautions against skin irritation.

We found that the distribution of common dermatologic diseases did not change significantly after the pandemic in 0 to 18 age group who have lower risk perception and a lower level of awareness about public health issues led them be less cautious.

In centers with lower COVID incidence, the frequency of dermatitis was decreased and acne and dermatophytosis were increased after the pandemic. In centers with higher COVID incidence, the frequency of dermatitis remained unchanged, and pruritus decreased. The frequency of psoriasis, urticaria, scabies, and herpes zoster increased after the pandemic in both. In the centers with lower COVID incidence the perception of low risk might have caused an increase in the lower priority diagnoses such as dermatophytosis and acne.

The ICD codes which refer to dermatologic lesions carrying high risk of malignancy such as in situ neoplasms and the ones with uncertain behavior were found to be decreased during the pandemic, and much more decreased in the centers with higher COVID incidence. This finding raises the concern of a possible delay in the diagnosis of the potentially malignant skin conditions. Indeed, not only the premalignant lesions but also the malignant lesions were found decreased. This finding should alert us to take precautions in order to reduce the morbidity and mortality of skin malignancies in the future. Although teledermatology could be offered as a solution for the diagnosis and treatment of many dermatologic conditions during the pandemic, pigmented lesions would be better evaluated with face-to-face visits.[23]

The limitations of ICD-10 coding in itself, physicians' coding errors due to busy outpatient practices and insufficient knowledge about the content of the disease categories were the limitations of this study.

5 | CONCLUSION

This study describes the change in the profile of dermatology patients applying to outpatient clinics during the COVID-19 outbreak. Providing data may facilitate the management of dermatological patients during a possible future pandemic. Since it is predicted that new pandemics will appear in the future; the results of this study might contribute to the developments that will carry dermatological practice to better standards.

CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

AUTHOR CONTRIBUTIONS

Selda Pelin Kartal conceived of the presented idea. The study designed by Selda Pelin Kartal and Gökçen Çelik with support from Neslihan Sendur, Sema Aytekin, Server Serdaroğlu and Bilal Doğan. Selda Pelin Kartal, Neslihan Sendur, Sema Aytekin, Server Serdaroğlu, Bilal Doğan, Ayca Cordan Yazıcı, Demet Çiçek, Murat Borlu, Nida Gelincik Kaçar, Müge Güler Özden, Dilek Bayramgürler, Asena Cigdem Doğramacı, Didem Didar Balcı, Hayriye Sarıcaoglu and Erkan Alpsoy participated in data collection. Levent Dönmez, Gökçen Çelik, and Zehra Asiran Serdar performed statistical analysis. Selda Pelin Kartal, Gökçen Çelik, Müge Güler Özden, Dilek Bayramgürler, Asena Cigdem Doğramacı, Didem Didar Balcı, Hayriye Sarıcaoglu, Levent Dönmez and Erkan Alpsoy carried out data analysis and interpretation. Selda Pelin Kartal and Gökçen Çelik wrote the manuscript with support from Neslihan Sendur, Sema Aytekin, Server Serdaroğlu, Bilal Doğan, Ayca Cordan Yazıcı, Demet Çiçek, Murat Borlu and Nida Gelincik Kaçar. Erkan Alpsoy supervised the findings of this article. All authors provided critical feedback and helped shape the research, analysis and manuscript. All authors discussed the results and contributed to the final manuscript.

ETHICS APPROVAL

The study was approved by both the Ethics Committee of Ankara Diskapi Yildirim Beyazit Research and Training Hospital and Ministry of Health Scientific Research Platform regarding certifying that the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki.

CONSENT FOR PUBLICATION

Data were collected from the electronic registration databases of hospitals. No consent was obtained to participate in the study.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

1. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395:497-506. https://doi.org/10.1016/S0140-6736(20)30183-5.
2. World Health Organization. Coronavirus disease 2019 (COVID-19) Situation Report – 106. 2020. Retrieved on Semptember 1 2020 from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200505covid-19-sitrep-106.pdf?sfvrsn=47090f63_2
3. World Health Organization. Coronavirus disease 2019 (COVID-19) Situation Report – 163. 2020. Retrieved on Semptember 1 2020 from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200701-covid-19-sitrep-163.pdf?sfvrsn=c202f05b_2
4. Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the COVID-19 epidemic? *Lancet*. 2020;395:931-934. https://doi.org/10.1016/S0140-6736(20)30567-5.

5. Demirbilek Y, Pehlivantürk G, Özgüler ZÖ, et al. COVID-19 outbreak control, example of ministry of health of Turkey. *Turk J Med Sci*. 2020; 50:489-494.
6. Bishopp A, Oakes A, Antoine-Pitterson P, Chakraborty B, Comer D, Mukherjee R. The preventative effect of hydrocolloid dressings on nasal bridge pressure ulceration in acute non-invasive ventilation. *Ulster Med J*. 2019;88:17-20.
7. Singh M, Pawar M, Bothra A, et al. Personal protective equipment induced facial dermatoses in healthcare workers managing COVID-19 cases. *J Eur Acad Dermatol Venereol*. 2020;34:e378–e380. http://doi.org/10.1111/jdv.16628.
8. Ng JN, Cembrano KAG, Wanitphakdeedecha R, Manuskiatti W. The aftermath of COVID-19 in dermatology practice: what's next? *J Cosmet Dermatol*. 2020;19:1826-1827. https://doi.org/10.1111/jocd.13520.
9. Cengiz FP, Emiroglu N, Bahali AG, et al. Which dermatology patients attend to dermatology outpatient clinics during the SARS-CoV-2 outbreak in Turkey and what happened to them? *Derm Ther*. 2020;33. https://doi.org/10.1111/dth.13470.
10. Kutlu O, Güneş R, Coerdt K, Metin A, Khachemoune A. The effect of the "stay-at-home" policy on requests for dermatology outpatient clinic visits after the COVID-19 outbreak. *Derm Ther*. 2020;e13581. https://doi.org/10.1111/dth.13581.
11. Turan C, Metin N, Utlu Z, Öner Ü, Kotan ÖS. Change of the diagnostic distribution in applicants to dermatology after COVID-19 pandemic: what it whispers to us? *Derm Ther*. 2020;33():https://doi.org/10.1111/dth.13804.
12. Gisondi P, Piaserico S, Conti A, Naldi L. Dermatologists and SARS-CoV-2: the impact of the pandemic on daily practice. *J Eur Acad Dermatol Venereol*. 2020;34:1196-1201. https://doi.org/10.1111/jdv.16515.
13. Kwatra SG, Sweren RJ, Grossberg AL. Dermatology practices as vectors for COVID-19 transmission: a call for immediate cessation of nonemergent dermatology visits. *J Am Acad Dermatol*. 2020;82:e179–e180. https://doi.org/10.1016/j.jaad.2020.03.037.
14. Ayanlowo O, Puddicombe O, Gold-Olufadi S. Pattern of skin diseases among children attending a dermatology clinic in Lagos, Nigeria. *Pan Afr Med J*. 2018;29:1-10. https://doi.org/10.11604/pamj.2018.29.162.14503.
15. Furue M, Yamazaki S, Jimbow K, Tsuchida T, Amagai M, et al. Prevalence of dermatological disorders in Japan: a nationwide, cross-sectional, seasonal, multicenter, hospital-based study. *J Dermatol*. 2011; 38:310-320. https://doi.org/10.1111/j.1346-8138.2011.01209.x.
16. Chung MC, Symons C, Gilliam J, Kaminski ER. Stress, psychiatric comorbidity and coping in patients with chronic idiopathic urticaria. *Psychol Health*. 2010;25:477-490. https://doi.org/10.1080/08870440802530780.
17. Elsaie ML, Youssef EA, Nada HA. Herpes zoster might be an indicator for latent COVID 19 infection. *Dermatol Ther*. 2020;33. https://doi.org/10.1111/dth.13666.
18. Tartari F, Spadotto A, Zengarini C, et al. Herpes zoster in COVID-19-positive patients. *Int J Dermatol*. 2020;59:1028-1029. https://doi.org/10.1111/ijd.15001.
19. Ciccarese G, Parodi A, Drago F. SARS-COV-2 as possible inducer of viral reactivations. *Dermatol Ther*. 2020;19:e13878. https://doi.org/10.1111/dth.13878.
20. Dursun R, Temiz SA. The clinics of HHV-6 infection in COVID-19 pandemic: Pityriasis rosea and Kawasaki disease. *Dermatol Ther*. 2020;33:e13730. https://doi.org/10.1111/dth.13730.
21. Ozden MG, Erturk K, Kartal SP, Yaylı S, Goktay F. An extraordinary outbreak of scabies in Turkey. *J Eur Acad Dermatol Venereol*. 2020. https://doi.org/10.1111/jdv.16699.
22. Giacalone S, Bortoluzzi P, Nazzaro G. Which are the "emergent" dermatologic practices during COVID-19 pandemic? Report from the lockdown in Milan, Italy. *Int J Dermatol*. 2020;59:e269–e270. https://doi.org/10.1111/ijd.15005.
23. Gomolin T, Cline A, Handler MZ. The danger of neglecting melanoma during the COVID-19 pandemic. *J Dermatolog Treat*. 2020;29:1-2. https://doi.org/10.1080/09546634.2020.1762844.

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