Original Article

Changes in the Clinical and Histopathological Features of Melanoma and Nonmelanoma Skin Cancers after COVID-19 Lockdown Period

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Abstract

Introduction: Studies show that the number of skin cancers diagnosed and treated during the coronavirus disease 2019 (COVID-19) lockdown periods has decreased. **Objectives:** Comparing demographic and histopathological changes in skin cancer cases after the COVID-19 lockdown period with the prepandemic period. **Materials and Methods:** A retrospective observational study of skin cancers (basal cell carcinoma [BCC], squamous cell carcinoma [SCC], and malignant melanoma [MM]) diagnosed before the COVID-19 pandemic period (January 1, 2018–January 1, 2020) and after the COVID-19 pandemic period (June 1, 2022–January 1, 2023). A comparison was made between the two groups in terms of the duration of admission to the hospital, the tumor diameter at the time of admission, and the histopathological features of the tumor. **Results:** A total of 422 BCC, 257 SCC, and 67 MM cases were evaluated. After the COVID-19 pandemic period, the mean age at diagnosis was lower, and the mean time to diagnosis was shorter in BCC and SCC cases compared to the prepandemic period. There was no statistically significant difference in tumor thickness, tumor diameter, ulceration, lymphovascular invasion, or perineural invasion in nonmelanoma skin cancers before and after the COVID-19 pandemic. Although there was no significant difference between melanoma cases in terms of age, gender, mean duration of diagnosis, location, and presence of ulceration or mitosis, the rate of *in situ*/invasive melanoma increased in the post-COVID period. **Conclusions:** This study may allow an assessment that the COVID-19 lockdown period does not have a negative impact on skin cancers. However, for a more accurate assessment, studies with a larger sample size and longer follow-up periods are needed.

Keywords: Basal cell carcinoma, COVID-19, melanoma, prognosis, SARS-CoV-2, squamous cell carcinoma

Introduction

Skin cancers are the most common cancer in the United States.[1,2] Skin cancers cause significant morbidity and mortality each year.

The coronavirus disease 2019 (COVID-19) pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has so far affected nearly 661 million people worldwide.[3]

During the pandemic period, outpatient clinic applications were restricted by healthcare providers according to the urgency of the disease. Changes in outpatient clinic visits of skin cancer patients during this period have been reported in different studies in the literature. During the COVID-19 period, the decrease in patient applications in the lockdown period, the reduction in the number of dermatology outpatient clinics, the closure of wards, and the reduction in the number of surgical days may have led to a decrease in skin cancer diagnoses. For all patients with cancer, many faced delays in obtaining a diagnosis, whereas

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others experienced delays in starting or maintaining treatment.[4-6] Patient compliance with deferred visits also contributes to these numbers.[7] For skin cancer, the total number of lesions diagnosed and treated during lockdown periods decreased.[8]

The negative effects of the COVID-19 pandemic are diminishing in recent times, and many countries are lifting COVID-19 restrictions. This study aims to determine the demographic and histopathological changes in skin cancer cases during the postpandemic period compared to the prepandemic period.

In this study, a total of 746 patients who presented to the dermatology outpatient clinic and were histopathologically diagnosed with skin cancer (cutaneous squamous cell carcinoma [SCC], basal cell carcinoma [BCC], or malignant melanoma [MM]) were included. The objective was to assess whether there was a delay in the diagnosis of skin cancer during the normalization period after the COVID-19 pandemic compared to the prepandemic period, as well as to compare the histopathological characteristics of skin cancers. It should be noted that there has been no research examining the impact of the COVID-19 pandemic on skin cancers in our country, and international studies on this topic are limited.

Materials and Methods

The study included patients of all age groups who presented to dermatology clinics and were clinically and histopathologically diagnosed with cutaneous SCC, BCC, or MM. The individuals' names, surnames, age at diagnosis, gender, number of diagnosed skin cancers, type, lesion localization, and histopathological features of the tumor (tumor thickness, diameter, degree of differentiation, perineural and lymphovascular invasion status, etc.) were recorded.

From hospital records, all patients diagnosed with cutaneous SCC, BCC, or MM using the corresponding ICD codes between January 12018, and January 12020, and between June 12022, and January 12023, were screened. Histopathology reports of patients diagnosed with SCC, BCC, and MM were obtained from the Department of Medical Pathology. Skin cancers diagnosed between January 12018, and January 12020, were considered as the pre-COVID-19 pandemic period, while skin cancers diagnosed between June 12022, and January 12023, were considered as the post-COVID-19 pandemic period. A comparison was made between the two groups in terms of patients' time of hospital admission, tumor diameter at presentation, and histopathological characteristics of the tumor. Ethics approval for this study was obtained from the local ethics committee.

Statistical analysis

The analysis of the data was conducted using the SPSS 23.0 statistical package (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp). The descriptive statistics of the evaluation results were given as numbers and percentages for categorical variables, and mean and standard deviation for interval variables. The normality of interval variables was examined with the One-Sample Kolmogorov–Smirnov test. As the condition of normal distribution was not met, interval data were compared using the Mann–Whitney *U* test. The chi-square test was used in the analysis of the differences between the ratios of categorical variables in independent groups. The statistical significance level was accepted as $P < 0.05$.

Results

Characteristics of nonmelanoma skin cancers, such as gender, average age, average diagnosis time, and tumor size before and after the COVID period, are presented in Table 1. Characteristics of nonmelanoma skin cancers, such as tumor location and subtypes before and after the COVID period are presented in Supplementary Table 1.

Before the COVID pandemic, 195 cases of BCC were detected, which increased to 227 cases after the pandemic. Prior to the pandemic, 9 cases (13.2%) of BCC were infiltrative BCC, 39 cases (57.4%) were nodular BCC, 14 cases (20.6%) were ulceronodular BCC, and 6 cases (8.8%) were superficial BCC. Among the cases detected after the pandemic, 9 cases (4.0%)

Table 1: Characteristics of non-melanoma skin cancers pre- and post-COVID period

	Pre-COVID BCC, *n* (%)	Post-COVID BCC, *n* (%)	*P* value	Pre-COVID SCC, *n* (%)	Post-COVID SCC, *n* (%)	*P* value
Female, *n* (%)	79 (40.5%)	102 (44.9%)	0.360	37 (31.6%)	57 (40.7%)	0.132
Male, *n* (%)	116 (59.5%)	125 (55.1%)		80 (68.4%)	83 (59.3%)	
Average age (years), mean ± std. dev	70 ± 12.9	61.2 ± 18.2	**<0.001**	72.9 ± 13.4	72.2 ± 14.5	0.830
Average diagnostic time (months), mean ± std. dev	53.7 ± 89.2	29.4 ± 45.4	0.081	24.9 ± 54.9	23 ± 51	0.710
Average tumor size (cm), mean ± std. dev	1.4 ± 1.1	1.1 ± 0.8	**0.010**	2.7 ± 2.3	2.2 ± 2.1	**0.024**

* *P* value not be calculated

P values below 0.05 are considered statistically significant. Significant p values are colored in bold.

were infiltrative, 103 cases (46.2%) were nodular, 99 cases (44.4%) were ulceronodular, and 12 cases (5.4%) were superficial BCC.

There was no significant gender difference observed for BCC (*P*:0.360); however, the average age at diagnosis for BCC was 70 ± 12.9 years before the pandemic and dropped to 61.2 ± 18.2 years after the pandemic ($P < 0.001$). The average diagnosis time was 53.7 ± 89.2 months before the pandemic, which shortened to 29.4 ± 45.4 months after the pandemic ($P = 0.081$).

Before the COVID pandemic, 117 cases of SCC were identified, which increased to 140 cases after the pandemic. Prior to the pandemic, 97 cases (82.9%) of SCC were invasive, and 20 cases (17.1%) were *in situ* SCC. Among the cases detected after the pandemic, 116 cases (82.9%) were invasive, and 24 cases (17.1%) were *in situ*.

There was no significant difference in gender for SCC before and after the pandemic ($P = 0.132$), and no significant difference was found in the average age at diagnosis ($P = 0.83$). The average diagnosis time was 24.9 ± 54.9 months before the pandemic and 23.0 ± 51.0 months after the pandemic ($P = 0.71$).

There were 30 cases of MM detected before the pandemic and 37 cases detected after the pandemic. Before the pandemic, 15 cases (50%) of MM were acral MM, 6 cases (20%) were superficial spreading invasive MM, and 6 cases (20%) were nodular MM. After the pandemic, 12 cases (32.4%) were nodular MM, 8 cases (21.6%) were superficial spreading invasive MM, 6 cases (16.2%) were acral MM, and 11 cases (29.7%) were *in situ* ($P < 0.001$).

Characteristics of MM cases before and after the COVID period, such as gender, average age, average diagnosis time, and tumor size, are presented in Table 2. Characteristics of MM cases, such as tumor location and subtypes before and after the COVID period, are presented in Supplementary Table 2.

Table 2: Characteristics of malignant melanoma cases before and after the COVID period

	Pre-COVID MM, *n* (%)	Post-COVID MM, *n* (%)	*P* value
Female, *n* (%)	15 (50%)	18 (48.6%)	1.000
Male, *n* (%)	15 (50%)	19 (51.4%)	
Average age (years), mean ± std. dev	64 ± 15	58.5 ± 22.8	0.427
Average diagnostic time (months), mean ± std. dev	18.3 ± 26.3	23.2 ± 33.6	0.615
Average tumor size (cm), mean ± std. dev	2.5 ± 1.9	2.4 ± 1.3	0.521

* *P* value not be calculated

When the pre- and postpandemic periods for MM were compared, there was no difference in the female/male ratio, mean age at diagnosis, and mean time at diagnosis. Prior to the pandemic, the most frequent MM location was the lower extremity (18 cases, 60%), while after the pandemic, the most frequent locations were the head and neck (14 cases, 37.8%), followed by the lower extremity (13 cases, 35.1%).

In all skin cancer cases, complaints of pain, burning, stinging, bleeding, itching, weakness, and for melanoma, blistering were questioned before and after COVID.

While bleeding was the most common complaint in BCC (59%) and SCC (67.2%) patients in the pre-COVID period, itching was the most common complaint in the post-COVID period (44.6% in BCC and 35.8% in SCC, respectively). In MM patients, the most common symptoms both before and after COVID were puffiness and bleeding, respectively (65% and 48.3% pre-COVID; 47.3% and 41.2% post-COVID, respectively).

The histopathological features of BCC, SCC, and MM pre- and post-COVID are summarized in Tables 3 and 4. There were no statistically significant differences in tumor thickness and tumor diameter for all three cancer types before and after the pandemic. The most common depth of tumor invasion in nonmelanocytic skin cancers (BCC and SCC) in the pre- and post-COVID periods was the deep reticular dermis. The number of melanoma cases with vertical and radial growth patterns in the pre and post-COVID period is the same (*P* = not be calculated).

In BCC patients, frontal field localization increased in the later period (23 [11.1%]) compared to the pre-COVID period (13 [7.1%]) ($P = 0.023$). Supplementary Table 3 summarizes the distribution of nonmelanoma skin cancers in the head and neck region in the pre and post-COVID period.

The comparison of demographic characteristics of patients diagnosed with BCC, SCC, and MM before and after COVID, as well as tumor subtypes and tumor locations according to gender, is summarized in Table 5.

In the study, female and male cases were compared among themselves before and after the pandemic. In terms of gender, no difference was observed between the tumor subtype and tumor locations in the pre and post-COVID period; the evaluation of average age, average diagnosis time, and tumor size is presented in Table 5.

In BCC cases in the post-COVID period, compared to the pre-COVID period, the diagnosis age was statistically significantly lower in both female and male cases (female $P = 0.019$, male $P = <0.001$, respectively). In females, the average diagnosis time for BCC was shorter in the post-COVID period compared to the pre-COVID period, and there was statistical significance ($P = 0.024$). In males,

Table 3: Histopathologic features of nonmelanoma skin cancers pre- and post-COVID period

	Pre-COVID BCC, *n* (%)	Post-COVID BCC, *n* (%)	*P* value	Pre-COVID SCC, *n* (%)	Post-COVID SCC, *n* (%)	*P* value
Tumor thickness, (mm), mean ± std. dev	3.1 ± 2.9	3.1 ± 3.2	0.153	5.3 ± 4.2	6.7 ± 5.9	0.160
Tumor diameter (cm), mean ± std. dev	1.1 ± 0.8	1 ± 0.8	0.576	2.3 ± 2.1	2.3 ± 2.1	0.857
Tumor invasion depth			**<0.001**			*
1—Papillary dermis	10 (6.4%)	26 (13.5)		6 (7.7%)	11 (14.4%)	
2—Reticular dermis	21 (13.4%)	21(10.9%)		5 (6.4%)	8 (10.5%)	
3—Deep reticular dermis	85 (54.1%)	126 (65.3%)		44 (56.4%)	35 (46.1%)	
4—Subcutaneous fat tissue	41 (26.1%)	20 (10.4%)		21 (26.9%)	20 (26.3%)	
5—Muscular layer	0	0		2 (2.6%)	2 (2.6%)	
Ulceration, confirmed	117 (48.3)	125 (51.7%)	0.219	61 (63.5%)	70 (63.1%)	0.943
Lymphovascular invasion, confirmed	0	0		0	1 (0.9%)	0.491
Perineural invasion, confirmed	2 (1%)	5 (2.3%)	0.457	7 (6.1%)	9 (8.1%)	0.753
Histological differentiation						*
–High				52 (81.3%)	96 (83.5%)	
–Intermediate				11 (17.2%)	17 (14.8%)	
–Low				1 (1.6%)	2 (1.7%)	

* *P* value not be calculated

P values below 0.05 are considered statistically significant. Significant p values are colored in bold.

Table 4: Histopathologic features of malignant melanoma cases pre- and post-COVID period

	Pre-COVID MM, *n* (%)	Post-COVID MM, *n* (%)	*P* value
Tumor thickness (mm), mean ± std. dev	6.7 ± 7.2	8.3 ± 15.7	0.946
Tumor diameter (cm), mean ± std. dev	2.3 ± 1.7	2.5 ± 1.7	0.445
Ulceration, confirmed	22 (78.6%)	13 (54.2%)	0.116
Lymphovascular invasion, confirmed	1 (3.6%)	0	1.000
Perineural invasion, confirmed	0	0	*
Breslow thickness (mm), mean ± std. dev	7.7 ± 8.1	5.2 ± 3.7	0.409
Mitotic activity (..../mm^2), mean ± std. dev	6.5 ± 8.1	7.6 ± 7.3	0.347
Regression, confirmed	0	1 (4.5%)	0.449
Microsatellite, confirmed	3 (11.1%)	2 (9.5%)	1.000
Growth phase:			*
1—Vertical	9 (40.9%)	9 (42.9%)	
2—Radial	2 (9.1%)	2 (9.5%)	
3—Vertical and radial	11 (50%)	10 (47.6%)	
Intratumor lymphocyte:			0.291
1—None	9 (32.1%)	6 (28.6%)	
2—Mild	12 (42.9%)	13 (61.9%)	
3—Diffuse	7 (25%)	2 (9.5%)	

* *P* value not be calculated

in the post-COVID period compared to the pre-COVID period, the average BCC tumor size was smaller; there was statistical significance (*P* =0.036).

Discussion

In this study, we presented a comparison of melanoma and nonmelanoma skin cancers that we followed in a single center before and after the lockdown period due to COVID-19, examining their clinical and histopathological findings.

In a study, hospital admissions and surgical procedures for skin cancer patients have decreased persistently since the beginning of the pandemic in Germany.[9] In a study that collected data on the delay in cancer diagnosis due to the COVID-19 pandemic, the following was found: All cancer diagnoses fell in 2020 by 44.9% compared with 2018 and 2019. Melanoma and nonmelanoma skin cancer represented 56.7% of all missing diagnoses.[6]

Earnshaw *et al.*[8] found a 34.3% reduction in urgent skin cancer referrals in a retrospective review of a cancer tracking database in the UK from February to April 2020. Compared to previous years, the total number of skin cancers diagnosed in March 2020 was lower.

Nolan *et al.*,[10] a prospective cohort of patients undergoing nonmelanoma skin cancer surgery was undertaken. Retrospective data were collected on melanoma surgery. The number of NMSCs treated per week fell by

Table 5: Comparison of changes in average age, average diagnosis time, and tumor size in the pre and post-COVID period according to gender

	Pre-COVID female, *n* (%)	Post-COVID female, *n* (%)	*P* value	Pre-COVID male, *n* (%)	Post-COVID male, *n* (%)	*P* value
BCC						
Average age (years), mean ± std. dev	68.2±12.9	61±18	**0.019**	71.3±12.9	61.5±18.3	**<0.001**
Average diagnostic time (months), mean ± std. dev	46.3±80.8	26.7±36.3	**0.024**	58.7±94.5	31.6±5.4	0.689
Average tumor size (cm), mean ± std. dev	1.3±1.1	1.1±0.9	0.107	1.5±1.1	1.2±0.8	**0.036**
SCC						
Average age (years), mean ± std. dev	76.6±14.2	75.2±14.6	0.574	71.2±12.8	70.2±14.3	0.903
Average diagnostic time (months), mean ± std. dev	30.1±73	14.5±14	0.248	29.9±65.8	18±26.1	0.633
Average tumor size (cm), mean ± std. dev	3.1±2.5	2.2±1.8	0.090	2.5±2.1	2.2±2.3	0.086
MM						
Average age (years), mean ± std. dev	66.6±14.8	57.7±21.6	0.187	61.3±15.3	59.3±24.5	0.782
Average diagnostic time (months), mean ± std. dev	20.4±32	25.8±35.8	0.288	16.2±20.6	20.5±32	0.825
Average tumor size (cm), mean ± std. dev	2.2±1.6	2.4±1.4	0.561	2.7±2.2	2.4±1.3	0.734

**P* value not be calculated

P values below 0.05 are considered statistically significant. Significant p values are colored in bold.

27%–47% throughout April and May. Overall, 77% of Mohs micrographic surgeons stopped procedures.

In another study in which all dermatological and surgical activities were examined retrospectively, compared to the previous year, surgical excisions increased by 31.7%, and SLNBs decreased by 29% during the lockdown period. Dermatologic follow-up decreased 30.2%, whereas surgical follow-up decreased 37%.[11]

In a retrospective, single-center case–control study comparing 531 patients treated for NMSC during the COVID-19 period in 2020 with the outcomes of 817 patients treated the previous year, a decrease in BCC and SCC cases detected in 2020 was found (*P*: 0.021). No difference was observed between the groups in terms of the time from initial diagnosis to definitive treatment and tumor locations.[12]

In a study comparing the same periods of 2019 and 2020, it was found that excised advanced skin cancers significantly increased in 2020.[13,14]

In our study, the changes in NMSCs in the pre and post-COVID periods have been discussed in detail. The lower average diagnosis age and shorter average diagnosis time in BCC and SCC cases detected in the postpandemic period compared to the prepandemic period can be associated with various reasons. The first may be the rapid return of outpatient services in our country and the acceptance of many outpatient applications. The second reason could be that patients notice changes in visible areas like the skin quickly due to an increase in their self-care and disease perceptions during this period, thus applying to a doctor in a shorter time. The third reason might be that after the end of the epidemic, patients could have been referred more to the relevant department due to lesions detected by other departments.

In our study, the lack of statistically significant differences in findings such as tumor thickness, tumor diameter, ulceration, lymphovascular invasion, and perineural invasion in NMSCs in the pre and post-COVID periods, may allow an evaluation that the COVID-19 period had no negative impact on NMSCs. However, for a more accurate assessment, long-term follow-up with a large number of samples would be appropriate.

In a retrospective study by Barruscotti *et al.*, it was revealed that the diagnosis of melanoma decreased by 60% compared to previous years during the 2020 quarantine period and that there was a 30% decrease in all dermatological surgical activities.[14] Ricci and colleagues compared melanomas diagnosed before and after the 54-day quarantine period and found features known as poor risk factors, such as thickness, ulceration, nodular subtype, increased in melanomas after the closure.[15]

In one study, they documented a significant reduction in the number of new melanoma diagnoses during the lockdown period, which increased again in the period immediately after the first strict COVID-19 lockdown.[16]

In a newly published study, cases were compared during the COVID lockdown period and the normalization period afterward. In a total of 119 melanoma cases, no difference was observed in terms of age, gender, incidence, location, presence of ulceration or mitosis, and the ratio of *in situ* to invasive melanoma. After the recovery of normal activity, it was seen that Breslow's thickness increased compared to the previous year.[17] Similarly, Drumm *et al.*[18] compared melanoma cases detected in 2019 and 2020. They have noted that the observed increased thickness, ulceration, and microsatellitosis rates in melanoma cases in 2020 support the theory of delayed melanoma diagnosis during and after the COVID-19 pandemic.

In the post-COVID period, the average age of diagnosis in MM cases has decreased, and the shortening of the diagnosis time may result from the rapid normalization of outpatient services in our country. Despite this, similar to the literature, there has been an increase in tumor diameter, tumor thickness, and nodular subtype in the post-COVID period, although not statistically significant. However, no significant difference was observed in terms of the presence of ulceration or mitosis. The ratio of *in situ* to invasive melanoma in our study increased in the post-COVID period.

Conclusion

In our study, no difference was observed in terms of gender, tumor subtype, and location in NMSCs in the pre and post-COVID periods. In the post-COVID period, although no statistical significance was observed, the average diagnosis time in NMSCs was lower, whereas it was higher in MM cases. The average age in BCC and MM cases was younger in the post-COVID period. The average tumor size in the post-COVID period was statistically significantly lower in NMSCs, and although not statistically significant, it was also lower in MM cases.

The COVID-19 pandemic restrictions are being lifted globally. This study may suggest that the adverse effect of the COVID-19 pandemic on skin cancers was less observed in our country. We believe that the continuity of outpatient services in the pre and post-COVID periods, the ability of patients to reach doctors quickly, as well as increased disease anxiety during the COVID period, and patients becoming more alert to changes in the skin contributed to this result.

However, more research is needed to fully reveal the impact of cancer diagnosis and potential delays on long-term survival during the pandemic. The results obtained are necessary to optimize early diagnosis of skin cancer and long-term outcomes for patients.

Ethical approval

Ethical approval for this study was received from the ethics committee of Karadeniz Technical University Faculty of Medicine.

Data availability statement

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

Author contributions

Conception or design of the work: Arzu Ferhatosmanoğlu and Leyla Baykal Selçuk, Data collection: Arzu Ferhatosmanoğlu, Leyla Baykal Selçuk, Şafak Ersöz, Esma Katkat Çelik, Faysal Keskin, Deniz Aksu Arıca, Data analysis and interpretation: Arzu Ferhatosmanoğlu and Leyla Baykal Selçuk Critical revision of the article: Arzu Ferhatosmanoğlu, Leyla Baykal Selçuk, Şafak Ersöz, Esma Katkat Çelik, Faysal Keskin, Deniz Aksu Arıca Final approval of the version to be published: Arzu Ferhatosmanoğlu and Leyla Baykal Selçuk.

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Conflict of interest

None.

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Supplementary Table 1: Characteristics of non-melanoma skin cancers pre- and post-COVID period

	Pre-COVID BCC, *n*(%)	Post-COVID BCC, *n*(%)	*P* value	Pre-COVID SCC, *n*(%)	Post-COVID SCC, *n*(%)	*P* value
Tumor location			*			*
1—Head and neck	182 (93.8%)	208 (91.6%)		91 (79.8%)	112 (80%)	
2—Upper extremity	2 (1%)	6 (2.6%)		15 (13.2%)	14 (10%)	
3—Lower extremity	2 (1%)	2 (0.9%)		7 (6.1%)	9 (6.4%)	
4—Trunk	8 (4.1%)	9 (4%)		1 (0.9%)	5 (3.6%)	
5—Genital	0	2 (0.9%)		0	0	
BCC subtypes, *n* (%)			*			
Infiltrative type	9 (13.2%)	9 (4%)				
Nodular type	39 (57.4%)	103 (46.2%)				
Ulceronodular type	14(20.6%)	99 (44.4%)				
Superficial type	6 (8.8)	12 (5.4%)				
Subtype not defined	127(65.1%)	4(1.8%)				
SCC subtypes, *n* (%)						1.000
Invasive SCC				97 (82.9%)	116 (82.9%)	
In situ SCC				20 (17.1%)	24 (17.1%)	

*P value not be calculated

Supplementary Table 2: Characteristics of malignant melanoma cases before and after the COVID period

	Pre-COVID MM, *n*(%)	Post-COVID MM, *n*(%)	*P* value
Tumor location			
1—Head and neck	6 (20%)	14 (37.8%)	*
2—Upper extremity	3 (10%)	4 (10.8%)	
3—Lower extremity	18 (60%)	13 (35.1%)	
4—Trunk	3 (10%)	6 (16.2%)	
5—Genital	0	0	
MM subtypes,n(%)			**0.001**
Superficial spreading invasive type	6 (20%)	8 (21,6%)	
Nodular type	6 (20%)	12 (32,4%)	
Acral type	15 (50%)	6 (16,2%)	
In situ type	0	11 (%29,7)	
Subtype not defined	3 (10%)	0	

*P value not be calculated

P values below 0.05 are considered statistically significant. Significant p values are colored in bold.

Supplementary Table 3: Distribution of nonmelanoma skin cancers in the head and neck region in the pre and post-COVID period

Tumor location	Pre-COVID BCC, *n*(%)	Post-COVID BCC, *n*(%)	*P* value	Pre-COVID SCC, *n*(%)	Post-COVID SCC, *n*(%)	*P* value
Head and neck	182 (93.8%)	208 (91.6%)	*	91 (79.8%)	112 (80%)	*
a—Frontal	13 (7.1%)	23 (11.1%)	**0.023**	5 (5.5%)	15 (13.4%)	*
b—Malar	26 (14.3%)	41 (19.7%)		14 (15.4%)	22 (19.6%)	
c—Eyelid	18 (9.9%)	12 (5.8%)		1 (1.1%)	7 (6.3%)	
d—Medial canthus	5 (2.7%)	10 (4.8%)		2 (2.2%)	1 (0.9%)	
e—Nose	75 (41.2%)	60 (28,8%)		21 (23.1%)	13 (11.6%)	
f—Chin	6 (3.3%)	6 (2.9%)		3 (3,3%)	0	
g—Lip	2 (1.1%)	6 (2.9%)		13 (14.3%)	19 (17%)	
h—Frontotemporal area	9 (4.9%)	13 (6.3%)		2 (2.2%)	5 (4.5%)	
i—Ear	9 (4.9%)	15 (7.2%)		15 (16.5%)	14 (12.5%)	
j—Scalp	11 (6.0%)	9 (4.3%)		12 (13.2%	16 (14.3%)	
k—Neck	8 (4.4%)	5 (2.4%)		3 (3.3%)	0	
l—Nasolabial	0	8 (3.8%)		0	0	

* *P* value not be calculated

P values below 0.05 are considered statistically significant. Significant p values are colored in bold.