Impact of SARS-CoV-2 pandemic on dermatology residents: A nationwide French study

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Abstract

Background: Coronavirus disease 2019 (COVID-19) has changed the practice of all health-care professionals. Determining the impact could prevent repercussions in future crisis.

Objectives: The objectives of the study were to assess the impact of the COVID-19 pandemic on dermatology residents' professional practice, working conditions, academic training and mental health.

Methods: An online questionnaire was sent to all French dermatology residents. We compared the activity of residents working in areas heavily impacted by COVID-19 to others. Logistic multivariate regressions were done, using as outcome variables the negative impact of the COVID crisis on residents' possibility to practice dermatology during the crisis, supervision, academic training and working more than 50 h/week. The last part of the questionnaire was the burnout questionnaire of Maslach.

Results: A total of 246 residents filled the questionnaire. Residents working in highly impacted COVID areas (odds ratio, OR 0.34 confidence interval, CI [0.18, 0.61], $P \leq 0.001$), first-year postgraduate (PGY-1) residents (OR 0.46 CI [0.23, 0.91], $P = 0.023$) and those in private practice (OR 0.10 CI [0.01, 0.57], $P = 0.032$) were significantly less able to maintain dermatology activities. Worse supervision was significantly more frequent with non-PGY-1 residents (OR 3.24 CI [1.65, 6.65], $P < 0.001$). One hundred and eighty one residents claimed the pandemic to have a negative effect on their dermatology curriculum with no difference according to their regions' affection by COVID-19. This was mostly attributed to the cancelation of courses and congresses. PGY-1 residents (OR 2.09 CI [1.09, 4.04], $P = 0.029$) and residents in highly affected areas (OR 1.79 CI [1.01, 3.18], $P = 0.049$) were more at risk of working above the maximal legal working time. None of the residents was free of burnout symptoms.

Conclusion: Dermatology residents have been highly affected by COVID-19. It might be important to have a more integrated healthcare system to fight times of crisis with the least repercussions on residents.

Key words: Academic training, burnout, coronavirus disease 2019, education, resident, working conditions

Plain Language Summary

Coronoavirus disease 2019 (COVID-19) has changed the practice of all healthcare professionals. Determining the impact could prevent repercussions in future crisis. The objective of our study is to assess the impact of the COVID-19 pandemic on dermatology residents' professional practice, working conditions, academic training and mental health. An online questionnaire was sent to all French dermatology residents. We compared the activity of residents working in areas heavily-impacted by COVID-19 to others. 246 residents filled the questionnaire. Residents working in highly-impacted COVID areas, first-year postgraduate residents (PGY-1), and those in private practice were significantly less able to maintain dermatology activities. Worse supervision was significantly more frequent with non-PGY-1 residents. 181

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residents claimed the pandemic to have a negative effect on their dermatology curriculum, with no difference according to their regions' affection by COVID. This was mostly attributed to the cancelation of courses and congresses. PGY-1 residents and residents in highly affected areas were more at risk of working above the maximal legal working time. None of the residents was free of burnout symptoms. In conclusion, COVID-19 has changed the lives of dermatology residents at different levels. Their involvement in controlling this outbreak highlights their indispensable role in health institutions. However, a more integrated healthcare system, along with strategies to increase the use of digital tools and teledermatology are essential weapons to fight times of crisis with the least repercussions on residents.

Introduction

Like other health-care professionals, medical residents were at the frontline of the fight against the coronavirus disease 2019 (COVID-19) pandemic.[1] Dermatology residents were no exception.

The objective of our study is to assess the impact of the COVID-19 pandemic on dermatology residents' professional practice, working conditions, academic training and mental health.

Methods

Future Dermatologists and Venereologists of France is the representative association of French dermatology residents. It includes all French dermatology residents (452 in total). An online questionnaire was sent three times, to all residents, between April 17, 2020, and April 26, 2020. A group of dermatology residents from different years of residency, training type and county developed a questionnaire aiming to assess COVID-19 impact on residents. The questionnaire included 104 items regarding general demographics, impact of the crisis on the type of medical activity, supervision status, working conditions, academic training, mental health and, when relevant, on their participation in biomedical research. The last part of the questionnaire was the burnout questionnaire of Maslach.[2] The Maslach burnout questionnaire is divided in three non-addable subscales: emotional exhaustion, depersonalization and personal accomplishment. Responders are categorized into free of symptoms, intermediate symptoms and highly affected in one, two or three dimensions. We compared the activity of residents working in areas heavily impacted by COVID-19 to those from other areas,[3] using Wilcoxon test for numerical variables and Chi-square and Fisher test for categorical variables. Logistic multivariate regressions were done, using as outcome variables the negative impact of the COVID crisis on the possibility of practicing dermatology, supervision and academic training. Finally, we tried to identify variables associated with working more than 50 h/week, 48 h/week being the maximum legal working time in Europe. Because we aimed to discover institutional factors associated with a worse situation in the epidemic, we included only the curriculum and position variables, namely, the type of training, the year of residency (1st year vs. older) and the workplace (highly affected areas vs. others). All data were analyzed using R software version 4. $P < 0.05$ was considered statistically significant.

The study was approved by the National Commission for Data Protection (registration number: 2217450 v 0). It was conducted according to the Declaration of Helsinki.

Results

In total, 246 dermatology residents filled in the questionnaire (response rate =54.4%). The mean age was 26.4 ± 1.7 years, and 190 residents were women. The main demographic characteristics are presented in Table 1.

Impact on professional practice

During the French outbreak, 110 residents (46.6%) maintained a dermatology activity, including 31 (13.1%) with the same former activity and 79 (33.4%) with a dermatology activity restricted to emergencies [Table 2]. Ninety nine residents (41.9%) have been deployed to COVID units, 49 residents (20.8%) to non-COVID units and 47 residents (19.9%) to general emergencies. On the other hand, 36 residents (15.3%) had no medical activity due to the closure of their departments. Of note, the residents' activities during the French outbreak were not exclusive, as 90 residents (38.1%) had more than one type of activity. Residents who were significantly less able to maintain dermatology activities were those in a highly impacted area (OR 0.34 CI [0.18, 0.61], $P \leq 0.001$), those in a private practice (OR 0.10 CI [0.01, 0.57], $P = 0.032$) and PGY-1 residents (OR 0.46 CI [0.23, 0.91], $P = 0.023$).

One hundred and twenty nine residents (54.7%) judged that they had a worse supervision during the crisis with 19 (8.1%) among them claiming to face problematic situations, 90 (38.1%) who felt abandoned in difficult situations and 60 (25.4%) who had a conflict with a senior medical doctor. Reporting a worse supervision was significantly more frequent with non-PGY-1 residents (OR 3.24 CI [1.65, 6.65], $P < 0.001$) and those having training in a non-university hospital (OR 2.21 CI [1.14, 4.46], $P = 0.022$). Being in a highly impacted area with COVID-19 was not associated with having a worse supervision at work [Table 3].

Impact on working conditions

During the French outbreak, 20 residents (8.5%) were working less than 30 h/week, 53 (22.5%) were working between 30 and 40 h/week, 75 (31.8%) between 40 and 50 h/week, 70 (29.7%) between 50 and 60 h and 18 (7.6%) more than 60 h. Residents more at risk of working above the maximal legal working time were PGY-1 residents (OR 2.09 CI [1.09, 4.04], $P = 0.029$) and residents in highly affected areas (OR 1.79 CI [1.01, 3.18], $P = 0.049$) [Table 4].

Impact on academic training

One hundred and eighty one residents (76.7%) claimed the pandemic to have a negative effect on their dermatology curriculum, including 20 residents (8.5%) for whom it had a very negative effect. One hundred

and seventy five (74.2%) residents attributed this to the cancelation of courses and congresses, 160 (67.8%) to a modification in their type of activity, 119 (50.4%) to the loss of dermatology training time and 40 (16.9%) to the lack of supervision, [Figure 1]. The crisis had a negative impact on the academic training of all residents with no significant differences between highly impacted areas and others. Moreover, comparison between the attributed causes of this negative impact between both groups showed no significant differences.

Table 1: Main characteristics of dermatology residents before the COVID-19 outbreak in France

Characteristics	Number of residents (*n* = 246) *n* (%)
Age (mean)	26.4±1.7
Women	190 (80.5)
Married	141 (59.7)
Health-care provider partner	102 (43.2)
Year of residency	
First	53 (22.5)
Second and third	125 (53)
Fourth	58 (24.6)
Working in highly affected area	80 (33.9)
Training setting	
Non-university hospital	54 (22.9)
Private practice	10 (4.2)
University-hospital	170 (72)
Type of activity before crisis	
Non-supervised outpatient consultation	80 (33.9)
Supervised outpatient consultation	79 (33.5)
Emergency dermatology	80 (33.9)
Inpatient consultations	96 (40.7)
Day hospital	97 (41.1)
Hospitalization	74 (31.4)
Dermatologic surgery	50 (21.2)
Other activity	23 (9.7)

Table describing residents respondent population in training at the time of the COVID-19 health crisis. Categorical variables are described by count (percentage) and numerical variables by mean (standard deviation)

Table 2: Factors associated with maintaining a dermatological activity during the crisis

	Univariate OR	Univariate *P*-value	Multivariate OR	Multivariate *P*-value
PGY 1	0.43 (0.23, 0.84)	0.013	0.46 (0.23, 0.92)	0.028
Highly affected area	0.33 (0.18, 0.58)	< 0.001	0.34 (0.19, 0.62)	< 0.001
Training type, ref: teaching. Hospital				
Hospital	0.56 (0.3, 1.05)	0.072	0.61 (0.31, 1.19)	0.149
Private practice	0.11 (0.01, 0.85)	0.035	0.1 (0.01, 0.82)	0.032

Logistic univariate and multivariate regression of factors associated with maintaining a dermatological activity during the COVID-19 crisis

Impact on young dermatologist's participation's in biomedical research

Before the pandemic, ten residents had interrupted their residency to pursue a master's degree. Among them, seven were deployed to COVID units. Eight residents (80%) could not finish their masters project.

Psychological impact

Thirty residents (12.7%) claimed to be depressed, 83 (35.2%) anxious, 50 (21.2%) stressed, 102 (43.2%) tired and 14 (5.9%) drained. Residents in highly affected areas were significantly more stressed (23 / 80 [28.7%] vs. 27 / 156 [17.3%], $P = 0.045$).

The results of the Maslach questionnaire showed that none of the residents was free of burnout symptoms. Five (2.1%) had intermediate symptoms, 43 (18.2%) were highly affected in one subscale, 76 (32.2%) in two subscales and 112 (47.5%) in three subscales. There was no difference in these proportions between highly affected areas and others.

Discussion

Impact on professional practices

Our study shows that during the pandemic, the vast majority of French dermatology residents were deployed to new units, including COVID units. This highlights the indispensable role of residents in hospitals. In particular, dermatology residents are often recognized as polyvalent residents, as

Table 3: Factors associated with reporting a worse supervision during the crisis

	Univariate OR	Univariate *P*-value	Multivariate OR	Multivariate *P*-value
PGY-1	2.59 (1.37, 4.91)	0.003	3.24 (1.62, 6.5)	< 0.001
Training type, ref: teaching. Hospital				
Hospital	1.66 (0.89, 3.11)	0.114	2.21 (1.12, 4.37)	0.022
Private practice	3.91 (0.81, 18.94)	0.091	2.98 (0.61, 14.68)	0.179
Highly affected area	1.5 (0.87, 2.6)	0.148	1.66 (0.93, 2.96)	0.084

Logistic univariate and multivariate regression of factors associated with reporting a worse supervision during the COVID-19 crisis

Table 4: Factors associated with working more than the legal working time

	Univariate OR	Univariate *P*-value	Multivariate OR	Multivariate *P*-value
PGY-1	2.43 (1.3, 4.55)	0.005	2.09 (1.09, 4.02)	0.026
Training type, ref: teaching. Hospital				
Hospital	1.39 (0.75, 2.59)	0.295	1.21 (0.63, 2.32)	0.571
Private practice	0.19 (0.02, 1.56)	0.123	0.2 (0.02, 1.63)	0.132
Highly affected area	1.79 (1.03, 3.11)	0.039	1.79 (1.01, 3.17)	0.046

Logistic univariate and multivariate regression of factors associated with working more than 50 h/week legal time during the COVID-19 crisis

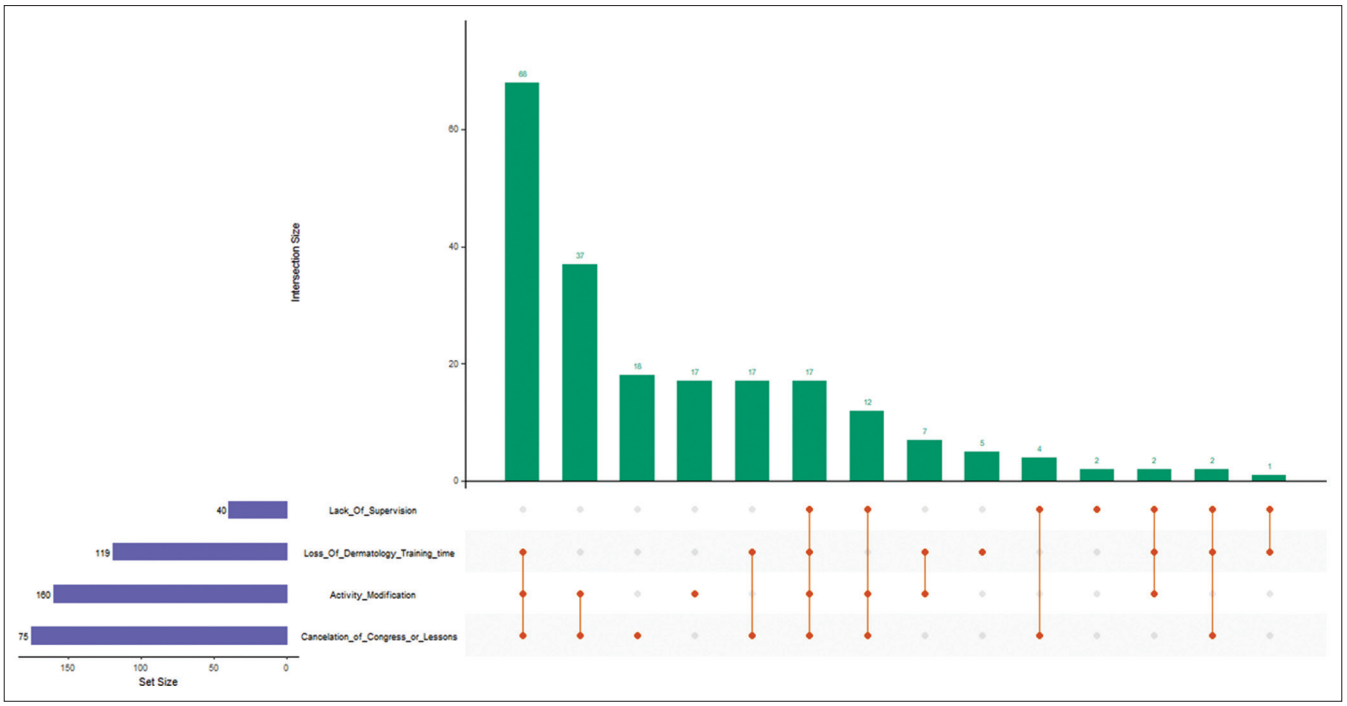

Figure 1: Causes reported for academic worsening. The horizontal axis bar plot represents the number of resident in training reporting each type of cause for academic training worsening during the crisis, the vertical axis bar plot represents the number of resident having each type of combination of cause as defined by the grouping of points under the bar plot

they spend at least one residency year in internal medicine departments, have night shifts in the emergencies unit and manage a variety of medical conditions.

In highly impacted areas, most residents could not maintain a dermatological activity during the crisis because hospitals were being restructured to cope with the pandemic in the safest conditions. In some hospitals, patients who were not infected with coronavirus SARS-CoV-2 had to be discharged or transferred to other hospitals.

PGY-1 residents were less likely to maintain a dermatologic activity. Priority for dermatologic activity was probably for senior residents because they have less remaining years before graduating. Moreover, residents in private practice were also less likely to maintain their dermatologic activity. Dermatologists were asked to cancel non-urgent consultations,[4] and patients visiting dermatologists in private practice are less acute and severe.

About 15% of residents have stopped their dermatologic activity without being deployed. Some health institutions were in desperate need for health-care professionals,[5] but they could not reach available residents. This highlights a lack of structured connections between different health institutions during the pandemic. Thus, an integrated health-care structure at a national level seems essential in times of crisis.

Being doctors in training, residents are supervised in the hospital by the seniors. Half of the residents in dermatology felt less well-supervised during the pandemic.[6] This was more significant in non-university hospitals, where doctors are less motivated to train residents. Non-PGY1 residents were also less supervised. We assume that they are considered more independent. This might be beneficial because the pandemic played a role of accelerator of their independent skills.

Impact on working conditions

A decree published in 2015 increases the legal working time of residents in France to 48 weekly hours.[7] However, this is not being respected. A recent study by the main French union representing residents shows that the average for dermatology residents is 53.6 h.[8]

Even though residents in highly affected areas were significantly more impacted, residents in other areas were also working for more than 50 h/week, despite restriction of activities to urgent cases. PGY-1 residents were working above the maximal legal working time, even more than other residents. The resulting stress in their 1st year of residency might decrease their motivation in the following years.[9]

Impact on academic training

Dermatology is globally a neglected subject in the undergraduate curriculum globally, particularly taking into consideration the quantum of dermatological complaints in primary care.[10] This makes it more challenging for dermatology residents to overcome training deficiencies during this pandemic time compared to other disciplines such as internal medicine or pediatrics.

Courses dedicated to residents along with national seminars or congresses are a major part of the residency program. Most residents found the cancelation of courses and seminars to

have a negative impact on their academic training. Digital teaching tools and online conferences could have been possible substitutes for teaching residents.[11-13] The demands that online conference platforms place on physicians to prepare the courses could explain why they were not used in highly impacted areas. However, surprisingly, our results show no significant difference between highly impacted areas and others. Since dermatology is more visual than other specialties, we should encourage the use of virtual interactive tools to advance our specialty through distance learning.[14] Moreover, teledermatology under supervision should be used by residents[4,15] to avoid disruption in their education and allow for troubleshooting while patient volume is low.[16] However, it is important to highlight that although telemedicine is useful, there are elements of basic dermatology education and practice that cannot be replaced virtually, such as the ability to assess texture, perform biopsies or use tools such as dermoscopy, Wood's lamp and potassium hydroxide scraping.[11]

Psychological impact

All residents had symptoms of burnout with no significant differences between areas. The burnout might not be related to the health crisis itself because the intensity of the crisis varied greatly from one region to another. Factors linked to burnout in dermatology residents probably predated the health crisis. Although dermatology residents are less burned-out than residents in other specialties, the burnout syndrome still afflicts almost one in two dermatology residents. A Canadian study on the burnout in dermatology residents shows that Canadian residents commonly experience burnout with over 50% of the residents experiencing high levels of emotional exhaustion and depersonalization.[17]

Limitations of the study

Although our study is a national study on all dermatology residents in France, residents negatively impacted by the pandemic are more likely to respond. Although our response rate was quite low, all subdivisions and year of residency were correctly represented. Repeated testing to assess reliability was not considered as the COVID-19 situation was rapidly changing and lockdown lengthening could in itself modify answers. Moreover, the retrospective nature of the study creates a memorization bias. However, its early conduction during the crisis decreases this bias.

Conclusion

COVID-19 has changed the lives of dermatology residents at different levels not only in France but also worldwide.[15] Their implication in controlling this outbreak highlights their indispensable role in health institutions. However, it might be important to have a more integrated health-care system to fight times of crisis with the least repercussions on residents.

Acknowledgments

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Ethical approval

The study was approved by the National Commission for Data Protection (registration number: 2217450 v 0).

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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