Revista Española de Educación Médica

The Spanish medical specialist training perception of the COVID-19 pandemic impact in their emotional health and training, a cross-sectional observational study

Percepción de los médicos especialistas en formación sobre el impacto de la pandemia por COVID-19 en su salud emocional y formación, un estudio observacional transversal

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Recibido: 6/1/2022; Aceptado: 28/2/2022; Publicado: 4/3/2022

Abstract: Specialist training in Spain is conceptualized as a dual system regulated as both a public employment and a graduate training program. Due to the global pandemic created by COVID-19 which hit Spain in March 2020, the Spanish specialist training system underwent temporary but major restructuring, giving priority to labor aspects within the system. The main goal of the study was to assess how resident physicians in Spain perceive the impact of the COVID-19 pandemic on their training and on their emotional wellbeing. A descriptive observational cross-sectional study was carried out where data was gathered through an anonymous survey distributed to all resident physicians in Spain during a period of two weeks in November 2020. The results were analyzed by the statistical package SPSS v.25. A total of 2889 responses were collected and analyzed. More than 80% of the residents stated that training had worsened and 47% indicated that working in COVID-19 related duties had not contributed to their core or specialized curriculum. The increase in 24h on-call shifts and in regular working hours, the lack of supervision and the suspension of elective surgeries were the variables associated with a major training impact and psychological distress. The COVID-19 pandemic has severely affected residency programs, fundamentally in the acquisition of specialized competencies. This situation must be urgently addressed by health authorities at government and hospital levels in order to prevent important shortcomings in the training of future specialists.

Keywords: Residents, COVID-19, pandemic, residency program, medical education, emotional impact.

Resumen: La formación de especialistas en España se conceptualiza como un sistema dual regulado tanto como una condición laboral como un programa de formación de postgrado. Debido a la pandemia global por COVID-19, cuya primera fase afectó a España en marzo de 2020, el sistema español de formación de especialistas sufrió una reestructuración temporal pero importante, dando prioridad a los aspectos laborales dentro del sistema. El objetivo principal del estudio fue evaluar cómo los médicos residentes en España perciben el impacto de la pandemia de COVID-19 en su formación y en su bienestar emocional. Se realizó un estudio descriptivo observacional transversal donde se recogieron los datos a través de una encuesta anónima distribuida a todos los médicos residentes en España durante un período de dos semanas en noviembre de 2020. Los resultados fueron analizados mediante el paquete estadístico SPSS v.25. Se recopilaron y analizaron un total de 2889 respuestas. Más del 80% de los residentes afirmó que la formación había empeorado y el 47% indicó que trabajar en tareas relacionadas con COVID-19 no había contribuido a su plan de formación. El aumento de las guardias de 24 horas y del horario regular de trabajo, la falta de supervisión y la suspensión de cirugías programadas fueron las variables asociadas a un mayor impacto formativo y psicológico. La pandemia COVID-19 ha afectado gravemente a los programas formativos de los residentes, fundamentalmente en la adquisición de competencias especializadas. Esta situación debe ser abordada por las autoridades sanitarias a nivel gubernamental y hospitalario para evitar marcadas deficiencias en la formación de los futuros especialistas.

Palabras clave: Residentes; COVID-19; pandemia; programa formativo; educación médica; impacto emocional.

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1. Introduction

The origin of Spanish medical specialist training, also known as the *MIR system,* dates back to the 1970s when the Spanish healthcare system was comprehensively reorganized (1). Graduate medical education in Spain is conceptualized as a dual system regulated as both a public employment and a graduate training program (1-2). In recent years, the balance between these two facets has been put into question due to an increase in healthcare demand and the organizational difficulties created by the budget cuts enacted after the 2008 economic crisis. One of the examples which could illustrate this imbalance can be found in the systematic non-compliance of labor rights in relation to compulsory resting times after 24-hour on-call shifts (3-4). One particularity of the system is that its access and evaluation periods are centralized at the state level. Every year a national specialist training access exam takes place, which allows candidates to choose the specialty based on their results (2). Before 2020, the exam took place in January and residents started their programs in May, the month in which last year residents are evaluated. In Spain training itineraries of different medical specialties are divided into two groups, based on duration, which are 4- and 5-year specialties. The majority of specialties belong to the first group and the 5-year group is reserved to surgical specialties, cardiology, and oncology, among others.

In March 2020 the uncontrollable spread of SARS-CoV2 led to the enactment of a countrywide state of emergency by the Spanish Government (5) to address the health emergency which was collapsing the healthcare system. Residency programs were temporarily put on hold (6) and medical residents were reassigned to COVID wards for several months. The government allowed the transfer of residents to medical centers which did not possess any graduate training certification and also allowed the possibility of forced transfers of resident physicians between regions (6). This resulted in a dismantling of the specialist training system which caused the suspension of clinical placements, elective surgeries and other activities which are vital to the achievement of residency programs' competencies. The most important values of specialist training, which are clinical supervision and the progressive acquisition of clinical competency, were *de-facto* abolished. In April 2020, a similar scenario of collapse was still evident in the Spanish healthcare system, therefore the Government postponed the nationwide annual evaluation process of all residents (7) resulting in the automatic extension of residents' contracts. However, the improvement of the situation, the flattening of the curve and the protests of medical organizations (8) led to a partial return to the previous regulatory framework (9) which allowed last-year residents to finally become specialists.

Resident's evaluation which occurred during the first-wave de-escalation process marked a return to a paradigm of certain normality in relation to the training curriculum and the reestablishment of ordinary duties. However, a regulatory framework has remained in force, allowing the Government to return to a crisis scenario at their will, which translates into the suspension of clinical placements and forced transfer of specialists-in-training at any time (6). On top of this, the delayed incorporation of first-year residents by the end of September 2020, which traditionally takes place in May, left the healthcare system with a diminished workforce in a time of need. In addition to the constantly changing contingency care scenarios in which residents labor, contagion prevention measures have led to the rapid implementation of telemedicine and the interruption of ordinary activities such as surgeries and interventional procedures, resulting in a delay of diagnosis and treatments.

Healthcare workers have suffered emotionally during the pandemic regardless of their profession in which they work (10), thus becoming a national priority yet to be solved (11). However, only a handful of studies have analyzed the perception of resident physicians regarding the impact on their emotional health. In the same way, no studies have been found which address their perception on the shortcomings of postgraduate training during the pandemic. Thus, the main goal of our study was to assess how Spanish resident physicians perceive the impact of the COVID-19 pandemic on their training. As secondary goals, we aimed to understand the psychological distress derived from the working conditions and work overload which residents have endured.

2. Material and methods

An observational cross-sectional descriptive study was carried out using a multiple-choice questionnaire. An anonymous voluntary survey was distributed to all the resident physicians in Spain through email, social networks, and instant messaging platforms, in which informed consent was requested and the future use that would be made of the data was specified. All surveys between the 4th and 11th of November 2020 were analyzed. The eligibility criteria for this study were to be a Spanish resident physician during the recruitment period. The study population includes a total of 30,630 residents. The survey (which is available as additional information) comprised 13 multiple-choice questions. The first question dealt with the region in which residents work. Subsequently, the rest of the questions were structured in three blocks:

1. Block I - Resident's duties and level of supervision (6 questions):
    a. COVID-19 duty; type of COVID-19 related duties; changes in residency program; Increased number of 24h on-call shifts; increased work overload; level of supervision; interruption of elective surgeries.
2. Block II - Psychological distress and training consequences (4 questions):
    a. COVID-19 as a learning opportunity; the impact of implemented health measures; psychological distress.
3. Block III - Other questions (2 questions):
    a. Work overload due to the late incorporation of residents. In the final block, we included a question which tried to find out whether last-year residents wanted to voluntarily extend or finalize their training programs because of the pandemic consequences.

*Statistical analysis***.** All variables were described as absolute and relative frequencies (percentages) of their categories. A Kruskal-Wallis test, a Dunn post-hoc test and a logistic multinomial regression has been applied to analyze whether the variables in block I influence variables in block II. A value of $p \leq 0.05$ was considered statistically significant, adjusted by Bonferroni correction in Dunn's test. The results were analyzed with the statistical package SPSS v.25.

3. Results

A total of 2889 responses were analyzed. The results of the survey's block I and III are shown in table 1, and block II results in figure 1. Results from the first block "Resident's duties and level of supervision", show that resident physicians have had an important role in the healthcare response

to the COVID-19 pandemic in Spain. More than 83% of the residents stated that they had worked in COVID-19 related activity. Moreover, 65.5% had worked directly and exclusively in a COVID-19 ward and suffered an increase in work overload (50.6%), and increased number of 24h on-call shifts (47.2%). Looking into the second block "Emotional impact and training consequences", more than 80% of the residents perceived that their training had worsened and 88% experienced psychological distress. Lastly, around 59% of resident physicians believe that their training should be extended in order to ameliorate the loss in specific competencies as a consequence of the pandemic.

Table 1. Spanish medical specialist training's duties and level of supervision (Block I) and other questions (Block III) absolute and relative frequencies. 2889 respondents, November 2020, Spain.

Questions and answers	Absolute frequency	Relative frequency (%)
COVID related activity		
Yes	2399	83.04
No	490	16.96
Type of COVID related activity		
Direct activity	310	12.81
Indirect activity	1586	65.54
COVID Diagnosis	141	5.83
Primary care	383	15.83
Increase number of 24h on-call shifts		
No	1423	49.38
Yes, only in the first wave	730	25.33
Yes, still doing more	729	25.29
Increase in regular working hours		
No	1524	52.88
Yes, paid working hours	433	15.02
Yes, unpaid working hours	925	32.10
Level of supervision		
Good supervision	249	8.62
Acceptable supervision	1620	56.07
No supervision	1020	35.31
Changes in training itineraries		
No	1386	47.98
Yes	1503	52.02
Suspension of elective surgeries		
No	78	2.70
Yes	2811	97.30
Work overload due to the delayed incorporation of residents		
No	729	25.73
Yes	2104	74.27
Residence extension		
No	1148	40.10
Yes	1715	59.90

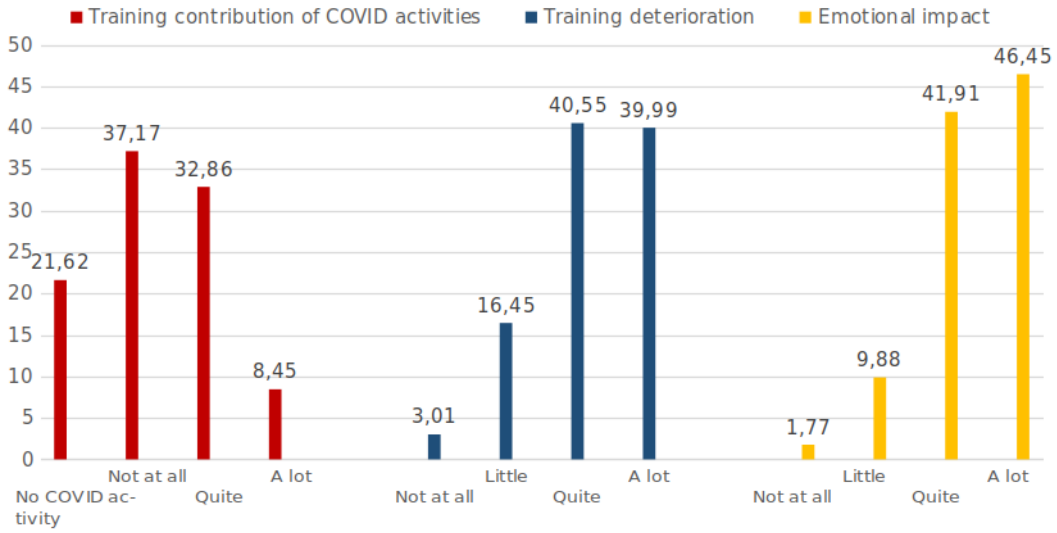

Figure 1. Spanish medical specialist training's emotional impact and training (Block II) relative frequencies. 2889 respondents, November 2020, Spain.

In order to analyze which factors are central to the training and emotional impact, a Kruskal Wallis test alongside a post-hoc Dunn test between each variable from the first and second block were applied. The results (displayed in table 2 and 3) show that working in COVID-19 wards, an increase in 24h on-call shifts, work overload, less supervision, and the interruption of elective surgeries had a negative impact both in terms of psychological distress and on training curricula. A statistically significant difference was found in all the variables analyzed which confirms that multiple factors have influenced in greater or lesser degree to the training and emotional impact of Spanish residents. On top of this, a greater impact is observed in residents who have experienced: COVID-19-related activities, changes in their training programs, increased working hours, increased unsupervised work, and increased unpaid working hours.

Table 2. Kruskal Wallis Test between block I variables (independent variables) and block II variables (dependent variables) results and statistical significance, set at 0.05.

Independent Variable	Dependent Variable (Impact)	Kruskal Wallis Test	*p*-value
COVID-related activity	Training	7.49	<0.01
	Emotional	34.03	<0.01
Type of COVID related activity	Training	35.54	<0.01
	Emotional	49.00	<0.01
Change in training itinerary	Training	35.04	<0.01
	Emotional	32.12	<0.01
Increased number of 24h on-call shifts	Training	23.72	<0.01
	Emotional	113.75	<0.01
Increase in regular working hours	Training	144.36	<0.01
	Emotional	149.37	<0.01
Level of supervision	Training	107.47	<0.01
	Emotional	80.54	<0.01
Suspension of elective surgeries	Training	12.93	<0.01

	Emotional	22.83	<0.01

Table 3. Dunn post-hoc Test between block I variables with more than two answers (independent variables) and block II variables (dependent variables) results and statistical significance, set at 0.05 and adjusted by the Bonferroni correction.

Indep. variable	Depend. variable	Compared groups	Dunn Test	Adjusted *p*-value
Type of COVID related activity	Training impact	No activity vs Direct Activity	-108.03	0.10
		No activity vs **Indirect activity**	-170.46	0.03
		No activity vs **Primary Care**	191.57	0.01
		No activity vs COVID diagnosis	191.14	0.10
		COVID diagnosis vs **Direct Activity**	299.17	0.01
		COVID diagnosis vs **Indirect activity**	361.60	0.01
		COVID diagnosis vs **Primary Care**	-382.71	0.01
		Direct Activity vs Indirect activity	-62.43	1.00
		Direct Activity vs Primary Care	-83.54	0.59
		Indirect activity vs Primary Care	-21.11	1.00
	Emotional impact	No activity vs **Direct Activity**	-268.76	0.01
		No activity vs **Indirect activity**	-172.37	0.02
		No activity vs **Primary Care**	-183.19	0.01
		No activity vs COVID diagnosis	-95.50	1.00
		COVID diagnosis vs **Direct Activity**	173.27	0.09
		COVID diagnosis vs Indirect activity	76.869	1.00
		COVID diagnosis vs Primary Care	-87.70	1.00
		Direct Activity vs Indirect activity	96.40	0.41
		Direct Activity vs Primary Care	85.57	0.47
		Indirect activity vs Primary Care	-10.83	1.00
Increase in 24h on-call shifts	Training impact	No increase vs **1st wave increase**	-113.32	0.01
		No increase vs **Ongoing increase**	-159.69	0.01
		1st wave increase vs Ongoing increase	-46.38	0.76
	Emotional impact	No increase vs **1st wave increase**	-244.98	0.01
		No increase vs **Ongoing increase**	-340.14	0.01
		1st wave increase vs **Ongoing increase**	-95.16	0.05
Increase in regular working hours	Training impact	No increase vs **Unpaid working hours**	-191.40	0.01
		No increase vs Paid working hours	-79.36	0.18
		Paid working hours vs **Unpaid working hours**	112.04	0.04
	Emotional impact	No increase vs **Unpaid working hours**	-222.13	0.01
		No increase vs **Paid working hours**	-372.65	0.01
		Paid increase vs **Unpaid increase**	150.1	0.01
Supervision	Training impact	Acceptable vs **No supervision**	233.94	0.01
		Good vs **No supervision**	509.10	0.01
		Good vs **Acceptable**	275.17	0.01
	Emotional impact	Acceptable vs **No supervision**	233.97	0.01
		Good vs **No supervision**	138.25	0.01
		Good vs **Acceptable supervision**	138.25	0.02

Assessing the importance of individual factors may be useful in the planning of future strategies for the improvement of residents' training. Therefore, a logistic multinomial regression between the variables of the first block and the variables from the second block was applied. The statistically significant results of the Exp (b) value compared respectively with the first answer of each variable are shown in table 4. When analyzing the training impact, all variables except COVID-19 duties were statistically significant and have been included in the model. The model obtained resulted in a X^2 value of 255.67 with a p-value of less than 0.01 and a Cox and Snell pseudo-R squared value of 0.09.

Table 4. Logistic multinomial regression Exp(b) value between block I variables (independent variables) and block II variables (dependent variables), significant results and statistical significance, set at 0.05.

Depend. Variable	Category of variable	Independent Variable	Compared groups	Exp (B)	*p*-value
Training impact	**A lot**	Type of COVID related activity	No activity vs **Primary Care**	2.76	0.04
		Changes in training itineraries	No change vs **Change**	1.75	0.01
		Increase in 24h on-call shifts	No increase vs **Ongoing increase**	2.70	0.02
		Level of supervision	Good supervision vs **No supervision**	3.57	0.01
		Suspension of elective surgeries	No vs **Yes**	5.26	0.01
	Much	Changes in training itineraries	No change vs **Change**	2.78	0.01
		Increased in number of 24h on-call shifts	No increase vs **Ongoing increase**	2.76	0.02
		Increase in regular working hours	No increase vs **Unpaid increase**	2.22	0.04
		Level of supervision	Good supervision vs **No supervision**	6.67	0.01
		Suspension of elective surgeries	No vs **Yes**	5.56	0.01
Emotional impact	**A lot**	Increased number of 24h on-call shifts	No increase vs **Ongoing increase**	3.56	0.04
		Level of supervision	Good supervision vs **No supervision**	3.45	0.01
		Suspension of elective surgeries	No vs **Yes**	4.35	0.01
	Much	Increased number of 24h on-call shifts	No increase vs **1st wave increase**	3.18	0.01
		Increased number of 24h on-call shifts	No increase vs **Ongoing increase**	5.98	0.01
		Increase in regular working hours	No increase vs **Unpaid increase**	3.88	0.01
		Level of supervision	Good supervision vs **No supervision**	4.35	0.01
		Suspension of elective surgeries	No vs **Yes**	6.67	0.01

Taking into account the Exp (b) value, the variables which had the worst impact on medical training were the lack of supervision and the interruption of elective surgeries. Those residents that had been affected by this problem presented a 500 to 600% increase in the answers: "much" and "a lot" in training deterioration, followed by the variables change in clinical placements and an increased number of 24h on-call shifts by 200 to 300%, respectively. The variables which showed statistically significant increases psychological distress in our model were: increased number of 24h on-call shifts, increased work overload, the lack of supervision and the interruption of elective surgeries. These variables had a value X^2 of 288, a p-value of **<**0.01 and a Cox and Snell value of 0.1 in our model, revealing a 400 to 600% increase of negative emotional impact on our residents.

4. Discussion

The COVID-19 pandemic has posed an unprecedented challenge to contemporary societies and the resulting crisis will have far-reaching consequences for the health of populations, the economy and our social systems. The first and second waves of the pandemic have particularly transformed healthcare systems throughout the world. In this regard, the pandemic has altered the Spanish medical specialist training as shown by the role of residents during the crisis and the resulting psychological distress and training shortcomings, confirming the international data in other healthcare professions (10-11).

Undertaking COVID-19 related duties and treating patients affected by COVID-19 have been reported as one of the key factors underlying psychological sequelae (10). Other factors cited in various studies were: working alone, feeling high levels of uncertainty, the absence of effective treatments, and having experienced a personal or family case of COVID-19 (11). On the subject of specialist training, the changes in training curricula and the interruption of elective surgeries have been described as important obstacles in the acquisition of core and specific competencies (13-14); these results are congruent with the data from our study. Moreover, no published work has explored the relationship between work overload, increasing number of 24h on-call shifts, and the lack of supervision with psychological distress and negative training impact during the COVID-19 pandemic. Available literature published prior to the pandemic in this particular subject (15-17) is consistent with the results obtained in the present study.

Regardless of the optimism and the expectations which have been placed on available vaccines (18-19), the pandemic continues spreading worldwide, and therefore, it is imperative to minimize the impact it has had and continues having on resident physicians. Bearing in mind our observational study results, it is essential to consider immediate changes in the following areas:

- Minimize the changes in clinical placements outside the ordinary training curriculum, always bearing in mind the possibilities of each hospital and considering the healthcare situation.
- If changes need to be made because of the pandemic, they should be implemented in the shortest time possible and adapted to the training needs of each resident and specialty.
- A balance between the work-related and training aspects in each resident's itinerary must be reached, without increasing the number of 24 on-call shifts or working hours.
- If there is no other option and the residents' workload is increased, it should be done with the corresponding remuneration and said situation should be temporary. These measures will likely reduce the psychological distress of resident physicians.
- Residents' supervision must be guaranteed to reduce the negative impact on training, as it is one of the key aspects underlying both the training and emotional impact resulting from the COVID-19 pandemic.
- A voluntary extension of residency programs should be allowed and considered in the case of residents who have not met the training needs and acquired the required competencies of their specialties because of the pandemic (13).

There are different examples of how residency programs have been successfully adapted with the aim of ameliorating the training shortcomings and the reduction of the work overload caused by the pandemic (14). On the subject of the emotional impact of healthcare workers, the available evidence suggests:

- To promote the interaction of residents with mental health services when possible, providing e-consultation options, bearing in mind the stigma which health professionals experience when seeking medical help (20).
- To implement e-learning within residents' training itineraries (21).
- To encourage training through simulation in fields where technical skills cannot be achieved through other means as in the case of surgical specialties (22).
- Maintaining a work environment in which an assertive and fluid communication exists and which cares for the needs of residents, with special emphasis on the role of residents' tutors, and heads of department (23).

5. Conclusions

- The COVID-19 pandemic has severely impacted medical specialist training in Spain.
- Due to an increased number of working hours, on-call 24h shifts, and a lack of supervision; Spanish residents have sustained a significant training and emotional impact which needs to be addressed.
- Residents are vital to the improvement of the existing healthcare crisis and the future of healthcare provision, this situation must be urgently addressed by health authorities both at government and hospital levels.

Funding: There has been no funding.

Acknowledgment: The authors wish to thank all Spanish residents, whose efforts and sacrifices have been crucial in the management of the COVID-19 crisis and the threat it has posed to the Spanish public healthcare system. The authors wish to also thank the members of the Spanish Medical Association's Junior Doctors committee who have made this study possible. Finally, special thanks to Rupert Donovan and Oriol Rivera for their help in the revision of the manuscript and statistical analysis.

Declaration of interest statement: The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties. No writing assistance was used in the production of this manuscript. No previous presentation of the data used in this manuscript.

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Additional information

SURVEY: COVID-19 impact on resident's training and emotional wellbeing

Block I - Resident's duties and level of supervision (7 questions):

1.-During the health crisis, have you had to carry out COVID related activities? (Yes/No)

2.-In what way?

- No COVID-19 activity
- COVID-19 ward (hospitalization, ICU, emergency department).
- COVID-19 diagnosis (Radiodiagnostic/laboratory).
- In primary care attending COVID19 (including telephone care).
- Indirect support without direct contact with COVID patients: (phone calls, data collection...).

3.-Since the beginning of the pandemic, have you worked in a department other than your own or in an activity other than your training plan?

- No, I have worked in the same department/service that I had scheduled.
- Yes, in COVID-19 related duties.

4.-Have you experienced an increase in the number of monthly on-call duties?

- Yes, only in the first wave.
- Yes, I am still doing more.
- No.

5.-Have you experienced an increase in your normal working hours as a result of your COVID activity?

- Yes, and I have received financial remuneration for overtime.
- Yes, and I have not received any overtime pay.
- I have not had to extend my working hours.

6.-Have you felt supervised in the work you have done in COVID-19 related duties?

- I did not feel supervised
- Acceptable supervision
- Good supervision

Block II - Emotional impact and training consequences (4 questions):

7.-Has the work you have done in COVID-19 related duties provided you with important knowledge or has been formative in terms of training? (No COVID-19 activity/Not at all/Quite/A lot).

8.-If your specialty is surgery: In your hospital, have surgeries been suspended as a result of the health crisis? (Yes/No)
9.-Do you feel that your training has deteriorated? (Not at all/Little/Quite/A lot)
10-Do you consider that this crisis has had an impact on your emotional state (irritability, insomnia, sadness, anxiety...): (Not at all/Little/Quite/A lot)
Block III - Other questions (2 questions):
11- Have you had to perform a greater number of shifts or have you perceived a greater workload due to the delay in the incorporation of first-year residents? (Yes/No)
12-Do you think it would be necessary to extend your training to make up for the training lost during these months? (Yes/No)

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