



Impact of the COVID-19 pandemic on pathology training: a survey among Spanish residents

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Abstract

This study aimed to assess the impact of the COVID-19 pandemic on the training of Spanish pathology residents by conducting an online survey. It was distributed among the pathologists who had been residents during the pandemic and consisted of 31 questions about the demographics and the impact of the pandemic on their pathology training. In total, 114 residents completed the survey; they reported a decrease in the number of biopsies, cytology samples, autopsies, research activities, sessions, case corrections, and courses, as well as the detrimental effect this had on their training. Half of the residents had to cancel rotations and 32% were redeployed to other departments. The COVID-19 pandemic has affected pathology training, and our results can be used to understand the challenges residents have faced and mitigate their impact.

Keywords Pathology · Training · COVID-19 · Survey

Introduction

The COVID-19 pandemic has caused a healthcare crisis and has taken a toll on our lives these past years. In Spain, most of the impact was noted between March 2020 and June 2020,

when the lockdown was imposed to contain the propagation of the virus and to diminish healthcare pressure. However, the effects of the pandemic have continued beyond this period.

Hospitals were overwhelmed by the influx of COVID-19 patients, resulting in a healthcare collapse in which “common” pathologies could not be attended to properly [1]. Physicians from all specialties were redeployed to the front lines of the hospital, and the normal activities of the pathology departments were profoundly affected. As screening and surgical procedures diminished, so did pathology samples [2, 3].

This study aimed to assess the impact of the COVID-19 pandemic on the perceived quality and quantity of training among Spanish residents, from March 2020 to May 2021.

Material and methods

We conducted an online survey among Spanish pathologists who were residents at some point during the pandemic, from March 2020 to May 2021. This included first-year residents who started their residency in September 2020, to second-year pathologists who finished their training in May 2021. We asked for participation in this survey to all pathology residents with membership in the Spanish Society of Anatomic

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Pathology (SEAP), via e-mail, WhatsApp groups, and the official Twitter SEAP account. It was open from 21 May 2021 to 30 June 2021.

All responses were anonymous, and participation was completely voluntary. The answers were collected using Microsoft Forms and analysed with STATA (version 13.0). Fisher's exact test or Chi-square test was used when dealing with categorical variables and contingency tables, whereas t-test or ANOVA were applied to compare quantitative data. We set 0.05 as the limit for statistical significance.

The survey consisted of 31 questions. The first nine were asked about demographics, while the rest were asked about the impact of the pandemic on their pathology training. The questionnaire is available as supplementary material.

Results

A total of 114 residents participated in this survey, representing approximately 30% of all Spanish pathology residents [4]. The demographic features are shown in Table 1.

More than half of the participants reported a loss in their skills in biopsy and cytology interpretation, autopsy procedures, and research methods (Table 2). The perception of loss in biopsy interpretation was more notorious in women (77%) than in men (54%) (Fisher's exact test = 0,044).

Most participants reported a decrease in the number of biopsies, cytology samples, autopsies, and scientific activities. Additionally, a decrease in the number of pathology sessions, cases correction, congresses, courses, and supervision was reported by most participants (Table 3). Statistically significant differences were found between the year of residency and the perceived impact on training, and a higher proportion of junior pathologists (first- and second-year attending) reported a decrease in training (78,6%), compared to intermediate-year residents (third- and fourth-year residents) (52,5%) or junior residents (first- and second-year residents) (32%) (Fisher's exact test = 0,005). 70,2% of the participants reported a perceived increase in the number of webinars offered.

As for the scheduled training programme, 57 residents (50%) had to cancel rotations, most of them external. Most

Table 1 Demographic features of the participants

Demographics	Total	114 (100%)
Age, years	Median (IQR)	30 (4)
	Min, max	26, 43
Gender, n (%)	Female	82 (71,93%)
Residency year, n (%)	R1	21 (18,42%)
	R2	4 (3,51%)
	R3	26 (22,81%)
	R4	35 (30,70%)
	Junior pathologist (first year)	18 (15,79%)
	Junior pathologist (second year)	10 (8,77%)
Nationality, n (%)	Spanish	97 (85,09%)
	Other countries	17 (14,91%)
Type of hospital, n (%)	30–200 beds	1 (0,88%)
	200–800 beds, moderately specialised	12 (10,53%)
	> 800 beds, highly specialised	101 (88,60%)
Place of training, n (%)	Andalusia	27 (23,68%)
	Madrid	26 (22,81%)
	Catalonia	18 (15,79%)
	Other regions	43 (37,71%)
Previous training in another speciality	Yes	14 (12,28%)

Table 2 Perception of the pandemic impact on residents' learning

	Loss of skill	Same as before	Improvement	Not applicable
Biopsy diagnosis	68,4%	23,7%	4,4%	3,5%
Cytology diagnosis	57%	28,9%	4,4%	9,6%
Autopsy procedure	58,8%	27,2%	7,9%	2,1%
Investigation methods	42,1%	35,1%	13,2%	9,6%

Table 3 Percentage of participants reporting changes in the volume of biopsies, cytology samples, autopsies, scientific activities, and the number of educational activities due to the pandemic impact

	Less than before	Same as before	More than before	Not applicable
Workload volume				
Biopsies	78,9%	14%	5,3%	1,8%
Cytology samples	71,9%	17,5%	0,9%	9,6%
Autopsies	78,9%	9,6%	10,5%	0,9%
Scientific activities	52,6%	29,8%	8,8%	8,8%
Educational activities				
Pathology sessions	81,6%	14,9%	3,5%	0%
Case corrections	57,0%	41,2%	1,8%	0%
Courses	76,3%	14,8%	7,9%	0%
Standby learning	54,4%	42,1%	2,6%	0,9%
Webinars	9,7%	11,3%	70,2%	8,8%

residents (67%) think they will not make up for their lost rotations in the future.

When we analysed the direct burden of SARS-CoV-2 infection in the training programme, we found that forty-three (37,7%) residents had sick leave, most of them for three or more weeks (37%) or two weeks (35%).

Although 68% of the participants considered that they had achieved their competencies for that year of training, 51% agree that the residency should be prolonged.

Among the participants in this study, 37 (32%) were redeployed to other departments. When comparing the rate of redeployment between residents with a previous specialty and those without one, we did not find statistically significant differences (28% with the previous specialty, 33% without; Fisher's exact test = 1). Twenty-six residents (70%) reported that they did not receive specific training to perform their new redeployment duties.

Discussion

In this study, we report the results of a national survey to analyse the impact of the COVID-19 pandemic on the training of Spanish pathology residents. Participants reported a significant reduction in general workload and learning activities, and they agree on the negative impact this has caused in their training. Some published works already discuss the impact of the pandemic on pathology training [5–9], but we have not found any study conducting a survey for pathology residents.

Previous surveys on the impact of the pandemic on residents' training in other specialties have shown similar results. Due to the reduction in elective activities and the redeployment, residents reported a decrease in educational activities, with a detrimental effect on their training [10, 11]. A survey in a large academic medical centre found that

pathology residents were more likely to be concerned about missing educational opportunities compared to other specialties [12].

The decrease in the activity of pathology departments has resulted in a lower number of cases for residents to work up. A study by Amador et al. [3] about the COVID-19 impact on cancer care in Spain reported a decrease of 41.2% in biopsies and 57.1% in cytology samples in 2020 compared to 2019. In this regard, most residents reported a decrease in the volume of work. Although the pandemic hit differently in the different Spanish autonomous communities, we did not find any statistically significant differences between places of training. The workload reduction had a major impact on learning opportunities, with residents reporting a deterioration in their diagnosis skills and autopsy procedures. Most hospitals cancelled autopsies during the worst period of the pandemic, starting to perform COVID-19 autopsies in mid-April 2020 [13] in some hospitals.

Residents report a decrease in the perceived self-capability in diagnosis skills. The deterioration in the abilities to diagnose was reported more by junior pathologists (first- and second-year attending) when compared to intermediate-year residents (third- and fourth-year residents) and junior residents (first- and second-year residents). We may be facing the impostor syndrome (competent individuals underestimating their capabilities) in junior pathologists or the Dunning–Kruger effect (inexpert individuals overestimating their capabilities) in junior residents. Regardless of this, data show a consistent decrease in self-perceived skills across residents. These findings correlate with the reported decrease in sessions, training, standby teaching, and work volume.

Those residents in hospitals where in-centre rotations are organized by specialties may have missed their scheduled rotations. This represents missed-out opportunities to learn basic skills in diagnosis. External rotations usually take a lot

of planning, and as COVID-19 restrictions prevented traveling, residents could not transfer to their destined hospitals. In addition, as the workload was diminished, even if they were able to access their new destination, this rotation was not as useful as during a normal pre-pandemic period.

According to our results, the pandemic has taken just a moderate toll on research-related activities. One reason for this may be the lack of a research tradition in some pathology departments, so the pandemic has not had a major impact in this area. However, 9% of residents reported an increase in scientific activities, which may be explained by the interest COVID-19 has raised in the scientific community; additionally, the workload reduction has provided, residents with extra time to finish their previous projects.

During the pandemic, many medical professionals were redeployed to emergency departments and COVID wards. We hypothesized that those residents with previous training in other specialties would be more likely to be redeployed than residents who had not completed previous specialties. However, we did not find significant differences in the rate of redeployment between both groups, which may be due to the small number of residents who had a previous specialty. A striking result is that 70% of pathology residents were not trained for their new redeployment duties. Attending the free-text answers provided on our survey and a previous questionnaire on oncology residents [11], this fact contributed to the stress faced by residents. However, during the pandemic a lot of professionals became infected with COVID-19, resulting in short staffing, and those apt to work had high clinical loads. All of these contributed to the scarce time professionals had to teach redeployed residents.

Regardless of the data provided above, it is important to keep in mind that 68% of the participants considered their competencies had been achieved during the pandemic, but 51% still think their residency should be prolonged. Surgical pathology is a specialty that includes lots of personal study during the training period, which can be done in a work-from-home setting. However, on-site learning and hands-on training with surgical specimens are imperative in pathology training and cannot be replaced by online working.

The pandemic has brought an increase in online activities and a decrease in in-person activities. Previous studies focused on the pandemic impact on residents' training shows similar results, as they report an increase in virtual pathology education[5–9].

This study has several limitations. For instance, there is a little overrepresentation in female responders, as women represent 71.93% of the participants in our survey and 61.28% of pathology residents in Spain [4]. This fact may reflect an increased willingness in women to participate in these activities. Further, the sample size is limited. This

may represent a response bias, as probably those residents with more COVID-19 exposure were more likely to answer this survey and share their experiences. Additionally, we cannot rule out a significant degree of memory bias, as in any retrospective survey. Moreover, the aim of this study was to assess the impact of the pandemic on pathology training, without asking about the psychological effects it has had on the residents. Thus, we cannot rule out a significant effect of the psychological aspects on training programmes. Further studies are needed to investigate this interesting point [11].

In conclusion, this national survey sheds light on the impact the COVID-19 pandemic has entailed in pathology training in Spain. The results we present can be used to understand the challenges residents have faced and to make proposals to mitigate their impact. In the era of digital pathology, powerful tools in pathology teaching have become available. For instance, massive implementation of slide scanning in Spanish hospitals would facilitate home-based study of cases. Digital slides of paradigmatic or infrequent cases can be shared among teaching centres and hospitals, increasing the range of cases which residents face during their training. Similarly, to bolster online teaching sessions and courses, specifically designed for residents, could boost learning and training among the soon-to-be pathologists.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s00428-022-03303-w>.

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Authors' contribution Irene Carretero-Barrio conceived the study; Irene Carretero-Barrio and Joan Lop-Gros contributed to methodology and wrote the original draft; Joan Lop-Gros carried out formal analysis and investigation; Mar Iglesias, Carolina Martínez, Xavier Matias-Guiu, Belén Pérez-Mies, and José Palacios took part in writing, reviewing, and editing and supervised the study; and José Palacios acquired the funding.

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Data availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

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