




# Pediatric residents' perceptions about the impact of the COVID-19 pandemic on their training

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## ABSTRACT

**Introduction.** Medical residency programs suffered changes that may have affected academic training during the COVID-19 pandemic.

**Objectives.** To describe the perceptions of pediatric residents about the pandemic's impact on their education. To transculturally adapt and validate the COVID-19 Resident Education and Experience Survey into Spanish.

**Materials and methods.** Observational, cross-sectional study. Participants were pediatric residents from hospitals across the country. The survey by Ostapenko et al. was used. A descriptive analysis was done using the SPSS software, version 21. The project was approved by the Institutional Ethics Committee.

**Results.** The survey was completed by 127 residents. Most did more than 50 hours of health care activities before and during the pandemic. Also, 43.3% (95% CI: 35–52) spent at least 1 hour a day studying individually before the pandemic, while 63% (95% CI: 54.3–70.9) did so during the pandemic. In relation to the time spent doing academic work, 75.6% (95% CI: 67.4–82.2) reported that, before the pandemic, they spent at least 4 hours a week doing academic activities, dropping to 41.7% (95% CI: 33.5–50.4) during the pandemic. More than 60% (95% CI: 54.3–70.1) perceived that the pandemic impaired their training to become a specialist and 93.7% (95% CI: 88.1–96.8), that their stress levels increased.

**Conclusions.** The perception was that participants spent less hours doing academic activities during the pandemic. Most surveyed participants mentioned that their stress levels increased and that the pandemic impaired their training to become a specialist.

**Keywords:** professional training; medical residency program; COVID-19 pandemic.

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## INTRODUCTION

On March 11<sup>th</sup>, 2020, the World Health Organization declared that the newly identified SARS-CoV-2 was a pandemic.<sup>1,2</sup> This implied a threat for the population worldwide, specifically for the health care systems, which in a short time had to be reorganized to face this new scenario.<sup>3</sup>

As far as medical education is concerned, residency programs were possibly affected the most. As integral postgraduate training systems, under the modality of in-service training, residency programs are known for the possibilities of intensive practice and immersion in the hospital environment.<sup>4</sup> While experiencing this health emergency may represent valuable learning, the development of skills based on health care practice and academic opportunities for learning and content integration were compromised by multiple causes in this context.<sup>5-7</sup>

Such impact was observed early on in various medical specialties;<sup>8-10</sup> later, in relation to surgical specialties, residents' concerns became evident.<sup>11,12</sup> In Argentina, the education conditions in some residency programs have been described,<sup>11,13</sup> but there is little scientific evidence in relation to pediatric residency programs.

Although the highest proportion of COVID-19 cases was observed in the adult population, pediatric services suffered changes. For epidemiological purposes, hospitalization areas were rearranged to admit pediatric patients with suspected COVID-19.<sup>14-16</sup> In addition, outpatient pediatric services initially experienced a decrease in the number of patients seen as a consequence of the preventive and mandatory social isolation policy and also underwent a change in the demand for care for patients with typical seasonal conditions due to the changes in the usual viral circulation.<sup>17</sup>

For the aforementioned reasons, the reduction in practice in relation to well child care visits, care for typical diseases, and the adaptation to the requirements of the care of these patients affected the training of pediatric residents.<sup>6</sup> In this study, our objective was to describe the pediatric residents' perceptions about the pandemic's impact on their education. To this end, the COVID-19 Resident Education and Experience Survey, developed by Ostapenko A. et al.,<sup>8</sup> was transculturally adapted into Spanish and the instrument's reliability was assessed.

## MATERIALS AND METHODS

Observational, cross sectional study with an online self-administered survey. Pediatric

residents who were in their third and fourth years of training and chief residents of public hospitals located in the City of Buenos Aires and public children's hospitals in other districts across the country were invited to participate through their respective Teaching and Research Committees.

The sample size was estimated at 126 residents completing the survey, considering an expected prevalence of 32% of subjects answering the item "The COVID-19 pandemic has impaired my training to become a pediatrician" as strongly agree or agree,<sup>8</sup> with a  $\pm 10\%$  precision, a 1.5 effect design, and a 95% confidence level. This item was selected as the most representative in the survey to assess residents' perceptions in relation to how the pandemic affected their training to become pediatricians.

For the transcultural adaptation, we used a sample of 10 first-year residents who were not included in the study population and who were selected by convenience. The instrument's reliability was assessed using a sample of 30 subjects for Cronbach's alpha index.

## Instrument description

The survey developed by Ostapenko et al.<sup>8</sup> was used. The authors were asked for permission to use it. The first part of the questionnaire asks about the hours spent on various activities before and after the pandemic. Then, it includes a series of statements related to academic activities that participants must answer using a 5-point Likert-like scale (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree).

Two bilingual pediatric investigators translated the survey<sup>18,19</sup> into Spanish. The survey was then assessed by a multidisciplinary reviewing committee, which included a B.S. in Literature, subsequently back-translated, and approved by the authors.

The 39-question survey was administered to 10 first-year residents using non-probability, purposive sampling with a comment section for each question. After making the suggested modifications, the instrument's reliability was assessed by administering it to 30 residents; a Cronbach's alpha of 0.49 was obtained. The index was improved by removing 5 questions that had a low corrected index of homogeneity ( $< 0.35$ ), whose content did not substantially contribute to the main objective. The final instrument's Cronbach's alpha was 0.7 and included 34 questions (*Supplementary material*).

The following variables were analyzed: year

of residency, hospital of origin, hours spent before and after the pandemic doing health care activities and academic activities, caring for COVID-19 patients, and perception about the different aspects of professional training (changes in the quality of educational strategies, changes in academic training, need for additional training time, training on how to correctly care for a COVID-19 patient, and perception of the impact of the pandemic on occupational stress).

Variables were described using proportions for categorical variables and average and standard deviation (SD) or median and interquartile range (IQR), based on the adjustment to normality (Kolmogorov-Smirnov test), for continuous variables. Results were described with their corresponding 95% confidence interval (CI). The McNemar test and a proportional odds linear logistic regression model was used for inferential statistics, as applicable. A value of  $p < 0.05$  was considered significant. IBM SPSS Statistics 21.

### Ethical considerations

In accordance with the current regulations, the study was approved by the hospital's Research Ethics Committee. We worked with statistical data stripped of any element that would allow the identification of the participants. Since participation was voluntary, the Ethics Committee was asked to consider the survey completion as sufficient informed consent.

### RESULTS

A total of 343 residents were invited to participate, of whom 127 (37%) completed the survey. The sample was made up of 68 subjects from hospitals located in the City of Buenos Aires and 59 from children's hospitals in other districts across the country. At the time of the survey, 63 residents were in third year; 43, in fourth year; and 21 worked as chief residents.

In relation to the number of hours spent providing clinical care (*Table 1*), it is worth noting that 62.2% (95% CI: 53.5–70.2) of residents spent more than 50 hours a week doing health care activities before the pandemic, whereas 55.1% (95% CI: 46.4–63.5) did so after the pandemic, with no statistically significant differences based on the cutoff point between both periods (McNemar test  $p = 0.093$ ).

In relation to hours spent doing academic activities, 43% (95% CI: 35–52) of surveyed residents spent up to 1 hour a day to studying individually before the pandemic, and 63% (95%

CI: 54.3–70.9) did so during the pandemic. In addition, 75.6% (95% CI: 67.4–82.2) of participants reported that they spent 4–6 hours a week devoted to classes, workshops, and hospital grand rounds before the pandemic; such percentage dropped to 41.7% (95% CI: 33.5–50.4) during the pandemic. These were statistically significant differences (McNemar test  $p < 0.00$ ).

In relation to the involvement of staff physicians in academic activities, 26% (95% CI: 19.1–34.2) of residents indicated that it was less than 1 hour a week before the pandemic, and 55.1% (95% CI: 46.4–63.5) referred this during the pandemic (McNemar test  $p < 0.00$ ).

The relationship between the number of hours doing health care activities and studying individually was analyzed using a proportional odds linear logistic regression model before and during the pandemic. In both cases, the hours spent doing health care activities did not serve as a statistically significant predictor of the number of hours spent studying ( $p = 0.21$  and  $p = 0.76$ , respectively). A positive trend towards a higher category in relation to the number of hours spent studying was observed with a higher number of hours spent in health care practice (OR: 1.1; 95% CI: 0.9–1.4) before the pandemic; however, after the pandemic, there was a negative trend between both variables (OR: 0.97; 95% CI: 0.8–1.2).

In the second portion of the survey (*Table 2*), 92.1% (95% CI: 86.1–95.7) of the subjects agreed/strongly agreed that academic activities in their residency program were mostly online during the pandemic and 54% (95% CI: 45.7–63.3) disagreed/strongly disagreed that such modality is equally effective for training as in-person activities.

Also, 60% (95% CI: 54.3–70.1) agreed/strongly agreed that the pandemic impaired their training to become a specialist; 38.6% (95% CI: 30.6–47.3) agreed/strongly agreed that they did not reach their training goals; and 21.3% (95% CI: 15–29.2), agreed/strongly agreed that they would require an extra year of training. In addition, 77.2% (95% CI: 69.1–83.6) referred that they missed a professional development opportunity due to the pandemic.

Besides, 93.7% (95% CI: 88.1–96.8) of residents agreed/strongly agreed that their stress levels increased during the pandemic and were more concerned about spreading COVID-19 to their family than about getting COVID-19

**TABLE 1. Perception about the time devoted to health care and academic activities before and during the COVID-19 pandemic**

Hours spent providing health care	0–10	11–20	21–30	31–40	41–50 n (%) (95% CI)	51–60	61–70	71–80	81–90
-Before the pandemic	-	-	8 (6.3) (3.2–11.9)	15 (11.8) (7.3–18.6)	25 (19.7) (13.7–27.5)	24 (18.9) (13–26.6)	36 (28.3) (21.3–36.7)	13 (10.2) (6–16.7)	6 (4.7) (2.2–9.9)
-During the pandemic	-	-	6 (4.7) (2.2–9.9)	24 (18.9) (13–26.6)	27 (21.3) (15–29.2)	21 (16.5) (11.1–24)	24 (18.9) (13–26.6)	15 (11.8) (7.3–18.6)	10 (7.9) (4.3–13.9)
-Caring for COVID-19 patients	7 (5.5) (2.7–10.9)	21 (16.5) (11.1–24)	33 (26) (19.1–34.2)	20 (15.7) (10.4–23)	17 (13.4) (8.5–20.4)	10 (7.9) (4.3–13.9)	7 (5.5) (2.7–10.9)	7 (5.5) (2.7–10.9)	5 (3.9) (1.7–8.9)
Hours spent studying individually	0–2	2–4	4–6	6–8	8–10 n (%) (95% CI)	10–12	12–14	More than 14	
-Before the pandemic	1 (0.8) (0.1–4.3)	27 (21.3) (15–29.2)	27 (21.3) (15–29.2)	33 (26) (19.1–34.2)	21 (16.5) (11.1–24)	9 (7.1) (3.8–12.9)	5 (3.9) (1.7–8.9)	4 (3.1) (1.2–7.8)	
-During the pandemic	22 (17.3) (11.7–24.8)	37 (29.1) (21.9–37.6)	21 (16.5) (11.1–24)	21 (16.5) (11.1–24)	12 (9.5) (5.5–15.8)	7 (5.4) (2.7–10.9)	4 (3.1) (1.2–7.8)	3 (2.4) (0.8–6.7)	
Hours spent doing academic activities	0–2	2–4	4–6	6–8	8–10 n (%) (95% CI)	10–12	12–14	More than 14	
-Before the pandemic	2 (1.6) (0.4–0.56)	27 (21.3) (15–29.2)	27 (21.3) (15–29.2)	23 (18.1) (12.4–25.7)	18 (14.2) (9.2–21.3)	8 (6.3) (3.2–11.9)	7 (5.5) (2.7–10.9)	1 (0.8) (0.1–4.3)	
-During the pandemic	22 (17.3) (11.7–24.8)	37 (29.1) (21.9–37.6)	21 (16.5) (11.1–24)	21 (16.5) (11.1–24)	16 (12.6) (7.9–19.5)	1 (0.8) (0.1–4.3)	2 (1.6) (0.4–0.56)	1 (0.8) (0.1–4.3)	
Hours staff physicians spent doing academic activities	0–1	1–2	2–3	3–4	4–5 n (%) (95% CI)	5–6	6–7	7–8	More than 8
-Before the pandemic	33 (26) (19.1–34.2)	36 (28.3) (21.2–36.7)	15 (11.8) (7.3–18.6)	7 (5.5) (2.7–10.9)	17 (13.4) (8.5–20.4)	10 (7.9) (4.3–13.9)	2 (1.6) (0.4–0.56)	2 (1.6) (0.4–0.56)	5 (3.9) (1.7–8.9)
-During the pandemic	70 (55.1) (46.4–63.5)	27 (21.3) (15–29.2)	9 (7.1) (3.7–12.9)	8 (6.3) (3.2–11.9)	6 (4.7) (2.2–9.9)	3 (2.4) (0.8–6.7)	1 (0.8) (0.1–4.3)	1 (0.8) (0.1–4.3)	2 (1.6) (0.4–0.56)

*n*: number.

*CI*: confidence interval.

themselves (95.3% and 56.7% agreed/strongly agreed, respectively). Eighty percent (95% CI: 81.4–92.7) of residents mentioned that they received support from their residency program colleagues in relation to their concerns and stressors. Lastly, 5.5% (95% CI: 2.7–10.9) of participants felt that the hospital acknowledged their efforts during the pandemic.

## DISCUSSION

In our study, we observed that resident physicians perceived the impact of the pandemic in different aspects of their training process. More than 60% felt that the pandemic impaired their training to become a specialist, as described in relation to surgical specialties.<sup>11,12</sup> This is twice the percentage reported in the study by Ostapenko et al.<sup>8</sup> It is worth noting that the latter

included residents from other specialties and was conducted in June 2020, only 3 months after the onset of the pandemic; therefore, the impact had been shorter.

Only 38% were concerned that they had not achieved the goals corresponding to their residency program and 21% considered that they needed an additional year of training; this is not consistent with what was reported by Ortopeza-Aguilar et al.,<sup>12</sup> who found that approximately 70% of participants mentioned not having achieved their training goals. Hernández et al. also proposed that such perception was higher among residents working in public facilities.<sup>13</sup> It is worth mentioning that other studies conducted among pediatric residents also found that a low percentage of participants perceived needing an additional year of training and reported that 74% of them would

**TABLE 2. Perceptions about education among pediatric residents in the context of the COVID-19 pandemic**

	Strongly agree	Agree	Neither agree nor disagree n (%) (95% CI)	Disagree	Strongly disagree
1. The academic activities of my residency program were mostly online during the pandemic.	85 (66.9) (58.4–74.5)	32 (25.2) (18.5–33.4)	9 (7.1) (3.8–12.9)	1 (0.8) (0.1–4.3)	-
2. I believe that online academic activities are as effective for my training as in-person academic activities.	8 (6.3) (3.2–11.9)	19 (15) (9.8–22.1)	31 (24.4) (17.8–32.6)	44 (34.6) (26.9–43.3)	25 (19.7) (13.7–27.5)
3. The COVID-19 pandemic has impaired my training to become a specialist.	32 (25.2) (18.5–33.4)	48 (37.8) (29.8–46.5)	31 (24.4) (17.8–32.6)	14 (11) (6.7–17.7)	2 (1.6) (0.4–0.56)
4. I think I would have needed an extra year of training due to what I missed because of the COVID-19 pandemic.	7 (5.5) (2.7–10.9)	20 (15.7) (10.4–23.1)	26 (20.5) (14.4–28.3)	58 (45.7) (37.3–54.3)	16 (12.6) (7.9–19.5)
5. I missed a course or a professional development opportunity due to the COVID-19 pandemic.	56 (44.1) (35.8)	42 (33.1) (25.5–41.6)	15 (11.8) (7.3–18.6)	13 (10.2) (6–16.7)	1 (0.8) (0.1–4.3)
6. I'm concerned I have not met the residency program goals due to the COVID-19 pandemic.	8 (6.3) (3.2–11.9)	41 (32.3) (24.8–40.8)	29 (22.8) (16.4–30.9)	42 (33.1) (25.5–41.6)	7 (5.5) (2.7–10.9)
7. I think staff physicians have adequately cared for COVID-19 patients.	17 (13.4) (8.5–20.4)	41 (32.3) (24.8–40.8)	31 (24.4) (17.8–32.6)	25 (19.7) (13.7–27.5)	13 (10.2) (6–16.7)
8. I think residents were asked to do more than staff physicians during the COVID-19 pandemic.	88 (69.3) (60.8–76.7)	21 (16.5) (11.1–24)	13 (10.2) (6–16.7)	4 (3.1) (1.2–7.8)	1 (0.8) (0.1–4.3)
9. I think residents were asked to put themselves at greater risk situations than staff physicians.	82 (64.6) (55.9–72.3)	22 (17.3) (11.7–24.8)	13 (10.2) (6–16.7)	9 (7.1) (3.8–13)	1 (0.8) (0.1–4.3)
10. During the COVID-19 pandemic, I was assigned duties outside my specialty.	23 (18.1) (12.4–25.7)	28 (22) (15.7–30)	27 (21.3) (15–29.2)	40 (31.5) (24–40)	9 (7.1) (3.7–12.9)
11. I felt/feel adequately trained to do the job I was asked to do during the COVID-19 pandemic.	18 (14.2) (9.2–21.3)	60 (47.2) (38.8–55.9)	25 (19.7) (13.7–27.5)	21 (16.5) (11.1–24)	3 (2.4) (0.8–6.7)
12. Patient safety was compromised due to role reassignment during the COVID-19 pandemic.	19 (15) (9.8–22.2)	44 (34.6) (26.9–43.3)	44 (34.6) (26.9–43.3)	18 (14.2) (9.2–21.3)	2 (1.6) (0.4–0.56)
13. I wish someone else cared for COVID-19 patients.	17 (13.4) (8.5–20.4)	22 (17.3) (11.7–24.8)	63 (49.6) (41–58.2)	21 (16.5) (11–23)	4 (3.1) (1.2–7.8)
14. I felt/feel the responsibility of taking on more work to care for COVID-19 patients.	23 (18.1) (12.4–25.7)	52 (40.9) (32.8–49.6)	37 (29.1) (21.9–37.6)	11 (8.7) (4.9–14.8)	4 (3.1) (1.2–7.8)

<b>15.</b> My stress levels increased during the COVID-19 pandemic.	91 (71.7) (63.3–78.8)	28 (22) (15.7–30)	5 (3.9) (1.7–8.9)	3 (2.4) (0.8–6.7)	-
<b>16.</b> I was/am concerned about getting COVID-19.	33 (26) (19.1–34.2)	39 (30.7) (23.3–39.3)	37 (29.1) (21.9–37.6)	13 (10.2) (6–16.7)	5 (3.9) (1.7–8.9)
<b>17.</b> I was/am concerned about spreading COVID-19 to my family.	89 (70.1) (61.6–77.4)	32 (25.2) (18.5–33.4)	5 (3.9) (1.7–8.9)	1 (0.8) (0.1–4.3)	-
<b>18.</b> I had to quarantine away from my family.	78 (61.4) (52.7–69.4)	27 (21.3) (15–29.2)	11 (8.7) (4.9–14.8)	7 (5.5) (2.7–10.9)	4 (3.1) (1.2–7.8)
<b>19.</b> My colleagues in the residency program have supported me in relation to my concerns and stressors.	62 (48.8) (40.3–57.4)	50 (39.4) (31.3–48)	6 (4.7) (2.2–9.9)	6 (4.7) (2.2–9.9)	3 (2.4) (0.8–6.7)
<b>20.</b> The teachers have supported me in relation to my concerns and stressors.	6 (4.7) (2.2–9.9)	35 (27.6) (20.5–35.9)	35 (27.6) (20.5–35.9)	28 (22) (15.7–30)	23 (18.1) (12.4–25.7)
<b>21.</b> The hospital management acknowledged the efforts I made during the COVID-19 pandemic.	1 (0.8) (0.1–4.3)	6 (4.7) (2.2–9.9)	15 (11.8) (7.3–18.6)	29 (22.8) (16.4–30.9)	76 (59.8) (51.1–68)

*n*: number.

*CI*: confidence interval.

be willing to do extra work in the training period to compensate for such impact.<sup>6</sup>

Consistent with Ostapenko et al.,<sup>8</sup> the number of hours spent doing academic activities and the involvement of staff physicians in these activities decreased during the pandemic. While more than 50% of the surveyed population stated that online academic activities did not replace in-person activities, other international studies proposed that online activities should be used as a complement and not as a replacement.<sup>6</sup>

A survey administered to Washington hospital residents had already reported, by May 2020, that 47% were concerned about missing out on educational opportunities because of the pandemic and suggested that this percentage was significantly higher among residents who had to stay at home and lower in those who were assigned to research duties.<sup>20</sup> In our study, carried out 2 years later, this percentage rises to 77.2%; in this regard, the article by Hernández et al. suggested that the interruption of scheduled clerkships may have influenced this perception.<sup>13</sup>

It will be necessary to establish, at a local level, what other opportunities were available so as to be able to offer the possibility of accessing them during their training stage at the hospitals.

In addition, in similar scenarios, reinforcing the hours spent doing research tasks may also be implemented as a strategy to reduce such impact.

As in the study by Nagasaki et al.,<sup>21</sup> it was observed that, in relation to hours spent studying individually, a greater number of hours spent doing health care activities was not necessarily associated with less time for individual study; the inverse trend was actually observed. A possible explanation is that the more hours spent with in-service practice, the more concerns related to theoretical content may arise and, therefore, the greater the motivation for individual reading.

The increase in perceived stress levels in this context has been widely described in the bibliography;<sup>7,22,23</sup> however, an interesting finding reported by a French study in pediatric residents proposed that there may not be a significant association between changes in health care activities resulting from the pandemic and the involvement in the care of COVID-19 patients and burnout syndrome.<sup>24</sup> Some studies propose that transparency in informing those involved early on about the changes implemented in the programs in these contexts was associated with a reduced possibility for burnout syndrome.<sup>20</sup>

A finding of the study by Enujioke et al.<sup>25</sup> is

that the perception of having received institutional-level support from the mental health team was positively associated with the degree of educational preparedness during the pandemic. Organizing regularly scheduled activities with the mental health team for residents may, in other similar situations, have a lesser impact on the academic level.

In relation to the fear of spreading COVID-19, our results are also consistent with the bibliography in stating that residents were more concerned about infecting their families than the fear for their own health.<sup>13,27,28</sup>

A limitation of this study is that it was carried out in a period of time when the changes imposed by the COVID-19 pandemic (social distancing, reorganization of health care, etc.) were no longer as significant as in the previous year. In addition, although the expected sample size was achieved, the percentage of survey completion was low. However, this is the first type of study conducted in pediatric residents of Argentina, so it may serve as a starting point to implement appropriate changes across the different pediatric residency programs.

## CONCLUSIONS

Pediatric residents perceived that they spent less hours doing academic activities during the pandemic. Most surveyed participants mentioned that their stress levels increased and that the pandemic impaired their training to become a specialist. ■

Supplementary material available at: [https://www.sap.org.ar/docs/publicaciones/archivosarg/2024/10059\\_AO\\_Labanca\\_Anexo.pdf](https://www.sap.org.ar/docs/publicaciones/archivosarg/2024/10059_AO_Labanca_Anexo.pdf)

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