

Qualitative analysis of the Orthopedics and Traumatology residency system in times of COVID-19

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ABSTRACT

COVID-19 pandemic has a direct impact on the daily practice of the Orthopedics and Traumatology residents. The considerable hour load demanded by their training is experiencing a severe reduction. We assume that their practical training is being seriously impaired, while their theoretical education has not been particularly hindered. **Objective:** To carry out a qualitative analysis of the Orthopedics and Traumatology residency system in the city of Buenos Aires and the Pampeana region during the COVID-19 pandemic. **Materials and Methods:** A cross-sectional study was carried using an anonymous survey of 16 multiple-choice questions oriented to changes perceived regarding the theoretical and practical training during the pandemic. The survey was distributed to 361 Orthopedics and Traumatology resident doctors who work in the city of Buenos Aires and the Pampeana region. **Results:** We received 122 answered surveys. Regarding their theoretical education, 76.2% of respondents stated that they were devoting more time to study than before the pandemic, and 71.3% that they were not worried about their theoretical education. The practical training perceptions present a different scenario as 88.5% of respondents stated that their surgical activities decreased and 90.1% expressed their concern regarding this situation. **Conclusions:** Residents are aware of the impact that the quarantine has on their training and many of them are using this period to improve their theoretical education. To rise to this challenge, relying on various strategies, such as telemedicine, webinars, and videos on surgical procedures, is essential. However, this unprecedented circumstance has made us aware of the major challenge involved in replacing practical training.

Key words: Coronavirus; pandemic; medical training; residency; COVID-19.

Level of Evidence: IV

Análisis cualitativo del sistema educacional de la residencia en Ortopedia y Traumatología en tiempos del COVID-19

RESUMEN

La pandemia del COVID-19 afecta directamente la actividad de los residentes de Ortopedia y Traumatología. La gran carga horaria que requiere su formación está disminuida ampliamente en estos momentos. Suponemos que dicha capacitación se ve gravemente afectada principalmente en el aspecto práctico, y no tanto así en el teórico. **Objetivo:** Realizar un análisis cualitativo del sistema educacional de la residencia de Ortopedia y Traumatología en la Ciudad Autónoma de Buenos Aires y la región pampeana en tiempos del COVID-19. **Materiales y Métodos:** Se llevó a cabo un estudio de corte transversal que consta de una encuesta anónima de 16 preguntas de opción múltiple, orientadas a los cambios en la actividad teórica y práctica durante la pandemia. Se encuestó a 361 médicos residentes de Ortopedia y Traumatología que trabajan en la Ciudad Autónoma de Buenos Aires y la región pampeana. **Resultados:** Se recibieron 122 encuestas respondidas. El 76,2% manifestó estar invirtiendo más tiempo en estudio que antes de la pandemia y el 71,3%, que no estar preocupado por su formación teórica. Distinto escenario se observa en la formación práctica, ya que el 88,5% refiere que su actividad quirúrgica disminuyó y el 90,1% manifiesta su preocupación ante tal situación. **Conclusiones:** Los residentes son conscientes del impacto que genera la cuarentena en su educación y muchos utilizan este período para fortalecer su formación teórica. Para enfrentar este desafío, son esenciales diversas estrategias, como telemedicina, webinars y videos sobre procedimientos quirúrgicos. Sin embargo, esta circunstancia sin precedentes nos deja como enseñanza lo complejo de suplantar la actividad práctica.

Palabras clave: Coronavirus; pandemia; educación médica; residencia; COVID-19.

Nivel de Evidencia: IV

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How to cite this paper: de Zavalía M, Pierro I, Tálamo F, Varaona JM. Qualitative analysis of the Orthopedics and Traumatology residency system in times of COVID-19. *Rev Asoc Argent Ortop Traumatol* 2020;85(4):427-436. <https://doi.org/10.15417/issn.1852-7434.2020.85.4.1120>

INTRODUCTION

The social, preventive, and mandatory isolation established by the Argentine Federal Government on March 20, 2020, seeks to decrease the spread of COVID-19. This federal order has a direct impact on the Argentine medical residents, in that the considerable hour load intrinsic to their professional training has experienced a severe reduction.

There are currently 117 medical residencies accredited by the Argentine Association of Orthopedics and Traumatology (AAOT) and 31 are undergoing AAOT accreditation process.¹ Each one of them has its own and distinct academic programs and resident graduated profiles.² However, the most complete postgraduate training remains the medical residency system.

The Argentine Orthopedics and Traumatology residency system rests on two pillars: the practical or surgical pillar, and the academic or theoretical pillar. The practical pillar entails residents acquiring confidence, expertise, and, above all, knowledge of their own limitations to ensure safe surgical practice. These aspects improvements gain substantial benefit from “OR hours” or from simulator training (both physical and virtual simulators). The theoretical pillar benefits from lectures delivered by residents and hospital staff doctors, which may involve in-person or online interaction or additional reading assignments to be conducted on their personal time. Residents’ considerable hour load, especially during their first training years, inversely proportional to the time they can devote to their theoretical knowledge improvement.

Around the world, the academic pillar has taken advantage of current technology (teleconferences, case problems, virtual reality, artificial intelligence) to maintain residents’ training,^{4,5} a similar scenario that we speculate is taking place in our setting.

Our objective was to carry out a qualitative analysis of the Orthopedics and Traumatology residency system in the city of Buenos Aires and the Pampeana region during the COVID-19 pandemic.

MATERIALS AND METHODS

We conducted a cross-sectional study based on the universe of Orthopedics and Traumatology residents in the city of Buenos Aires and the Pampeana region (provinces of Entre Ríos, Santa Fe, Córdoba, Buenos Aires, and La Pampa). Based on our estimation of the proportion of the sample population for the total number of residents (n=428; 80% CI), we established the study population size to be 119 respondents. The total number of residents was estimated from the total amount of vacancies published on the AAOT web site. We created a database containing data derived from direct communications with a resident of each health center. A survey was distributed via email, which included the research group members and purpose. Residents were asked to fill out the survey, consisting of 16 multiple-choice questions (*Annex*). Data collection on respondents’ demographics was made using the relevant questions of the AAOT survey on the COVID-19 impact on the orthopedic practice in Argentina.⁷ The rest of the survey focuses on the residents’ current practice characteristics and their access to theoretical and practical training during the quarantine. We used Google Forms to create and distribute the survey.

RESULTS

The survey was distributed via email to 361 residents. The answer rate was 33.7% (n=122). We obtained 59.8% of answers from professionals working in hospitals from the private sector and 40.1% in public health centers (*Figure 1*). Within the public setting, 53% of respondents serve in municipal hospitals, 28.5% in provincial hospitals, and 18.3% in federal hospitals. Regarding geographical distribution, 77% of respondents were from the city of Buenos Aires and 22.9% from the Pampeana region (*Table*). Distribution in terms of medical hierarchy was: 31.9% were first-year residents (R1); 26.2%, R2; 21.3%, R3; 15.5%, R4 y 4.91%, R5 or Chief of Residents (*Figure 2*).

Regarding their duties, 87.7% of respondents stated performing the same tasks they did before the isolation period while 9% stated being reallocated to COVID-19 patients’ care sectors. The remaining 3.2% did not choose either of the proposed answers.

Regarding their hospital working week, 7.3% respondents work 7 days a week; 9.8%, 6 days; 10.6%, 5 days; 10.6%, 4 days; 12.2%, 3 days, 14.7%, 2 days; 27.8%, 1 day; and 6.5% have interrupted their hospital practice. Regarding on-call shifts, 36.8% respondents were covering 1 shift a week; 29.5%, 2 shifts; 9.8%, 3 shifts; 4.9%, 4 shifts; and 0.8%, 5 shifts. There was an open question to collect any special cases, from which we found that 10% work under a 14-day rotation group system and 8% cover at-home call shifts.

ACADEMIC EDUCATION IN TIMES OF COVID-19

Hello! We are conducting an ANONYMOUS survey for Orthopedics and Traumatology residents in Argentina. We appreciate you taking your time to complete it! It doesn't take more than 5 minutes.

*Required

1. Which health sector do you work in? *

Please choose only one

- Private.
 Public.

2. Public sector level. If you work in the private sector, choose NA *

Please choose only one

- Municipal.
 Provincial.
 Federal.
 NA.

3. Within which geographic region your Residency Program is located? *

Please choose only one

- Northwest (Jujuy, Salta, Tucumán, Catamarca, Santiago del Estero)
 Northeast (Formosa, Chaco, Misiones, Corrientes)
 Pampeana (Entre Ríos, Santa Fé, Córdoba, Buenos Aires, La Pampa)
 Cuyo (La Rioja, San Juan, San Luis, Mendoza)
 Patagonia (Neuquén, Río Negro, Chubut, Santa Cruz, Tierra del Fuego)
 City of Buenos Aires

4. What year of residency are you currently in? *

Please choose only one

- 1
 2
 3
 4
 5

5. Choose the answer that best describes your situation during the pandemic

Please choose only one

- I perform the same tasks I did before the COVID-19 crisis arose.
 I have been reallocated to a COVID-19 patients' care sector (e.g., Emergency Department)
 None of the above

6. How many days a week you work at the hospital? *

Please choose only one

- 7
 6
 5
 4
 3
 2
 1
 I have interrupted my hospital practice

7. How many on-call shifts do you work per week? *

Please choose only one

- 1
 2
 3
 4
 5
 Others: _____

8. Regarding the academic activities of your residency program, are there classes or case conferences being held at your hospital? *

Please choose only one

- Yes, we are still following the same academic syllabus as before the pandemic.
 Yes, we had to adapt and take classes in areas of interest.
 No, all academic activities of the residency program had been suspended due to the pandemic.

9. Do you use webinars? *

Please choose only one

- Yes
 No
 I had no knowledge of them.

10. Webinar users. If you do not use webinars, choose NA *

Please choose only one

- I only watch classes on my subspecialty of interest
 I try to distribute webinars by subject and watch all classes relevant to my areas of specialization
 I rarely watch seminars, I do not like their format.
 NA.

11. Regarding your theoretical education *

Please choose only one

- I have plenty of time to study and read on subjects to which I could not devote time before the pandemic
 I devote the same amount of time to study as I did before the pandemic
 I am not studying

12. Have you conducted or began any research project during the pandemic? *

Please choose only one

- Yes.
 No.

13. Regarding your practical training: *

Please choose only one

- My practical training experienced an impact as I only attend a few surgeries.
 I try to attend as many surgeries as possible.

14. Are you concerned that your theoretical education may be affected? *

Please choose only one

- Yes
 No

15. Are you concerned that your practical training may be affected? *

Please choose only one

- Yes
 No

16. Do you consider 2020 to be lost in terms of your residency education? *

Please choose only one

- Yes
 No
 Maybe

Google did not create nor approved the contents of this form.

Google Forms

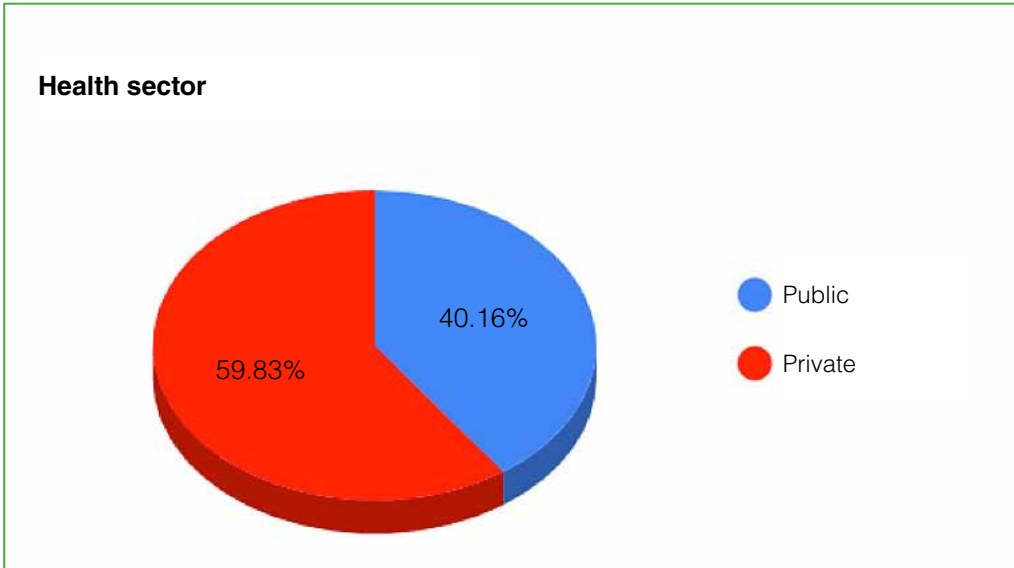


Figure 1. Respondents public/private-sector distribution.

Table. Respondents' demographics distribution

Region	Number of respondents
City of Buenos Aires	94
Pampeana region	28
Total	122

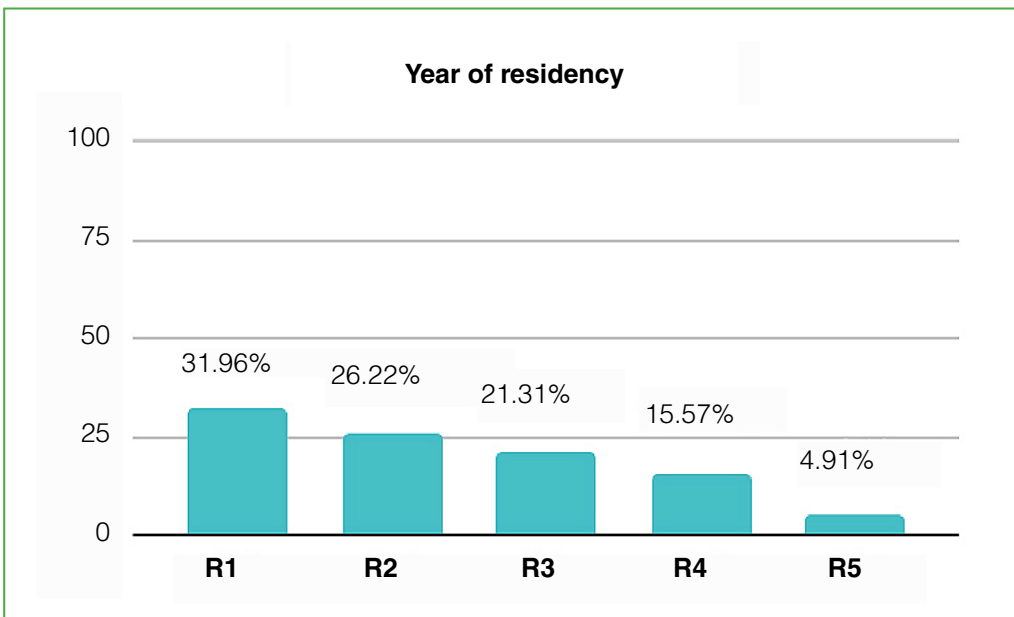


Figure 2. Respondents medical-hierarchy distribution. Junior residents have greater answer rates.

Regarding the academic training specific to each residency program, 45% respondents stated having to adapt to change and taking classes in areas of interest, 45% stated experiencing no changes in terms of the academic syllabus, and 9.8% stated that all academic activities had been suspended (Figure 3).

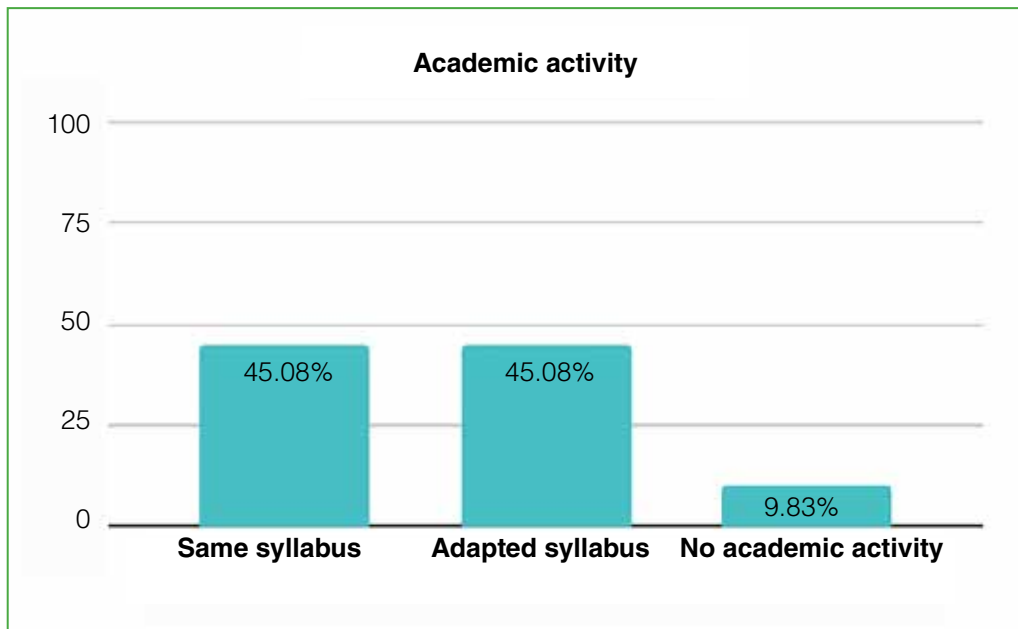


Figure 3. Distribution of the respondents regarding the academic training within their Departments.

Most respondents (98.3%) stated having at least some experience with educational resources such as online classes or webinars while only 1.6% stated no knowledge about them. Regarding the use of such resources, 68% of respondents dedicated time to reading general topics of their areas of specialization, 18.8% only watch classes on their subspecialty of interest, 7.3% rarely use them due to their format, and 5.7% do not use them.

Regarding the distribution of their free time and whether they use it for theoretical education, 76.2% respondents stated using it to study and read on subjects to which they had devoted no time before the pandemic, 20.4% stated experiencing no changes in terms of time devoted to study, and 3.2% stated they were not studying.

More than half (61.5%) of the respondents stated having conducted or began a research project during the pandemic (Figure 4). On the other hand, regarding their practical training, most respondents (88.5%) stated that it had experienced an impact, only attending a limited number of surgeries.

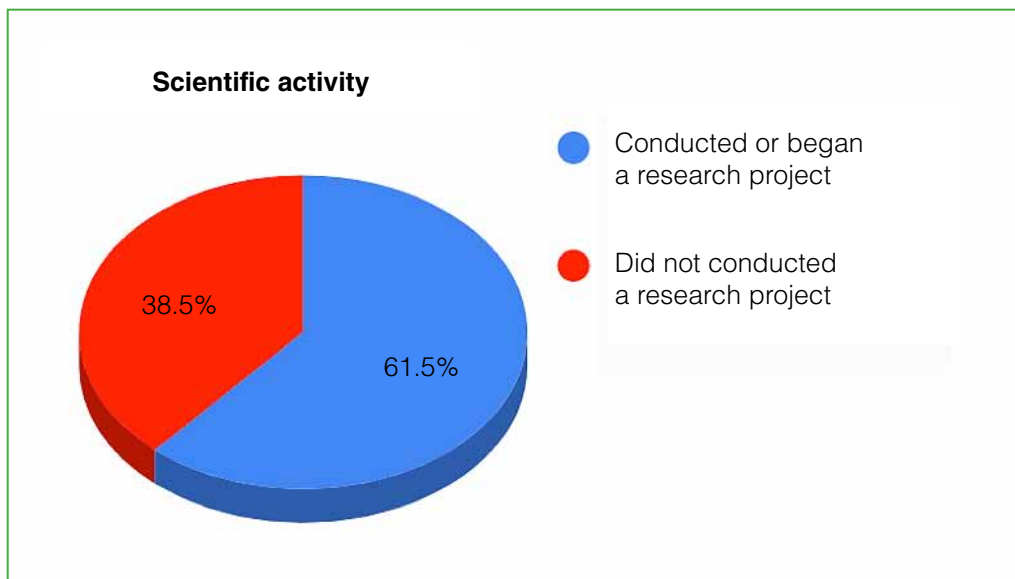


Figure 4. Distribution of the respondents regarding research studies during the quarantine.

Regarding the impact on their theoretical education, 71.3% stated not being worried about it while 28.6% stated having concerns.

The perception of the impact on their practical training yields reverse results, i. e., 90.1% stated having concerns while 9.8% stated not being worried (Figure 5).

To conclude, 49.1% of respondents stated they do not consider the current academic year as lost, 36.8% stated that it is possible, and 13.9% stated that it is lost.



Figure 5. Respondents' concern regarding the lack of practical training and surgical experience during the pandemic.

DISCUSSION

It is common knowledge that resident doctors have to comply with a minimum of five days a week of training and attendance as well as on-call and extra hours. This situation is not exclusive to Argentina as it is also the case of its neighboring countries.⁸ We currently face a particular situation where health-center departments have considerably reduced their health care services and surgical procedures.^{9,10} As a result, the medical staff, including resident doctors, began working in reduced groups, which in turn results in weekly training hours been considerably reduced. The study universe consisted of Orthopedics and Traumatology residents in the city of Buenos Aires and the Pampeana region; thus, our study sample population may not be representative as it only meets an 80%-confidence interval. Our sample is comprised of a heterogeneous composition of residents, from 49 public and 73 private hospitals and from different residency years. Regarding the current training situation of residency programs, we observe that most residents (87.7%) were able to keep on performing their education activities within their areas of specialization, unaffected by possible relocations that would entail performing tasks other than those related to their Orthopedics and Traumatology training. This result correlates with the current Argentine epidemiologic curve in that, for the time being, there is no evidence of an over-burdened health care system warranting such resource relocations. More than half of the respondents' hospital working week is of fewer than three days, and 6.5% have interrupted their hospital practice. The evaluation of the number of weekly on-call shifts yields similar results.

Each residency program faces different challenges depending on their geographic location and infrastructure. The survey results show that reducing training hours produced some degree of change in academic activities, considering that 45% of respondents had to adapt their academic schedules and took classes in areas of interest. However, another 45% experienced no changes regarding their academic schedules. It should be noted that 9.8% of respondents have seen their theoretical education completely interrupted.

Webinars have become a valuable resource during these times, which are known and used by most respondents (98.3%), thus supporting our hypothesis. Although webinars are no novelty as they predate the pandemic, they have currently taken a leading role. Webinars offer the advantage of attending classes at no cost (most of them) that are given by specialists and authorities from different regions on several subjects. Some online platforms, such as Zoom®, Google Meet®, YouTube®, Facebook®, Instagram®, the AO web page, the AAOT and member associations' numerous classes, provide residents the opportunity to continue their theoretical education from their homes while maintaining the same quality level of information.

Respondents stated having more time to conduct research studies and to continue their academic training, which constitutes a very positive aspect within the scenario posed by the pandemic. We consider that conducting research studies is a good way to learn and train as it stimulates authors to exercise critical reading of the literature, thus allowing for a more thorough understanding of the subject of interest than which could be gain by relying on only one source of information. During this period, the focus should be on transforming the threat into opportunities, which should be encouraged by educators to promote and supervise this type of activities.

Practical training represents a different scenario. The decrease of elective surgeries has a direct impact on the surgical learning curve of residents. This situation is mirrored in the concerns expressed by 90.1% of respondents in terms of their surgical experience. Undoubtedly this year has produced a fair amount of issues. We consider that the most pressing issue is to establish whether 2020 is a lost year in terms of residency training because 49.1% stated not considering it a lost year while 36.8% stated it might be lost. This result may show that, although the theoretical pillar of the residency system may have strengthened within these last months, the failure to adapt the practical pillar in like manner, which resulted in the respondents' concerns. These rates belong to the March 2020 survey and reflect t residents' projections, hence they should not be taken as representative values but as estimative values. These concerns should be addressed again once the public health emergency is over in a retrospective analysis.

Connor *et al.*¹¹ proposed several alternatives for residents' theoretical education and prompted us to consider that the current situation will be a significant source of wisdom regarding the theoretical education of residency programs, which agrees with our survey results. In addition, these authors concluded that the practical pillar will sustain a mayor impact as no method has been able to replace surgical activities. They proposed as alternatives to mitigate the impact the use of some resources, such as surgical videos or virtual reality. Other authors have described access to theoretical education solutions similar to those of this study.¹² Regarding the practical training,

some can exploit advanced-technology features, such as virtual reality stations, although they argue them not to be a match for hands-on operative experience. An affordable and practical alternative for Argentina's current situation may be the use of digital libraries that offer videos on surgical techniques of different specialization areas. Orthoflix Simall® is an example of such digital catalogs, which is consulted by the medical residents of our health center. The platform offers surgery educational videos focusing, step by step, on the virtual teaching of several surgical procedures.

The limitations of this study included the little response received regarding the number of hospitals we approached first considered. According to a survey conducted by the AAOT Committee of Medical Residences and Equivalent Systems, more than 70% of Orthopedics and Traumatology residency programs run in the public health-care system while less than 30% run in the private sector.¹³ Nevertheless, we received more answers from the private than from public sector residents. We limited our population to those in the city of Buenos Aires and the Pampeana region because we lack an email database of all Argentine residents but have good communication with those areas hospitals. A retrospective evaluation of the survey showed us that using multiple-choice and binary (yes/no) questions rules out a wide array of potential answers. Our selection prevented the evaluation of the actual degree of concern of the residents as we failed to provide a space for debate or personal answers. Using this type of biased and induced questions resulted in polarized and, mainly, expected answers.

To summarize, we consider that medical residents are aware of the impact caused by the social, preventive, and mandatory isolation established by the Argentine Federal Government. It is indisputable that residents are taking advantage of the mandatory quarantine to strengthen then theoretical-academic education.

Our study is the first to report data on the potential impact the residency training may experience during the current public health emergency. To rise to this challenge, relying on various strategies, such as telemedicine, webinars, and videos on surgical procedures, is essential. However, this unprecedented circumstance has made us aware of the weak points and major challenges involved in replacing practical training. This study was conducted since the quarantine was implemented up to and including May. Further research should address the evolution of the situation. We consider that the situation analysis conducted during the pandemic presented by this study only applies to interventions made during the pandemic. We advocate for further analyses to be made once we had surpassed the current situation to evaluate the final impact and possible damage.

Conflict of interests: Authors claim they do not have any conflict of interest.

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