



Editorial

Radiology Education in the Time of Pandemic

To participate in the forum on pandemic and radiology organized by Health4theworld, and with the support of the Asociación Colombiana de Radiología, the heads of radiology and diagnostic imaging programs in the country and some of their professors and residents, I conducted a small survey on what happened to radiology education in Colombia during the first months of the COVID-19 pandemic, between March and July 2020.

There are 16 radiology residency programs in Colombia. The information I describe is that obtained from 14 of them, corresponding to about 200 students in the specialty, from both public and private universities.

The average age of the residents is 28 years old, and few of them have children or parents in their care or with whom they live. These last factors could cause residents to change their place of residence or eventually require them to suspend their studies for short periods. One of the universities offered these residents a place to live if they needed to avoid being a source of contagion for their families.

Unlike other countries, the vast majority of radiology programs in Colombia did not ask them to move to other areas of their hospital, such as the emergency room or intensive care unit, to support other specialties in patient care.

In Colombia, in contrast to other countries, ultrasounds are done directly by radiologists and not by technologists. In addition, the practice of diagnostic imaging for patients with COVID 19 that require direct contact, ultrasounds and major or minor interventional procedures in general is performed in hospitals directly by the institutions' radiologists, without direct participation of the residents, as a measure of protection for the resident.

Universities and practice hospitals provided residents with personal protective elements if they required them.

In Colombia, a strict quarantine was decreed at the beginning of the pandemic, which resulted in a dramatic decrease in the volume of patients and procedures in the inpatient and outpatient radiology departments where residents conduct their practices. One of the imaging centers therefore had to temporarily close its practice and grant two months' vacation to both its radiologists and its residents.

On-site attendance at the practice sites was reduced or cancelled to varying degrees, and strategies were developed to use virtual tools in education.

Teleradiology was used by several hospitals, although not all of them have this virtual work tool yet. The participation of residents in this virtual work depended on the characteristics of the picture archiving and communication systems (PACS), which in general were

modified or updated to optimize virtual work in radiology and also in some of them to make this work possible to include the learners. The hospitals made some ingenious changes to preserve the educational practice of the residents in a virtual way. In some, each of the teachers was the "godfather" of a resident, who could communicate with his teacher during the reading. Others simultaneously used virtual communication platforms to share the interpretation of the image studies. The volume practice was also significantly reduced in those areas that require the presence of the radiologist, such as ultrasound, fluoroscopic examinations, and diagnostic image-guided procedures.

The scheduling of resident rotations had to be modified, so that practices that require attendance, such as ultrasound, fluoroscopy and procedures, as well as mammography rotation, were cancelled or postponed. In some hospitals, image-guided procedures increased in volume, because patients with diseases such as appendicitis, diverticulitis or neck abscesses consulted the hospital late for fear of contagion and presented with advanced stages of their infectious diseases or with abscesses in the abdomen or neck, and benefited from percutaneous interventions. Also in intensive care units or in the emergency department, radiologist intervention was more often required, for example, to guide catheter insertion. In some hospitals, the hospital practice of conventional ultrasounds was maintained or increased, due to the greater requirement of such ultrasounds for patients with COVID-19 or, in some cases, as support for physicians in other specialties in their virtual consultations to patients of internal medicine, urology or family medicine. However, overall this did not increase the resident's practice in the areas of procedures and ultrasound. Therefore, in most hospitals, these rotations were replaced by practices such as reading conventional radiology studies, computerized tomography or magnetic resonance imaging. The practice of mammography, mainly practiced in the outpatient setting, was also reduced to a significant degree.

Due to biosecurity measures, elective rotations scheduled for residents, particularly those performed in hospitals outside the country, were also cancelled or postponed, since those hospitals closed the admission of foreign physicians. All of this led to a change in the vacation schedule of residents, for example, through the forced advancement of vacations for this and next year.

The move to virtualization in most institutions led to a greater number of theoretical activities, such as topic reviews, case presentations, seminars and magazine clubs, in favor of education. Some hospitals acquired programs that allow virtual education in radiology with access to case reviews, and in general, all used the existing virtual resources in academic radiology for education.

The Asociación Colombiana de Radiología organized and presented virtual updating courses in areas such as neuroradiology, emergency ultrasound, mammography and, in particular, education in thoracic radiology, which required urgent and updated knowledge of the pulmonary manifestations of COVID-19. These courses were carried out with foreign and national teachers. The residents, as transitory members of the Association, were able to take some of these courses. In other cases, the programs invited teachers who had been their students to participate in the virtual education of the residents on topics related to the pandemic.

This was perceived by all as a favourable development, which was reflected in better performance on theoretical tests in some programmes. Some residents had the opportunity to attend the virtual international congresses of the specialty. The departmental and inter-departmental meetings, mainly those for decision making and case presentation, which are a very good educational resource for the residents, also became virtual. A greater participation of professors, both from radiology and other areas, was found in these meetings, an aspect that favors their success. However, the perception of residents and faculty has been that purely virtual work is exhausting and does not completely replace face-to-face education.

Looking at residents' mental health and well-being, less than half of the programs conducted surveys to learn about this aspect during the pandemic and quarantine. The same is true for increased communication between program managers and residents to monitor the mental health of graduate students. Universities increased mental health support with psychological programs, the possibility of psychiatric or psychological telephone consultation, and the development of exercise or yoga programs.

One of the academic programs offered and encouraged student participation in playful spaces, directed and supported by neuropsychology. In another one, Balint group meetings were increased. Some of the radiology residents used them, others did not know them, or if they did, they did not use them. Half of the directors of the radiology programs in Colombia did not perceive mental health problems in their residents.

Residents presented fear and anxiety related to the lack of knowledge of the disease for fear of infecting their families. Also, they perceived uncertainty about the future of their education by not achieving the educational goals of their programs and not getting adequate training, which, of course, was proportional to the reduction in workload. They referred to uncertainty about what the work in radiology will be in the near and remote future. In some of them, this manifests itself as anxiety, fatigue, stress and anger.

The shift to practice and virtual education generates or increases exhaustion, which was already high among radiologists and residents of this specialty. At the same time, it is recognized that

This can be used to increase camaraderie and greater involvement in supporting physicians from other specialties in decision making, which can positively impact patient care. A small minority of residents decided to defer their training.

In the end, we see then that education in radiology was also impacted by the COVID-19 pandemic. The goal is to strike a balance between maintaining their safety and well-being and achieving the clinical and academic goals for adequate training of medical residents

so that they will be competent as radiologists in the near future, which is unlikely to be the case.

In educating on pandemics, we have learned to adapt to new situations, whether favorable or not. Challenges have been taken advantage of to be creative and innovative, using previously little known or exploited virtual resources. The skills and resources of the virtual acquired during the pandemic are likely to remain in education, useful not only for education but also for providing added value to patient care, a role that radiologists must increasingly play.

Skills such as knowledge of new diseases related to the pandemic, which we did not know before, must now be present. We have learned that being isolated does not mean being isolated and that communication is a key element in the well-being of radiologists and residents, which can create productive partnerships, for example, for sharing knowledge.

Knowing about the mental health of residents is very important, because, as with other professionals, mental health can deteriorate with the pandemic. In this regard, virtual resources as a means to use and share play and exercise activities, or to seek specialized help if needed, are also very useful.

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