To the Editor, Anatomical Sciences Education:

We read the recent Anatomical Sciences Education articles by Harmon et al. (2021) and Attardi et al. (2022) with great interest. These studies rendered a clear picture of the paradigm shifts in anatomy teaching before and during the Covid-19 pandemic. The authors found that there was a significant decrease in face-to-face interactions and cadaver-based instructions because compulsory lockdowns have necessitated virtual classes to maintain student safety (Harmon et al., 2021, Attardi et al., 2022).

We applaud Anatomical Sciences Education, for emphasizing Covid-19-related papers, which help communicate the ongoing challenges in anatomy education during the pandemic era. In light of the reports by Harmon et al. (2021) and Attardi et al. (2022), we would like to add our perspective on anatomy education during the post-Covid period in India, with a particular emphasis on students’ perceptions.

Anatomy, an essential subject in medical education, provides medical undergraduate students knowledge of the body’s architecture which subsequently enables understanding of disease processes (Barash et al., 2021). Cadaveric dissection gives unparalleled insight into the three-dimensional (3D) organization of the human body and prepares them for future surgical procedures (Ravi, 2020). Furthermore, cadavers are often considered silent teachers of professionalism, ethics, empathy, and confidentiality (Souza et al., 2020; Bond & Franchi, 2021).

The ongoing Covid-19 pandemic broadly affected life in India, and the second wave was more catastrophic resulting in a sharp surge of Covid-19 cases and death rates, particularly in the younger population (Asrani et al. 2021). Compared to the first wave, the havoc created by the second wave has been immense (Kumar, 2021).

Recurring waves of the Covid-19 pandemic have forced the authorities to impose lockdowns and restrict day-to-day activities, which include mass gathering (Lenzen et al. 2020). To comply with regulations, all medical schools in India shifted to virtual models of teaching. There was a complete cessation of face-to-face teaching for considerable periods of time (Kumar, 2021). Like many other educational institutions, medical schools have also suffered due to pandemic restrictions (Gill et al. 2020). Medical specialists and health care professionals were at the bleeding edge of the fight against the pandemic, and for this reason, preparing future medical specialists is important for the protection of the general public. In this environment, medical schools and other health professional schools should invest deeply in supporting students (Brassett et al., 2020; Pather et al. 2020).

Rapid adaptation was possible, thanks to pre-existing models of synchronous and asynchronous modes of didactic content delivery. Lecture-based classes were conducted via virtual platforms like Google Meet (Google LLC., Mountain View, CA), Zoom (Zoom Meetings Corp., Redmond, WA), and Cisco WebEx (Cisco Systems Inc., San Jose, CA) with some success. Unfortunately, teaching dissection and 3D orientation of structures was much more arduous in the virtual setting. Virtual dissection classes were conducted using the online repository of live or pre-recorded lectures, digital photographs, commercially available dissection videos from Acland’s Video Atlas of Anatomy, Grant’s Dissector Videos, and Complete Anatomy or in-house produced video clips and atlases (Harmon et al., 2021; Attardi et al., 2022). Although there was a shortage of health care workers and many pre-clinical faculty members with medical degrees were recruited for the Covid-19 pandemic management, anatomy teachers all over the country put their efforts into educating future doctors (Smith & Pawlina, 2021; Patra et al., 2021). Through this process, students’ perceptions of learning anatomy virtually must be considered, and various studies have been conducted on this topic (Iwanaga et al., 2021; Patra et al., 2021).

Student motivation fell with online teaching compared to prior levels with face-to-face interactions (Telyani et al., 2021). Students also struggled to correlate concepts learned in lectures with virtual dissections (Pather et al., 2020). At our institution after months of online learning, first-year students could finally return to the dissection hall. This was well expressed by one of our students: “We remembered what it meant to not be trapped in our homes and to learn with the best instructor of Anatomy i.e., the Cadaver. Adapting to and from virtual learning prompted us to more deeply appreciate the level of care that doctors must take with the human. Generally, online classes were a welcome distraction to chaos of the pandemic, yet in the end, no learning method was superior to in-person participation, particularly in Anatomy. Nothing can compare to the experience of seeing the human heart, appreciating the firmness of the liver in situ, or feeling the delicate surface of the lungs. As future doctors, it is essential for us to understand the gravity of our responsibility and gain the skills needed for our demanding future professions. These insights are provided by the opportunity to be in the lab.”
Daily dissection by students is not merely a means for understanding anatomy, but it is also a platform for sensitizing students to death and building emotional resilience. The environment helps students recognize the human being behind the cadaver as an individual who had a full life before graciously donating their body to medicine (Singal et al., 2021). Online pedagogy may be an effective way to gain theoretical knowledge, but the dissection hall provides an unparalleled environment for molding well-rounded individuals, (Onigbinde et al., 2020). For anatomy instructors, teaching the anatomical structures on specimens and cadavers is more gratifying than using digital content (Patra et al., 2020).

Although the Millennial generation is naturally comfortable with computers and other intelligent technologies, the traditional mode of dissection is exemplary in conveying the detailed structure of the human body to the young doctors in training (Jones, 2021). The pandemic has prompted medical institutes to shift from cadaver to computer (Evans et al., 2020; Harrell et al., 2021). The quality gap that resulted from this will indeed have repercussions not only due to loss of tactile experience but will also cause reductions in teamwork, empathy, communication, and humanism (Harrell et al., 2021). Body donation in India has been significantly reduced because of the ongoing pandemic (Ajita and Singh, 2007; Ravi, 2020) which may lead in turn to reduced availability of cadavers for teaching purposes. The plethora of dissection software now available can only complement or enhance the understanding of human architecture (Flynn et al., 2021). However, no virtual platform can replace the experience of dissecting and witnessing the real structures of human body (Onigbinde et al., 2020).

For this reason, the faculty members of anatomical sciences and medical students in our institution support teaching anatomy using cadaveric dissection or prospected specimens. The majority of our teaching team and medical students believe that the strongest learning occurs in small groups working in the dissection hall with only a few medical students advocating for self-coordinated e-learning (Davis et al., 2014).

The re-opening of medical schools following significant pauses and upheavals is a critical test for the medical education community particularly with the threat of Covid-19 still looming. Authorities in medical education must plan curriculum that gets students up to speed safely and ensures that no student is left behind. This is particularly difficult because the rapid shift to virtual learning has exacerbated learning gaps in students requiring further assistance. In an environment of restricted assets and time, we support evidence-based changes in anatomy curricula. Instructive advancement ought to be energized by rigorous experimentation and evaluation so that we may all assess what new methods will be best for our students. By increasing advancement and evidence together, we can follow the trend of the large biomedical community and enter period of evidence-based practice in medical education.

Inclusive education must be based on solid cooperation between stakeholders and address students’ learning and well-being. A joint effort by teachers, students, parents, educational and health care professionals, and communities is needed to (re-)create safe, supportive, and inclusive medical schools. We are embracing an open-minded philosophy to deal with the new challenges in medical education. We are carrying forward our drive to further support the educational and psychological condition of medical students, with an emphasis on vulnerable groups, in this new era of medical education.

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