

Perception and attitude toward online versus traditional anatomy teaching: An internet-based cross-sectional study among Indian medical students during COVID pandemic



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ABSTRACT

Background: The COVID-19 pandemic necessitated conduction of online medical education in India in both synchronized and asynchronized modes. Before the pandemic, the online teaching had very limited role in anatomy education in India. **Aims and Objectives:** This study was conducted to know the student's perceptions and attitudes regarding online versus traditional anatomy teaching, the problems hindering online anatomy learning, and the areas of anatomy students enjoyed in virtual lessons. **Materials and Methods:** A cross-sectional study was done among the 1st year medical students of various institutions of India based on a questionnaire applied by Google Forms. Relevant information on student's sociodemographic profile and their perception toward online versus traditional anatomy teaching were obtained. Four-point Likert scale was used for the responses on perception of teaching. Two hundred and fifty-two responses were studied and statistically analyzed. **Results:** Two hundred students (79.36%) used smartphones and 205 students (81.34%) used mobile internet in online learning. More than 90% of students preferred traditional anatomy teaching whereas less than 50% of students liked online anatomy teaching. In comparison with gross anatomy, students preferred online teaching of embryology, histology, and radiological anatomy. One hundred and six students (42.06%) opined that the internet problems were the major obstacle and 87 students (34.52%) considered the physical problems as main hindrances in online classes. Statistically significant increase in screentime after commencement of online class was seen among study participants. **Conclusion:** Majority of students preferred (statistically significant) traditional anatomy teaching over online anatomy teaching. Although students enjoyed online learning on selected topics of embryology, histology, and radiological anatomy, the main hindrances encountered in online anatomy classes were internet problems and physical problems.

Key words: Online teaching; Traditional teaching; Anatomy; Indian medical students; COVID pandemic

INTRODUCTION

The COVID-19 pandemic necessitated conduction of online medical teaching all over world.¹ India has also embraced the online teaching in medical education.² The online teaching has great advantage in the perspective

of the facts that it is time and place convenient, learner centered, helps in the development of new skills in the process of life-long learning.^{3,4} Mixing face-to-face learning sessions with technology in the name of blended learning and flipped classrooms can also increase the learning potential of the students.⁴

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In India, anatomy, physiology, and biochemistry are mainly taught in the first and second semester of medical curriculum. In the pre-COVID era, YouTube videos and WhatsApp group discussion were used as an adjunctive method of anatomy teaching and learning in few institutions;^{5,6} but, overall gross anatomy has been learned usually by gaining knowledge and skills through traditional cadaver dissections and didactic lectures, microanatomy through practical classes and embryology through didactic lectures, and radiological anatomy during practical classes. The vertical as well as horizontal integration with other subjects and early clinical exposures proposed by new curriculum of National Medical Commission help in acquiring competencies.^{7,8} The 1st year medical course was started in India as face-to-face mode in August–September 2019 and online anatomy education was started in the past week of March–April 2020 in most of the medical institution.

As the entire classroom-based education needed to be transitioned to digital formats in the current pandemic situation, the online lessons of anatomy have been started to deliver through various virtual platforms.^{9–13} Theoretical sessions were mostly served as synchronous live online sessions, asynchronous delivery of recordings of the lectures, and mixed methods. Practical classes were mainly delivered by pre-recorded sessions and by mixing both the live and pre-recorded sessions. Many institutions only focused on the online practical classes, didactic lectures, pre-recorded videos of dissection, and online discussion with the help of models and charts.^{9,10,14}

Student's feedback is a very important factor for implementation of innovative ideas and improvement of any educational curriculum. The literature regarding nationwide study on Indian medical student's perception on online anatomy teaching is limited.

Aims and objectives

Keeping the usefulness and limitations of the various online platforms in mind, the present study was planned to assess the perceptions and attitude of the 1st year medical students of India on online anatomy teaching in comparison to traditional anatomy teaching.

The primary objective of the study was to compare online anatomy teaching and learning with traditional anatomy teaching and learning according to students' perceptions and the secondary objectives were to identify the sections of anatomy which students preferred most and to find out the prevalence of difficulties they encountered when studying anatomy online.

MATERIALS AND METHODS

Following approval of the Institutional Ethics Committee, All India Institute of Medical Sciences (AIIMS), Bhubaneswar (IEC reference number: T/IM-NF/Kalyani/20/04), this study was conducted by faculty members (authors) of Anatomy Department of a Government Medical College in India (AIIMS, Kalyani) between August 2020 and December 2020. This study was carried out as across-sectional online survey on the 1st year medical students and non-probability sampling technique was used.

We considered the following as exclusion criteria in our study:

- Students attending the traditional classes for <4 months
- Students who attended <4 months of online anatomy class.

Calculation of minimum size of the sample¹⁵

Minimum sample size was calculated using the following formula:

$$n = Z^2 \times p \times q / e^2 = (1.96)^2 \times 0.5 \times (1-0.5) / (0.07)^2 = 196$$

Where, Z = 1.96 for confidence interval at 95%

p (prevalence) = 0.5

q = 1-p

e = margin of error, 7%

Considering 10% as non-responding rate, minimum sample size of the study was 216

Study tools¹⁶

Pre-tested semi-structured Google Forms-based questionnaire was prepared. The form contains various information on sociodemographic profile, the relevant factors associated with online teaching session such as the use of device, network, screen time, and the perceptions on traditional and online anatomy teaching.

The questionnaire was validated by taking the opinion of three external anatomy experts before sharing it to the study participants. Minor changes were done in questionnaire such as sentence rephrasing and adding the attendance of months of online classes. Reliability of the questionnaire was tested by conducting a pilot study among the five 1st year medical students of our institution. They were chosen randomly and link of the questionnaire was shared to them through email. The questionnaire had 37 items with a calculated Cronbach's alpha value 0.85 which was quite similar with the pilot study.

The link of the form was sent to the participants through WhatsApp and email along with message regarding the purpose of study. The participants were requested to fill

up the form with the help of their available device and to forward the link with the message to the other 1st year medical students. Link of the questionnaire was open from September 2020 to December 2020.

The responses from the participants were stored in principal investigator's Google Drive. The personal information and consent of the participants were obtained in the initial part of the Google Forms. The submission of the form had been taken as implied consent for the individual.

The questionnaire was organized in three parts:

Part one	Student's sociodemographic profile
Part two	<ul style="list-style-type: none"> • Student's perception on traditional versus online anatomy teaching and the hindrances faced during the online sessions • The response of questions of this part framed in 4-point Likert scale using the following options: Strongly agree, agree, disagree, and strongly disagree
Part three	Students' perception toward various methods of online anatomy assessment

Statistical analysis

Data filled Microsoft Excel spreadsheet was downloaded from Google Drive of the investigator and analyzed with the help of Microsoft Excel, IBM SPSS-23 (IBM, Armonk, NY, United States of America, and socscistatistics.com (Washington, Virginia, US). The responses were categorized. The categorical data were presented in percentages (%) and Pearson's Chi-square test was used to evaluate the differences in groups for categorized variables. P-value calculated with the help of online software socscistatistics.com and value <0.05 was considered as statistically significant.

RESULTS

A total of 263 students responded during the data collection period, of which 254 were selected based on our inclusion and exclusion criteria. Among the 254 study participants, two did not provide their consent. Hence, the total number of study participants was regarded as 252.

The ratio of male and female student is 1:1.03 (total of 124 male students and 128 female students).

The mean age of the study participants was 19.8 years with a standard deviation of 1.35.

Out of 252 students, 130 students (51.58%) belonged to the urban area, 70 students (27.2%) to the suburban area, and 52 students (20.63%) to the rural or remote area.

A total of 200 students (79.36%) used smartphones for virtual session, 38 (15.07%) used laptops, and 8 (3.17%) used tablets. A total of 6 (2.38%) students used desktops.

Out of 252 students, 205 (81.34%) used mobile internet, while 47 (18.65%) used broadband to access the online session.

Students' perception of online anatomy teaching versus traditional anatomy teaching (Tables 1-3)

Student's opinion on traditional and online anatomy teaching is represented in Table 1. Overall, traditional anatomy teaching was preferred by the majority of students than online anatomy teaching.

In Table 2, we considered the opinions of "agree" and "strongly agree" together as the category of "agree." We placed three questions on gross anatomy-

- Structure identification
- Structure relations
- Dissection steps.

We analyzed the data of all these three conditions and mentioned the average number and percentage in Table 2.

Statistically significant variance was seen among traditional and online anatomy teaching in every section of anatomy teaching (Table 2).

The rate of students preferring traditional classes to online classes was the same for males and females (Table 3).

Students' perception on different subpart of online anatomy teaching

We examined various aspects of online anatomy teaching such as gross anatomy, histology, embryology, and radiological anatomy.

Out of 252 students, 89 students (35.3%) preferred embryology and 87 students (34.52%) preferred histology. Seventy-one students (28.17%) rated that online radiological anatomy teaching was good. Views regarding online gross anatomy learning were lowest (1.98% students) in comparison with other sections.

Students' perception of hindrances faced during online anatomy learning

Study participants had varied perceptions regarding the hindrances to online learning. One hundred and six students (42.06%) indicated that internet difficulties were the most detrimental to online learning and 87 students (34.52%) said that physical difficulties were the biggest hindrance. A total of 21.03% (n=53) and 2.38% (n=6) of students believe that inappropriate teaching-learning tools and inappropriate devices were the main issues.

Table 1:Opinion of study participants regarding online and traditional anatomy teaching

Conditions	Online anatomy teaching (n=252) Number%				Traditional anatomy teaching (n=252) Number%			
	SA	A	D	SD	SA	A	D	SD
Structure identification in gross anatomy was done very well in	4 (1.6)	46 (18.3)	120 (47.6)	82 (32.5)	198 (78.6)	50 (19.8)	3 (1.2)	1 (0.4)
Steps of dissection in gross anatomy were demonstrated very well in	5 (1.9)	33 (13.1)	106 (42.1)	108 (42.8)	206 (81.7)	42 (16.7)	4 (1.6)	0
Relations of structures in gross anatomy were clearly described in	5 (1.98)	69 (27.38)	93 (36.9)	85 (33.73)	192 (76.2)	57 (22.6)	3 (1.2)	0
Explanation of the anatomical basis of congenital defects in embryology	15 (5.95)	102 (40.48)	73 (28.97)	62 (24.6)	139 (55.16)	97 (38.49)	12 (4.76)	4 (1.58)
Identification of slides in histology was very clear in	18 (7.14)	89 (35.31)	70 (27.78)	75 (29.76)	193 (76.58)	54 (21.43)	3 (1.19)	2 (0.79)
Structure identification in radiology was very clear in	18 (7.14)	86 (34.12)	72 (28.57)	76 (30.15)	165 (65.47)	82 (32.53)	4 (1.58)	1 (0.39)

SA: Strongly agree, A: Agree, D: Disagree, SD: Strongly disagree

Table 2:Comparison between students' opinion regarding online and traditional anatomy teaching

Student's opinion on different sections of anatomy	Online anatomy teaching (n=252)		Traditional anatomy teaching (n=252)		df	X ²	P-value
	Agree, number%	Disagree, number%	Agree, number%	Disagree, number%			
Gross anatomy	54 (21.42)	198 (78.57)	248 (98.41)	4 (1.58)	1	310.93	<0.0001
Histology	107 (42.46)	145 (57.53)	247 (98.01)	5 (1.98)	1	186.034	<0.0001
Embryology	117 (46.43)	135 (53.57)	236 (93.65)	16 (6.34)	1	133.89	<0.0001
Radiology	104 (41.26)	148 (58.73)	247 (98.01)	5 (1.98)	1	191.91	<0.0001

Table 3:Comparison between male and female students' opinion regarding traditional and online anatomy teaching

Student's opinion on different sections of anatomy	Male		Female		df	X ²	P-value	Remarks
	TA (n=124), number%	OA (n=124), number%	TA (n=128), number%	OA (n=128), number%				
Gross anatomy	122 (98.38)	24 (19.35)	126 (98.17)	28 (21.8)	1	0.06	0.8	NS
Histology	118 (95.16)	31 (25)	124 (96.87)	27 (21.09)	1	0.24	0.62	NS
Embryology	116 (93.54)	51 (41.13)	122 (95.31)	60 (46.87)	1	0.13	0.71	NS
Radiology	120 (96.77)	48 (38.7)	127 (99.21)	56 (43.75)	1	0.089	0.76	NS

TA: Traditional anatomy teaching agreed students, OA: Online anatomy teaching agreed students, NS: Not significant

Students' perception of hindrances during online anatomy learning based on their residential location (Table 4)

Network issue was the major problem among the students of urban and rural or remote area, whereas physical problems such as headache, eye pain, and backache were the major hindrance felt by suburban students. These variations in pattern of hindrance were statistically insignificant.

Male and female students' perceptions of hindrances during online anatomy learning (Table 4)

The pattern of hindrances was different among male and female students. Male students opined that network problems (46.77%) and use of inappropriate teaching-learning tools (26.61%) were the most common hindrances

whereas the female students felt that the physical problems (44.53%) and network issues (37.5%) were the major problem during online classes. This categorical variation among the study participants was statistically significant.

Differences between screen time before and after commencement of online classes (Table 5)

After starting of regular online classes, screen time among students was significantly increased than earlier.

More than 5 hours screen time was seen among less than 10% of students before online classes. However, after classes began, regardless of gender or location, more than 5 hours screen time was seen in more than 60% of participants.

Table 4: The pattern of hindrance faced in online classes

	Network issue, number%	Physical ailments, number%	Inappropriate teaching-learning tools, number%	Inappropriate device, number%	df	X ²	P-value	Remarks
Urban (n=130)	56 (43.07)	42 (32.3)	30 (11.9)	2 (1.53)	6	3.04	0.803	NS
Suburban (n=70)	26 (37.14)	28 (40)	14 (5.55)	2 (2.85)				
Rural/remote (n=52)	24 (46.15)	17 (32.69)	9 (17.30)	2 (3.84)				
Male (n=124)	58 (46.77)	30 (24.19)	33 (26.61)	3 (2.42)	3	12.45	0.005	Significant
Female (n=128)	48 (37.5)	57 (44.53)	20 (15.62)	3 (2.34)				

Table 5: The pattern of screen time before and after commencement of online classes

Study participants	Screen time (before commencement of online class), number%				Screen time (after commencement of online class), number%				df	X ²	P-value
	1 h	2–3 h	3–5 h	>5 h	1 h	2–3 h	3–5 h	>5 h			
Female (n=128)	26 (20.31)	65 (50.78)	34 (26.56)	3 (2.34)	2 (1.56)	10 (7.81)	34 (26.56)	82 (64.06)	3	134.9	<0.0001
Male (n=124)	29 (23.38)	48 (38.71)	35 (27.34)	12 (9.67)	1 (0.80)	16 (12.9)	29 (23.38)	78 (62.9)	3	91.09	<0.0001
Urban (n=130)	24 (18.46)	56 (43.07)	42 (32.31)	8 (6.15)	1 (0.76)	6 (5.38)	37 (28.46)	86 (66.15)	3	126.52	<0.0001
Semi-urban (n=70)	19 (27.14)	29 (41.42)	17 (24.28)	5 (7.14)	1 (1.42)	7 (10)	15 (21.42)	47 (67.14)	3	63.69	<0.0001
Rural/remote (n=52)	18 (34.61)	20 (38.46)	11 (21.15)	3 (5.76)	1 (13.46)	9 (17.31)	17 (32.69)	25 (48.07)	3	37.95	<0.0001

DISCUSSION

In March 2020, COVID 19 was declared pandemic by the WHO.¹⁷ On March 22, 2020, the Prime Minister of India declared a nationwide lock down to limit the spread of deadly COVID-19 infections.¹⁸ Majority of students returned back to their home. By the end of the March 2020 or 1st week of April, most of the medical institutions of India have started to deliver medical teaching through various virtual platforms. Since then, anatomy teaching has shifted from the regular face-to-face classroom to online classes in India.^{9,12,13} All subsections of anatomy according to new competency-based curriculum (proposed by medical council of India) such as gross anatomy, microanatomy, embryology, and radiological anatomy have been taught in virtual mode either by taking online classes or by providing the recorded class materials. The use of virtual resource materials in anatomy teaching was very limited before COVID pandemic, they have started online education on emergence basis during the lockdown. The lack of prior experience and preparation caused new challenge for anatomy students and teachers in India. According to the literature of Allsop et al., Grainger et al., and Trelease, the application of virtual resource materials is playing a significant role in anatomy teaching over the past two decades in developed countries.¹⁹⁻²¹ Before pandemic, many universities around world taught anatomy by projection of images and films of human dissection instead of face-to-face cadaver dissection.²² Therefore, it was easier for these universities to conduct online classes of anatomy during the pandemic. However, some researchers mentioned that

they faced difficulties in microanatomy teaching in practical classes.²²

The analysis of this new learning experience among Indian medical students reflected some important aspects in our study.

Demographic profile of Indian medical students

We found mean age of the 1st year medical students of India was 19.8 years which is similar with the findings of the previous studies.^{12,23}

Approximately half of the study participants were from urban area and rest of students were from suburban and rural or remote areas. The knowledge of this residential pattern was important regarding the availability of internet connection and proper device.

Type of device and internet connection

In our study, majority of students used smartphones and mobile internet for availing the online anatomy lessons. Other researchers also mentioned the same observations.^{12,13} Small screen of smartphone hampers the proper understanding of the contents. Mobile internet usage disrupted the continuity and bandwidth of internet connections, which caused problems during online anatomy lessons, especially during synchronized sessions.²⁴

Perception of traditional and online anatomy teaching

In our study, majority of students preferred traditional anatomy teaching over online anatomy teaching. This

preference was seen more in cases of gross anatomy teaching in comparison to other subsections. This pattern of preference is similar with the findings of the other researcher's articles.^{12,13,24}

Research conducted on medical students of Ghana also showed the same opinion of medical students. The authors opined that the absence of face-to-face cadaveric anatomy study hampered student's subject understanding and long-lasting knowledge in online anatomy teaching.²⁵

The other factors for disliking of online classes were challenges facing during the online classes.²⁶

Among the subsections of anatomy, students liked the online teaching of histology, embryology, and radiology in comparison to gross anatomy. A study involving university students of sports medicine in Italy indicated student's preference to learn histology and anatomy online.²⁷

Pattern of hindrance

In our study, we found that network issues were the main problems of online anatomy teaching followed by physical problems and use of improper teaching-learning tools. Very few students thought that improper device may be the hurdles of online classes. This finding is quite similar with the findings of the other researchers.^{12,13,15,24}

Students who attended the class from rural or remote area, they have faced the maximum network problem followed by students of urban and suburban area. Researchers reported that the poor network in urban India was caused due to the fact that the urban people were using the internet and internet-based services to communicate, interact, and continue with their job responsibilities from home. This huge use of internet caused the poor bandwidth in urban areas.²⁸ Another report said that poor network in rural/remote area had taken a huge toll on online education.²⁹

Second most problematic issue was physical problems such as headache, eye pain, and back ache, which might result from prolong screentime. Similar findings have been reported by the other researchers.¹⁵ Smartphone-dependent online study and statistically significant increase in screentime during online classes suggested a reasonable explanation for these physical problems.³⁰

Other researchers also mentioned that the lack of non-verbal contact caused difficulty in online anatomy education.³¹

Limitations of the study

A cross-sectional study design increased the chance of recall bias of the study participants. The smaller sample size and non-probability sampling technique of data collection

may compromise the representativeness of the sample and power of the study. As it was an internet-based study, poor understanding of the Google Forms might create problems for some students.

Although the scope of investigator bias was minimal in this study, as data were collected from various institutions of India.

CONCLUSION

Traditional anatomy teaching was favored over online anatomy teaching by majority of students. However, students liked virtual learning on selected topics of embryology, histology and radiological anatomy. Network and physical problems were major hindrances in online anatomy classes. The above information might be helpful in selecting policies regarding early reinstatement of traditional anatomy classes and planning for the implementation of efficient online anatomy classes during future crisis.

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REFERENCES

1. Ahmed H, Allaf M and Elghazaly H. COVID-19 and medical education. *Lancet Infect Dis.* 2020;20(7):777-778. [https://doi.org/10.1016/s1473-3099\(20\)30226-7](https://doi.org/10.1016/s1473-3099(20)30226-7)
2. Nimavat N, Singh S, Fichadiya N, Sharma P, Patel N, Kumar M, et al. Online medical education in India different challenges and probable solutions in the age of COVID-19. *Adv Med Educ Pract.* 2021;12:237-243. <https://doi.org/10.2147/amep.s295728>
3. Saiyad S, Virk A, Mahajan R and Singh T. Online teaching in medical training: Establishing good online teaching practices from cumulative experience. *Int J Appl Basic Med Res.* 2020;10(3):149-155. https://doi.org/10.4103/ijabmr.ijabmr_358_20
4. Dhawan S. Online learning: A panacea in the time of COVID-19 crisis. *J Educ Technol Syst.* 2020;49(1):5-22.
5. Ramachandran K. Perception of first year medical students on the use of WhatsApp as a supplementary learning tool. *IP Indian J AnatSurg Head Neck Brain.* 2018;4(3):69-74. <https://doi.org/10.18231/2581-5229.2018.0019>
6. Mondal H, Dutta S, Mondal S, Sahoo RM, Saha K and Mondal S. Educational resources used by 1st-year medical students. *J AnatSoc India.* 2021;70:130-5.

- https://doi.org/10.4103/jasi.jasi_16_20
7. Curriculum Implementation Support Programme of the Competency based Medical Education Curriculum Published by Medical Council of India 2019. p. 40-43.
 8. Kachur EK. Observation during early clinical exposure is an effective instruction tool or a bore. *Med Educ.* 2003;37(2):88-89. <https://doi.org/10.1046/j.1365-2923.2003.01421.x>
 9. Roy H, Ray K, Saha S and Ghosal AK. Study on students' perceptions for online zoom-app based flipped class sessions on anatomy organised during the lockdown period of COVID-19 epoch. *J Clin of Diagn Res.* 2020;14(6):AC01-AC04. <https://doi.org/10.7860/jcdr/2020/44869.13797>
 10. Patra A, Chaudhary P and Ravi K. Adverse impact of Covid-19 on anatomical sciences teachers of India and proposed ways to handle this predicament. *AnatSci Educ.* 2021;14(2):163-165. <https://doi.org/10.1002/ase.2052>
 11. Haileamlak A. How should medical education continue during COVID-19 pandemic? *Ethiop J Health Sci.* 2020;30(6):855-856.
 12. Singal A, Bansal A, Chaudhary P, Singh H and Patra A. Anatomy education of medical and dental students during COVID-19 pandemic: A reality check. *SurgRadiol Anat.* 2021;43(4):515-521. <https://doi.org/10.1007/s00276-020-02615-3>
 13. Ghosal T, Sadhu A and Mukherjee P. Assessment of online learning procedure through the eyes of medical students in COVID-19 scenario. *J ClinDiagn Res* 2021;15(5):AC01-AC05. <https://doi.org/10.7860/jcdr/2021/47089.14830>
 14. Patra A, Ravi K and Chaudhary P. COVID 19 reflection/ experience on teaching-learning and assessment: Story of anatomy teachers in India. *AnatSci Int.* 2021;96(1):174-175. <https://doi.org/10.1007/s12565-020-00576-6>
 15. Sharma N, Bhusal CK, Subedi S and Kasarla RR. Perception towards online classes during COVID-19 among MBBS and BDS students in a medical college of Nepal: A descriptive cross-sectional study. *J Nepal Med Assoc.* 2021;59(235):276-279. <https://doi.org/10.31729/jnma.5348>
 16. Kaur A, Ahamed F, Sengupta P, Majhi J and Ghosh T. Pattern of workplace violence against doctors practising modern medicine and the subsequent impact on patient care, in India. *PLoS One.* 2020;15(9):e0239193. <https://doi.org/10.1371/journal.pone.0239193>
 17. Velavan TP and Meyer CG. The COVID-19 epidemic. *Trop Med Int Health.* 2021;25(3):278-280. <https://doi.org/10.1111/tmi.13383>
 18. Gettleman J and Schultz K. Modi Orders 3-Week Total Lockdown for all 1.3 Billion Indians. *The New York Times*; 2020.
 19. Allsop S, Hollifield M, Huppler L, Baumgardt D, Ryan D, van Eker M, et al. Using video conferencing to deliver anatomy teaching to medical students on clinical placements. *Transl Res Anat.* 2020;19:100059. <https://doi.org/10.1016/j.tria.2019.100059>
 20. Grainger R, Liu Q, Geertshuis S. Learning technologies: A medium for the transformation of medical education? *Med Educ.* 2020;55:23-29. <https://doi.org/10.1111/medu.14261>
 21. Trelease RB. Essential E-learning and M-learning methods for teaching anatomy. In: Chan LK, Pawlina W, editors. *Teaching Anatomy: A Practical Guide.* Springer International Publishing; 2015. p. 247-257. https://doi.org/10.1007/978-3-319-08930-0_28
 22. Zarcone D, Saverino D. Online lessons of human anatomy: Experiences during the COVID-19 pandemic. *Clin Anat.* 2022;35(1):121-128. <https://doi.org/10.1002/ca.23805>
 23. Bandyopadhyaya R and Biswas R. Students' perception and attitude on methods of anatomy teaching in a medical college of West Bengal, India. *J ClinDiagn Res.* 2017;11(9):AC10-AC14.
 24. Khasawneh RR. Anatomy education of medical students during the COVID 19 pandemic. *Int. J. Morphol.* 2021;39(5):1264-1269. <https://doi.org/10.4067/s0717-95022021000501264>
 25. Asante EA, Maalman RS, Ali MA, Donkar OY and Korpisah KJ. Perception and attitude of medical students towards cadaveric dissection in anatomical science education. *Ethiop J Health Sci.* 2021;31(4):867-874.
 26. Murphy E, Manzanares MA. Instant messaging in a context of virtual schooling: Balancing the affordances and challenges. *Educ Med Int.* 2008;45(1):47-58. <https://doi.org/10.1080/09523980701847180>
 27. Saverino D, Marcenaro E, Zarcone D. Teaching histology and anatomy online during the COVID-19 pandemic. *Clin Anat.* 2022;35(1):129-134. <https://doi.org/10.1002/ca.23806>
 28. De R, Pandey N, Pal A. Impact of digital surge during Covid-19 pandemic: A viewpoint on research and practice. *Int J Inf Manage.* 2020;55:102171. <https://doi.org/10.1016/j.ijinfomgt.2020.102171>
 29. Malkarnekar G. Goa University Survey: Poor Internet Connectivity in Rural Areas Affecting E-learning. *The Times of India*; 2020.
 30. Pandya A and Lodha P. Social connectedness, excessive screen time during COVID-19 and mental health: A review of current evidence. *Front Hum Dyn.* 2021;3:684137. <https://doi.org/10.3389/fhumd.2021.684137>
 31. Flynn W, Kumar N, Donovan R, Jones M and Vickerton P. Delivering online alternatives to the anatomy laboratory: Early experience during the COVID-19 pandemic. *Clin Anat.* 2021;34(5):757-765. <https://doi.org/10.1002/ca.23722>

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SS-Concept and design of the study, data acquisition, statistical analysis, interpreted result, and prepared first draft of manuscript; **AG**-Concept, design of study, reviewed the literature, and manuscript preparation; **BR**-Design of the study, data acquisition, and manuscript revision; **ADG**-Data acquisition and manuscript revision; and **AS**-Data acquisition, coordination, and manuscript revision.

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