ORIGINAL RESEARCH

With the New Challenges of COVID- 19, Can We Depend Entirely on Online Learning for Higher Education in the Medical Schools?

Mohammad I Jumaa [1], Safaa M Hanafy[1], Mostafa A Arafa[2,3]

[1]Anatomy Department, College of Medicine, Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Saudi Arabia; [2]The Cancer Research Chair, College of Medicine, King Saud University, Riyadh, Saudi Arabia; [3]High Institute of Public Health, Alexandria University, Alexandria, Egypt

Correspondence: Mohammad I Jumaa, Assistant professor, Anatomy Department, College of Medicine, Imam Mohammad Ibn Saud Islamic University (IMSIU), P.O. Box: 7544 – Othman Bin Affan Road Al-Nada, Riyadh 4233-13317, Riyadh, Saudi Arabia, Tel +966542253151, Email migomaa@imamu.edu.sa

Background: Due to the COVID-19 pandemic, medical education has gone online. Human anatomy is a three-dimensional subject that requires a clear understanding of the relationships between structures through the study of human cadavers, microscopic samples, and models.

Objective: This study aimed to examine the attitudes and perceptions of students regarding teaching anatomy before and after the lockdown period and ways of improving the challenges they faced.

Methods: This cross-sectional study was conducted at AL Imam University School of Medicine. Structured surveys were designed to understand students' attitudes and opinions towards offline versus online teaching of anatomy and suggestions to improve the online teaching process.

Results: The mean attitude scores for the conventional lectures, seminars, and practical sessions were significantly higher. Students expressed positive attitudes towards the three teaching modules. Students agreed that themes related to computer skills and technical Internet infrastructure (71.55%) and administrative procedures (61.74%) are essential for improving the online teaching process.

Conclusion: Conventional learning is the main target of student learning. Improvements in computer skills, technical Internet infrastructure, learning resources, staff communication, examinations, and development of blended learning will enrich the learning process, especially during the impending challenges.

Keywords: online learning, anatomy, COVID-19, challenges

Introduction

An understanding of basic anatomy is vital for surgery and to focus on the relevant anatomical structures in medical imaging;[1,2] however, it also appears to be a challenging subject for medical students.[2,3] Human anatomy is a three-dimensional subject that requires a clear understanding of the relationships between structures, usually gained through the study of human cadavers, microscopic samples, and models.[3]

Due to the outbreak of the severe acute respiratory syndrome Coronavirus 2019 (COVID-19), physical anatomy education and face-to-face teaching have been adversely affected worldwide.[4] The cadaver dissection rate during the pandemic was drastically reduced, likely due to the lockdown policy and fear of COVID-19, which prevented hospitals from accepting body donations.[5–7]

In terms of COVID-19 control measures, maintaining physical distance between individuals makes it impossible to conduct teaching activities with a large number of students in a classroom or laboratory. By converting conventional in-person learning strategies into a virtual form, the continuity of learning outcomes is ensured.[8]

829

To overcome the interruption in the learning environment caused by the prevailing situation, teaching and learning environments need to adapt to the new normal and technologies. Various e-learning methods using digital technologies are being used in tertiary education.[9]

However, it is difficult to teach anatomy online through virtual classes and distance learning. Switching to this virtual mode suddenly requires additional work as there is no physical autopsy of the corpse, embryological models, bone samples, microscope slides, or direct interactions with the teacher. Moreover, it has a big impact on students.[4,10,11] The aims of this study were to examine students' attitudes and perceptions regarding teaching anatomy as part of medical training before and after the lockdown period and the ways of improving the defects detected during this lockdown period.

Materials and Methods

A cross-sectional study was conducted at Imam Mohammad Ibn Saud Islamic University (IMSIU) after approval from the IMSIU IRB committee Approval No. 23–2020. Between June 2020 and June 2021; 455 first-year and second-year students from the Faculty of Medicine were informed about the purpose of the study and invited to participate. Participants provided written informed consent to participate in the study and 399 student respond to the study.

The study was conducted using two methods:

1. Questionnaire survey: To understand Students' attitudes and perceptions towards offline and online anatomy teaching before and during the COVID-19 pandemic.
2. Focus group discussions: to discuss opinions and suggestions to improve the online teaching process.

Students' Attitudes and Perceptions Towards Offline and Online Teaching of Anatomy

Before the COVID-19 pandemic, anatomy was taught face-to-face through lectures, laboratory classes, and seminars. The lectures were interactive in nature. The anatomy labs were covered by learning on cadavers, plastinated specimens, and anatomy tables. The histology labs were covered by learning on slides observed under a microscope. Seminars were conducted in the college classroom and they were divided into smaller groups, each group taking a particular objective and presenting a related project to a staff member who assessed the students.

During the spread of COVID-19, the college was constrained to switch its entire teaching guidelines online. Therefore, anatomy learning was secured for online learning. Through a college-sponsored orientation event, staff and students were taught how to register for the Zoom video-conferencing application. The lectures were introduced through live Zoom sessions. Figures from atlas anatomy textbooks and recorded online videos were used to cover the anatomy laboratories. Learning of figures from histology textbooks was used to cover the histology laboratories. Seminars were conducted online.

A structured questionnaire was administered to the students. The survey comprised 15 closed-ended questions based on volunteerism guidelines. Questions employed a 5-point Likert-type scale, with 5=strongly agree, 4= agree, 3= uncertain, 2= disagree, and 1=strongly disagree.

The questionnaire for this study was structured and designed based on the study conducted by Hanafy et al,[12] where a pilot study was conducted on 13 students and chronbacks alpha was 0.73.

Focus Group Discussion

Depending on the data from the current questionnaire which was administered to students, students were classified into multiple groups; each group consisted of six to eight students, who discussed their opinions and provided suggestions to improve the online teaching process. Their ideas and concepts were coded and categorized and general themes were created.

Six main themes were identified: computer skills and technical Internet infrastructure (improving students' technical and computer skills, improving technical Internet infrastructure), improving learning resources

(providing students with textbooks, digital resources, and other teaching materials from multimedia and the Internet), staff communication (increasing communication time with staff on a weekly basis and encouraging small groups for discussion of different problems), administrative procedures (assigning administrative persons to communicate with students, help them, and solve any problems they face during the courses), examination (increasing time limit of and immediate feedback after online examinations, separate examination versions for each student to prevent cheating, and development of formative assessments for improving structure recognition), and general (development of blended learning, division of long courses into several parts, and increasing time limit for online lectures and seminars).

Students were then asked to give their opinions about such themes and how much they agreed to improve online learning using a 3-point Likert scale: with 3= agree, 2= neutral, and 1= disagree.

Analysis of Data

Data were analyzed using SPSS software version 23. A simple frequency distribution was used to express the distribution of different variables, and paired *t*-tests and Z tests were used for comparison of group means and proportions.

Results

Out of 455 students who were invited to participate in the study, 399 (87.6%) responded. Their ages ranged from 19–23 years; most of them were males (76%).

Table 1 indicates that the mean attitude scores for conventional lectures, seminars, and practical sessions were significantly higher than that of online lectures, seminars, and practical sessions, where t= 7.6, P=0.00; t= 5.5, p=0.00; and t= 9.2, p=0.00, respectively.

No significant difference was detected between men and women with regard to the mean attitude scores of the three teaching modules.

The two categories for the three attitude scales (strongly agree and agree) were combined and compared across the three teaching modules for conventional and online teaching. Results are illustrated in Tables 2–4.

There was a significant discrepancy between conventional and online lectures, seminars, and practical sessions. The students expressed a positive attitude towards the three teaching modules. The highest discrepancy was observed for the statement about the association of teaching materials provided by conventional lectures with learning anatomy and basic science. Two other statements attained a high discrepancy, but to a lesser degree, that is, the effect of conventional lectures on recognition of the structure and construction of a comprehensive picture and integrating medical knowledge, and their attitude towards the correlation between fundamental basic sciences and clinical diseases.

Table 1 Comparison of the Student's Total Scores Means for the Scales: Conventional Lectures, Seminars and Practical Sessions versus Online Lectures Seminars and Practical Sessions

scales	Mean± SD	Paired t test	P
Conventional lectures	4 ± 18.7	7.6	0.000
Online lectures	16.2 ± 5.1		
Conventional seminars	18.1 ± 4.3	5.5	0.000
Online seminars	16.3 ± 5.4		
Conventional practical session	19.7 ± 4.4	9.2	0.000
Online practical sessions	16.5 ± 5.4		

Table 2 Comparison of Students' Attitude Scales for Conventional and Online Lectures

Conventional Lectures	No (%)	Online Lectures	No (%)	P value
Do you think that teaching materials provided by conventional lectures help in learning anatomy and basic science?	287 71.9%	Did you think that teaching materials provided by online lectures help in learning anatomy and basic science?	185 46.4%	0.0001
Do you think that time allowed during online lectures help in learning anatomy and basic medical sciences?	216 54.1%	Did you think that time allowed during online lectures help in learning anatomy and basic medical sciences?	148 37.1%	0.0001
Do you think that conventional lectures help you to express different ideas and participate actively in-group discussions?	251 62.9%	Did you think that online lectures help you to express different ideas and participate actively in-group discussions?	183 45%	0.0001
Do you think that conventional lectures help to recognize the structure, and construct a comprehensive picture, and integrating medical Knowledge?	270 67.7%	Did you think that online lectures help to recognize the structure, and construct a comprehensive picture, and integrating medical Knowledge?	172 43.1%	0.0001
Do you think that conventional lectures help to correlate fundamental basic sciences with clinical diseases?	261 65.5%	Did you think that online lectures help to correlate fundamental basic sciences with clinical diseases?	179 44.9%	0.0001

Table 3 Comparison of Students' Attitude Scales for Conventional and Online Seminars

Conventional Seminars	No (%)	Online Seminars	No (%)	P value
Do you think that teaching materials provided by conventional lectures help in learning anatomy and basic science?	224 56%	Did you think that teaching materials provided by online lectures help in learning anatomy and basic science?	186 46.6%	0.0001
Do you think that time allowed during online lectures help in learning anatomy and basic medical sciences?	204 52.1%	Did you think that time allowed during online lectures help in learning anatomy and basic medical sciences?	177 44.4%	0.0001
Do you think that conventional lectures help you to express different ideas and participate actively in-group discussions?	238 59.6%	Did you think that online lectures help you to express different ideas and participate actively in-group discussions?	182 45.6%	0.0001
Do you think that online lectures help to recognize the structure, and construct a comprehensive picture, and integrating medical Knowledge?	235 58.9%	Did you think that online lectures help to recognize the structure, and construct a comprehensive picture, and integrating medical Knowledge?	170 42.6%	0.0001
Do you think that online lectures help to correlate fundamental basic sciences with clinical diseases?	219 54.9%	Did you think that online lectures help to correlate fundamental basic sciences with clinical diseases?	155 38.8%	0.0001

With regard to practical sessions, there were significant differences in students' attitudes between the conventional and practical online sessions. It ranged from 32.3% for the efficiency of conventional teaching materials in learning anatomy to 24.1% for the ability of conventional teaching to correlate fundamental basic sciences with clinical diseases (Table 4).

The second part of the study included obtaining students' opinions on improving the process of online learning. A total of 362 (79.5%) students completed their responses. Students' opinions that attained the highest and lowest agreement are listed in Table 5.

Table 5 describes students' opinions towards the six themes, where they agreed that themes related to computer skills and technical Internet infrastructure (71.55%), administrative procedures (61.74%), learning resources (59.6%), and staff communication (59.76%) are essential for improving the online teaching process. The two themes with least agreement

Table 4 Comparison of Students' Attitude Scales for Conventional and Online Practical Sessions

Conventional Practical Sessions	No (%)	Online Sessions	No (%)	P value
Do you think that teaching materials provided during the practical sessions (cadavers, plastinated models, anatomy tables, microscopes, and slides) help in learning anatomy and histology?	310 77.7%	Did you think that teaching materials provided during the practical sessions (recorded videos on cadavers, plastinated models, anatomy tables, and slides) help in learning anatomy and histology?	181 45.4%	0.0001
Do you think that time allowed during the attendance of conventional practical sessions help in learning anatomy and histology?	271 67.9%	Did you think that time allowed during the attendance of online practical sessions help in learning anatomy and histology?	166 41.4%	0.0001
Do you think that attending conventional practical sessions help you to express different ideas and participate actively in-group discussions?	280 70.2%	Did you think that attending online practical sessions help you to express different ideas and participate actively in-group discussions?	182 45.6%	0.0001
Do you think that attendance of conventional practical sessions helps you to recognize the structure, construct a comprehensive picture, and integrating medical knowledge?	284 71.2%	Did you think that attendance of online practical sessions helps you to recognize the structure, construct a comprehensive picture, and integrating medical knowledge?	177 44.4%	0.0001
Do you think that conventional practical sessions help to correlate fundamental basic sciences with clinical diseases?	270 67.7%	Did you think that online practical sessions help to correlate fundamental basic sciences with clinical diseases?	174 43.6%	0.0001

Table 5 Students' Opinions Towards Improvement of Online Teaching Process

Themes	Parameter	Frequency	Percent
Computer skills and technical internet infrastructures	Do not agree	28.5	7.87%
	Neutral	74.5	20.58%
	Agree	259	71.55%
Total		362	
Learning resources	Do not agree	38.25	10.57%
	Neutral	108	29.83%
	Agree	215.75	59.60%
Total		362	
Staff communication	Do not agree	39	10.77%
	neutral	106.6667	29.47%
	Agree	216.3333	59.76%
Total		362	
Administrative procedures	Do not agree	19	5.25%
	neutral	119.5	33.01%
	Agree	223.5	61.74%

(Continued)

Table 5 (Continued).

Themes	Parameter	Frequency	Percent
Total		362	
Examination	**Do not agree**	54.25	14.99%
	Neutral	110.75	30.59%
	Agree	197	54.42%
Total		362	
General	**Do not agree**	61.33333	16.94%
	Neutral	115.3333	31.86%
	Agree	185.3333	51.20%
Total		362	

for improving the online learning process were the general theme (51.2%) and the one related to examination statements (54.4%).

Discussion

The results of the current study indicated that the mean attitude scores for conventional lectures, seminars, and practical sessions were significantly higher than those for online lectures, seminars, and practical sessions. These results agree with those of Hanafy et al,[12] who found that medical student interest was significantly higher toward conventional than online teaching of anatomy, physiology, and biochemistry. These results might be explained by some authors[13] who stated that in classroom learning, students gain practical skills, acquire communication skills, and have the opportunity to interact with their teachers.

On the other hand, the results were different from those of Mahdy and Ewaida,[14] where veterinary anatomy was taught remotely during the COVID-19 pandemic, and nearly two-thirds of the students expressed interest in learning anatomy online. Most of the students believed that this type of learning is most effective for both the theoretical and practical parts of the course. Another study[15] evaluated the shift from face-to-face education at the University of Malta to remote teaching of human anatomy during the COVID-19 pandemic and found that almost half of the students thought that remote anatomy instruction was equivalent to face-to-face instruction.

The present study found that the highest discrepancy was observed for the statement about the association between teaching materials provided by conventional lectures and learning anatomy and basic science. The results are consistent with those of some studies[4,16] that found that the majority of technologically advanced students did not favor learning anatomy exclusively online. An important reason for this is their inability to acquire the three-dimensional orientation of the structures needed to learn anatomy.

The current study observed that the students' attitudes toward conventional practical sessions were significantly meaningful compared to the online sessions regarding the conventional teaching materials for anatomy (such as cadavers, plastinated models, anatomy tables, microscopes, and slides). These results agree with that of Khasawneh,[17] who assessed medical students' feedback regarding online teaching versus face-to-face teaching during the COVID-19 pandemic. According to his study, 79.14% of students found it difficult to understand histology without the benefit of seeing slides under a microscope. In addition, 69.28% of participants reported having difficulty understanding anatomy without viewing models in laboratories.

The second part of the study included students' responses regarding the improvement of the online learning process. The students agreed that improvement of the themes related to computer skills and technical Internet infrastructure will improve online learning. These results were in line with those of Nazeefa,[18] who discovered major limitations for live

Zoom sessions because of varying Internet connectivity strength across the board. According to Yoo et al,[6] network interruptions were the most severe restrictions for online learners.

The students agreed that the improvement of themes related to communication would improve online learning. Such communication can be obtained by increasing the scheduled live Zoom sessions with staff and small groups to discuss different problems. According to Totlis et al,[19] students prefer traditional classroom lectures to online sessions owing to a lack of interaction between peers and lecturers; as a result, they perceive a decline in the effectiveness of online learning methods.

The students agreed that the improvement of themes related to learning resources would improve online learning. Textbooks and other teaching materials from multimedia and the Internet, digital resources, virtual dissection tables, and Argosy publisher's Visible Body are useful tools. This suggestion was supported by one study,[20] which stated that the Argosy publisher's Visible Body, Elsevier's full anatomy, virtual dissection tables, and other web-based 3D virtual resources are available to understand organ architecture and relationships. Zhao et al[21] also mentioned that virtual reality-based technology is used to educate anatomy.

The students agreed that the improvement of the themes related to the examination would improve online learning. The suggestions include increasing the time limit and providing immediate feedback after the online examination, creating a separate examination version for each student to prevent cheating, and developing a formative assessment for improving structure recognition. Such suggestions are in line with Snekalatha et al,[22] who assessed medical students' perceptions of the reliability, usefulness, and practical challenges of online tests. Their results showed that medical students appreciated the usefulness of online formative assessment tests in enhancing learning. Kumar et al[23] assessed perceptions of the advantages and disadvantages of electronic assessment among first-year medical students engaged in online learning. Among the advantages, students said that they were being exposed to new ways of learning and obtaining immediate results/feedback.

The students agreed that the development of blended learning in anatomy would improve their learning process. Puljak et al[24] also found that 55.7% students preferred hybrid learning. In another national survey of 2721 students in the UK,[25] the author recommended a combination of online and face-to-face classes.

Limitations

This study has some limitations. First, it was a questionnaire-based survey set up on a non-probability voluntary sample and therefore entails typical pitfalls. Second, the participants were recruited from a single academic institution in one country. Our results could differ if the survey was distributed across multiple institutions in different countries. Third, the study depended on students' attitudes, which might be influenced by their personal feelings and might affect their responses.

Conclusion

Conventional anatomy teaching is preferred over online teaching. However, improvements in different aspects, such as computer skills, technical Internet infrastructure, learning resources, staff communication, and examinations will aid the learning process and development of blended learning, especially during future challenges.

Ethical Approval

The protocol was approved by the ethics review board of the Faculty of Medicine, Imam Mohammad Ibn Saud Islamic University (IMSIU), Saudi Arabia. Approval No. 23-2020.

Participants provided written informed consent to participate in the study.

Acknowledgment

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically

reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

Disclosure

The authors declare no conflicts of interest in this work.

References

1. Eizenberg N. Anatomy and its impact on medicine: will it continue? *Australas Med J*. 2015;8(12):373–377. doi:10.4066/AMJ.2015.2550
2. Guimaraes B, Durado L, Tsisar S, Diniz JM, Madeira MD, Ferreira MA. Rethinking anatomy: how to overcome challenges of medical education's evolution. *Acta Med Port*. 2017;30(2):134–140. doi:10.20344/amp.8404
3. Singh K, Bharatha A, Sa B, Adams OPM, Majumder AA. Teaching anatomy using an active and engaging learning strategy. *BMC Med Education*. 2019;19:149. doi:10.1186/s12909-019-1590-2
4. Franchi T, The impact of the covid-19 pandemic on current anatomy education and future careers: a student's perspective. *Anat Sci Educ*. 2020;13 (3):312–315. doi:10.1002/ase.1966
5. Harmon DJ, Attardi SM, Barremkala M, et al. An analysis of anatomy education before and during covid-19: May–August 2020. *Anat Sci Educ*. 2021;14(2):132–147. doi:10.1002/ase.2051
6. Yoo H, Kim D, Lee YM, Rhyu IJ. Adaptations in anatomy education during COVID-19. *J Korean Med Sci*. 2021;36(1):1–13. doi:10.3346/jkms.2021.36.e13
7. Bond G, Franchi T. Resuming cadaver dissection during a pandemic. *Med Educ Online*. 2021;26(1):1842661. doi:10.1080/10872981.2020.1842661
8. Owolabi J, Bekele A. Implementation of innovative educational technologies in teaching of anatomy and basic medical sciences during the covid-19 pandemic in a developing country: the covid-19 silver lining? *Adv Med Educ Pract*. 2021;12:619–625. doi:10.2147/AMEP.S295239
9. Srinivasan DK, Medical students' perceptions and an anatomy teacher's personal experience using an e-learning platform for tutorials during the covid-19 crisis. *Anat Sci Educ*. 2020;13(3):318–319. doi:10.1002/ase.1970
10. Brassett C, Cosker T, Davies DC, et al. COVID-19 and anatomy: stimulus and initial response. *J Anat*. 2020;237(3):393–403. doi:10.1111/joa.13274
11. Ross CF, Pescitelli MJ, Smith HF, Williams JM. Teaching anatomy with dissection in the time of COVID-19 is essential and possible. *Clin Anat*. 2020;34:1135–1136. doi:10.1002/ca.23640
12. Hanafy SM, Jumaa MI, Arafa MA. A comparative study of online learning in response to the coronavirus disease 2019 pandemic versus conventional learning. *Saudi Med J*. 2021;42(3):324–331. doi:10.15537/smj.2021.42.3.20200741
13. Shetty S, Shilpa C, Dey D, Kavya S. Academic crisis during COVID 19: online classes, a panacea for imminent doctors. *Indian J Otolaryngol Head Neck Surg*. 2020;1–15. doi:10.1007/s12070-020-02224-x
14. Mahdy MAA, Ewaida ZM. Evaluation of the emergency remote learning of veterinary anatomy during the COVID-19 pandemic: global students' perspectives. *Front Educ*. 2022;6:728365. doi:10.3389/feduc.2021.728365
15. Cuschieri S, Agius CJ. Spotlight on the shift to remote anatomical teaching during covid-19 pandemic: perspectives and experiences from the university of Malta. *Anat Sci Educ*. 2020;13(6):671–679. doi:10.1002/ase.2020
16. Prabhath S, DSouza A, Pandey AK, et al. Changing paradigms in anatomy teaching-learning during a pandemic: modification of curricular delivery based on student perspectives. *J Taibah Univ Medical Sci*. 2022;17:488–497. doi:10.1016/j.jtumed.2021.10.014
17. Khasawneh RR, Anatomy education of medical students during the COVID-19 pandemic. *Int J Morphol*. 2021;39(5):1264–1269. doi:10.4067/S0717-95022021000501264
18. Nazeefa HMFJ. Opportunities and challenges of online anatomy teaching and learning for pre-clinical students. *J Human Anat*. 2021;5(1):000157.
19. Totlis T, Tishukov M, Piagkou M, Kostares M, Natsis K, Online educational methods vs. traditional teaching of anatomy during the COVID-19 pandemic. *Anat Cell Biol*. 2021;54(3):332–339. doi:10.5115/acb.21.006
20. Longhurst GJ, Stone DM, Dulohery K, et al. Strength, Weakness, Opportunity, Threat (SWOT) analysis of the adaptations to anatomical education in the United Kingdom and republic of Ireland in response to the covid-19 pandemic. *Anat Sci Educ*. 2020;13(3):301–311.
21. Zhao J, Xu X, Jiang H, Ding Y, The effectiveness of virtual reality-based technology on anatomy teaching: a meta-analysis of randomized controlled studies. *BMC Med Educ*. 2020;20(1):127. doi:10.1186/s12909-020-1994-z
22. Snekalatha S, Marzuk M, Meshram SA, Maheswari KU, Sugapriya G, Sivasharan K. Medical students' perception of the reliability, usefulness and feasibility of unproctored online formative assessment tests. *Adv Physiol Educ*. 2021;45:84–88. doi:10.1152/advan.00178.2020
23. Kumar LR, Bedra A, Karkera R, Perception of medical students on e-assessment conducted through Yengage portal. *Arch Med Health Sci*. 2013;1 (1):61–66. doi:10.4103/2321-4848.113577
24. Puljak L, Civljak M, Haramina A, et al. Attitudes and concerns of undergraduate university health sciences students in Croatia regarding complete switch to e-learning during COVID-19 pandemic: a survey. *BMC Med Educ*. 2020;20:1–11. doi:10.1186/s12909-020-02343-7
25. Dost S, Hossain A, Shehab M, Abdelwahed A, Al-Nusair L. Perceptions of medical students towards online teaching during the COVID-19 pandemic: a national cross-sectional survey of 2721 UK medical students. *BMJ Open*. 2020;10:e042378. doi:10.1136/bmjopen-2020-042378