

Survey of patient attitudes of face-to-face and telemedicine teaching in COVID-19

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Abstract

Aims

The COVID-19 pandemic has impacted every aspect of the healthcare environment including the provision of medical education. Many institutions have used telemedicine teaching as an alternative to face-to-face sessions to comply with physical distancing recommendations, however little is known about patient attitudes towards participating in teaching with this technology. With the imminent need to deliver both remote consultations and teaching, we sought to assess patient perceptions of participating in telemedicine teaching by way of a written survey, in order to guide and develop provision of remote teaching methods for medical students.

Methods

We conducted a prospective survey of 229 surgical inpatients and outpatients at a university hospital between August–September 2020. The survey consisted of 31 questions exploring: general attitudes towards teaching and COVID-19 and perceptions of face-to-face and telemedicine teaching.

Results

Though participants reported a positive attitude towards both face-to-face (mean 5.5[1.1 SD]) and telemedicine teaching (mean 5.4 [1.2 SD]), there was a significant preference for the face-to-face approach (mean difference [MD]=0.16, $p=.14$). Face-to-face teaching was found to be less bothersome (MD=0.32, $p=.002$) and more rewarding (MD=0.33, $p <.001$). Older patients were more likely to report both teaching techniques as embarrassing (face-to-face $r=0.16$, $p=.048$; telemedicine $r=0.15$, $p=.036$). Qualitative analyses revealed four themes of patient experience: apprentice role of the medical student, communication and practical skills, transient need for telemedicine, and privacy concerns.

Discussion

Despite reporting a favourable impression of telemedicine teaching and acknowledging its transient need during the pandemic, patients have a more positive attitude towards face-to-face styles. Although introduction of technology to support clinical teaching during the COVID-19 period may be necessary, educators should continue to take the patient experience into consideration.

Introduction

Telemedicine describes the use of technology to enable healthcare provision at a distance.¹ Systems providing remote consultations were first described in the 1960s,² however until recently integration into routine practice was limited due to concerns for setup and maintenance cost, legal liability, patient privacy and physician reimbursement.³

The urgent need for physical distancing during the COVID-19 pandemic led to immediate and widespread changes in the healthcare environment and up to 4000% increase in the use of telemedicine since the beginning of 2020.⁴ In addition to adoption of existing technologies such as telephone assisted consultations and video conferencing for clinician meetings, a surge of innovative technologies emerged to facilitate clinical interactions at a distance such as mixed reality devices to facilitate inpatient review in a high risk environment,^{5,6} and mobile health platforms for monitoring of chronic conditions.⁷ This general shift in clinical practice has caused the estimated value of the global telemedicine industry to rise to more than \$250 billion.⁸

These changes in clinical practice have been mirrored by a transformation in the delivery of medical education.⁹ In 2020, many universities moved preclinical education almost exclusively online with clinical teaching adapted to facilitate patient-based teaching on virtual platforms.¹⁰ The most common form of telemedicine teaching was synchronous video consultation with students taking part in telehealth encounters between clinical staff and patients,¹¹ with other examples including consultations with patients or actors,¹² remote viewing of live operating,¹³ and virtual participation in tumour boards¹⁴. If telehealth is to be appropriately integrated into our health service, and regarded as a 'business as usual modality', it is imperative that key requirements necessary for integration of medical education are addressed to ensure readiness for clinical exposure in every day practice, and in times of emergency²⁶.

Pedagogical frameworks which support traditional face to face teaching sessions include Vygotsky's socio-cultural approach which focuses on the interaction between learning and environment in which case-based teaching promotes active connection²⁹. In contrast, the pedagogy that informs the delivery of telemedicine teaching is 'connectivism', a theoretical

framework that recognises the use of new technologies to enable people to learn and share information²⁹. Moreover, the theory of 'Education 3.0' encourages the use of web-based digital and mobile technology to form a digitised landscape of learning²⁸. However, both face to face and telemedicine teaching scenarios incorporate social constructivism theory with the creation of a learning environment conducive to group discussion and peer-to-peer feedback²⁹. In addition, both settings are supported by the 'Zone of Proximal Development' pedagogical theory in which the learner can perform with assistance through problem solving under adult guidance or in collaboration with more capable peers²⁹.

Though evidence for acceptability of a digital form of teaching amongst students is very positive,^{15,16} this change in pedagogical approach clearly affects patients too and further expansion of the boundaries of telemedicine education cannot be pushed without ensuring patients' continued acceptance towards participation. In order to explore patient attitudes towards telemedicine and traditional education using the Zone of Proximal Development theory²⁹, a thematic analysis was undertaken to draw out pertinent themes through a process of reading, working with and coding the data gathered. Themes capture implicit meaning beneath the surface and has a pattern of shared meaning underpinned by a central idea¹⁷.

To the authors' knowledge, no studies exploring patient acceptability of telemedicine teaching exist in the literature. Although many studies demonstrate that most patients find participation in traditional (face-to-face) styles of education rewarding with patients learning more about their condition,¹⁸ concerns regarding privacy and intimate clinical encounters often underlie reluctance to participate, factors which could be more relevant to student interaction remotely.^{19,20} This study therefore aimed to explore patient attitudes towards telemedicine and face-to-face teaching in a university teaching hospital setting in order to guide development of teaching methods, whilst taking into account patient preferences around participation. This study therefore aimed to explore patient attitudes towards telemedicine and face-to-face teaching in a university teaching hospital setting in order to guide development of teaching methods, whilst taking into account patient preferences around participation.

Methods

Questionnaire

A 31 point paper questionnaire was developed to collect data on the following domains of interest: (i) patient demographics (5 quantitative items); (ii) general impression of student teaching (1 quantitative item and 6 7-point Likert scale items [strongly agree - strongly disagree]); (iii) COVID-19 concern (5 7-point Likert scale items [strongly agree - strongly disagree]); (iv) impression of face-to-face teaching (1 quantitative item, 5 7-point Likert scale [strongly agree - strongly disagree] items and 1 free text item); and (iv) impression of

telemedicine teaching (1 quantitative item, 5 7-point Likert scale [strongly agree - strongly disagree] items and 1 free text item). All questions complied with a Flesch Kincaid readability test score of 9.2 indicating an estimated reading grade level of 10th - 12th grade (high school).

Participants

Inpatients and outpatients aged between 18-85 undergoing treatment by the general, plastic and orthopaedic surgery departments at a university teaching hospital between August 10-September 28, 2020 were deemed suitable for inclusion. The following exclusion criteria were applied: (i)patients unable to give consent; (ii)patients unable to read/write English or unable to understand the information leaflet; (iii)unconscious patients; (iv)patients in the emergency care setting; (v)clinically unstable patients (vi)patients with an acquired brain injury (vii)patients with immediately life limiting conditions; (viii)patients within 48 hours of surgery.

Interim Analysis and Power Calculation

An interim analysis of the first 80 patients demonstrated reasonable completion (n=79,98.75%) rates. A decision was made to perform a full powered study to enable a meaningful parametric analysis for quantitative data. A power analysis conducted in G-Power 3.0.10 demonstrated a required sample size of 220 to provide 80% power to detect an effect size of $d=.19$ for paired t tests and 80% power to detect an effect size of $r=.18$ for Pearson's correlation coefficients.

Measures

Post-hoc data transformation on quantitative data was performed to give composite scores from questions within the 4 domains of interest. These composite scores were derived by averaging item results with reverse coding of questions exploring negative perceptions.

Statistical Analysis

Data was analysed in IBM SPSS Statistics 23. In cases where there were missing data on a variable included in the analyses, pairwise deletion was used to retain as much of the data as possible in the analysis. The distributions of the continuous variables were examined with no indications of non-normal distributions therefore, all analyses assumed a normal distribution for continuous variables.

Pearson's correlation coefficients were used to examine relationships between all continuous variables. All t-tests and one-way ANOVAs assumed normal distributions. Levene's tests of inequality of variance were non-significant for all t-tests and ANOVAs, therefore variances were assumed to be equal across groups for all analyses. Cohen's d effect sizes were calculated for all means comparisons by dividing the mean difference by the pooled standard deviation.

Qualitative Analysis

Though the main aim of this study was not to deeply explore the thoughts, phenomena and meanings of the patient experience of teaching, a brief thematic analysis was performed on free text qualitative data. Inductive methodology was selected with a bottom up approach, requiring iterative coding and time for researchers to work with the data to ensure the final themes were representative of all the data that had been collected¹⁷.

Results

Responses and Demographics

229 of 232 questionnaires were included in the analysis. 1 participant retrospectively withdrew consent and 2 questionnaires were incomplete. 132 outpatients and 92 inpatients completed questionnaires. 58% of participants were female.

Table 1. Patient demographics

Age	n	(%)
18 – 24	27	12
25 – 34	22	10
35 – 44	48	21
45 – 55	47	20
55 – 64	38	17
65 – 74	31	14
74 – 84	10	4
>85	3	1
Not answered	3	1
Education		
Less than Leaving Certificate / A Levels ^a	43	19
Leaving Certificate / A Levels ^a	36	16
Some College, No Bachelors ^b	63	28
Bachelors ^b	47	20
Masters	31	13
Doctorate	5	2
Not answered	4	2
Gender		
Male	92	40
Female	135	59
Not Disclosed	2	1
Surgical Team		
General Surgery	140	61
Bariatric ^c	4	2
Breast ^c	54	24
Colorectal ^c	63	27
Hepatobiliary ^c	19	8
Orthopaedics	38	17
Plastics	33	14
Not answered	18	8
Reason for Attendance at Hospital		
Elective Inpatient	19	8
Emergency Inpatient	73	32
Outpatient	133	58
Not answered	4	2

N = 229

^aEquivalent to US high-school degree

^bEquivalent to US college degree

^cGeneral Surgery Subspeciality

Impression of Student Teaching

Patients reported a favourable impression of participating in student teaching. Out of a maximum score of 7, the mean general impression of student teaching was 6.0(SD 0.83), face-to-face teaching was 5.5(1.1) and telemedicine teaching 5.4(1.2) respectively.

Comparison of means for the impression of face-to-face versus telemedicine approach demonstrated a statistically significant difference (mean 5.55 vs. 5.40 respectively, mean difference [MD]=.16, $t(210)=2.49$, $p=.014$) with a more positive impression toward face-to-face teaching and small effect size ($d=.17$).

Relationship between Demographics and Teaching Styles/COVID-19 Concern

Correlations among the four domains/areas of interest, age and education level were examined. Age was negatively correlated with level of education ($r = -.18$, $p = .006$). Neither age nor education level were significantly associated with teaching style preference. COVID-19 concern was not significantly related with any of the other variables.

A more positive general impression of student teaching was associated with a more positive impression of both face-to-face ($r=.64$, $p<.001$), and telemedicine teaching ($r =.54$, $p<.001$). A more positive impression of face-to-face training was associated with a more positive impression of telemedicine training ($r=.67$, $p<.001$).

There were no significant differences between men and women in level of COVID-19 concern ($t[22]=-0.177$, $p=.08$), general impression of student teaching ($t[222]=.51$, $p=.61$), impression of face-to-face teaching ($t[217]=-0.06$, $p=.56$), or impression of telemedicine teaching ($t[211]=.69$, $p=.49$).

Comparing admission status (emergency inpatients/elective inpatients/outpatients), there were no significant differences in COVID-19 concern ($F[2, 221]=.10$, $p=.91$), impression of face-to-face teaching ($F[2,216]=.33$, $p=.72$), or telemedicine teaching ($F[2, 210]=1.20$, $p=.30$). However, there were significant differences among these groups in general impression of student teaching ($F[2,221]=3.18$, $p=.04$) with the general impression of student teaching being lower among outpatients compared to emergency (MD=.53, $p=.016$) and elective inpatients (MD=.50, $p=.016$).

Comparisons of Face-to-face and Telemedicine Training

Means were compared for each of the five individual face-to-face and five telemedicine teaching items. This demonstrated a more positive impression toward face-to-face than telemedicine teaching in regard to feeling of bother (MD=.32, $t[208]=3.14$, $p=.002$, small effect size [$d=.22$]), and feeling of reward (MD=.33, $t[209]=4.19$, $p<.001$, a small-to-medium effect size [$d=.29$]). The other items (level of embarrassment, infringement on privacy and uncomfortableness with opting out) were not significantly different.

Influence of Age and Education on Impression of Face-to-face and Telemedicine Training

Relationship of age and education to individual items within the face-to-face and telemedicine teaching measures was examined. For age, there were several correlations that were statistically significant. Older participants compared to younger patients tended to rate face-to-face teaching as more bothersome ($r = .20$, $p = .003$), more embarrassing ($r = .16$, $p = .018$), and more of an infringement on their privacy ($r = .13$, $p = .048$). Older participants compared to younger patients also tended to rate telemedicine teaching as more embarrassing ($r = .15$, $p = .036$) and more of an infringement on their privacy ($r = .17$, $p = .017$). The other items were not significantly correlated with age and education was not significantly correlated with any of the individual items.

Qualitative Analysis

Qualitative analysis revealed four main themes of the patient attitude and experience of face-to-face and telemedicine teaching: (i) the apprenticeship role of the medical student; (ii) communication and practical skills; (iii) transient need for telemedicine in the COVID-19 era; (iv) concerns about privacy.

Apprenticeship role of the medical student

Participants held face-to-face teaching in high regard, and they felt that medical students should take on an apprenticeship role in their training. A number of participants felt that face-to-face teaching was more beneficial to the students, allowing the students to learn from experience, develop a rapport with the patient, increase their knowledge more rapidly and learn about patient behaviour. Patients felt it was important for the students to be on-site when learning in order to observe non-verbal cues and patient behaviour.

I think everyone has to learn from experience.

I feel that healthcare students can observe and learn a lot from face-to-face. In the past, training was not so much about patient interaction, but I feel that more positive interactions

between healthcare workers can give patients peace of mind and build confidence. Healthcare workers can empathize with patients one-to-one.

I would feel more comfortable to be treated by medical contacts who had increased exposure to real life situations.

Communication and practical skills

Patients felt that students would not be able to develop their communication and practical skills as well using telemedicine teaching as they would with face-to-face teaching. Some participants reported they felt that a huge amount of information could be garnered from the patient by observing them in their surroundings and their body language when speaking and responding to questions and thought that with the use of telemedicine this additional information may not be observed. Patients also felt that speaking to a computer screen would not enable the students to develop their communications skills in the same way as face-to-face teaching would thus limiting their training and development.

Face-to-face is always better teaching. A large percentage of communication is body language and non-verbal. Use of screen is somewhat false and "set up" and misses out on surrounding circumstances or conditions.

As a receiver of telephone OPD appointments, I tend to fail to understand how a doctor or medical person can see "the full picture" when dealing with a client over phone e.g., body language, color, attitude, etc.- all important parts of an assessment to me.

Students need the experience of seeing procedures, consultations, etc. Communication skills are vital to good medicine and not taught so the next generation of students needs more not less.

Transient need for telemedicine in the COVID-19 era

Despite the demonstrated preference for face-to-face teaching, patients did accept that there was most certainly a transient need for telemedicine given the COVID-19 pandemic. Some also felt that telemedicine could be used in the future to augment and compliment face-to-face learning. While patients were happy to participate in telemedicine training during the COVID-19 pandemic, they did express a desire to revert to face-to-face consultations post-pandemic, or if this was not possible, to use of telemedicine to augment but not replace face-to-face teaching.

In this time of the pandemic, the combination of telemedicine and face-to-face consultation where safe and appropriate would be very good. Obviously less contact for both student & patient is good at this time.

I acknowledge the relatively "new" need for telemedicine and telemedicine training. I acknowledge it may become the 'norm' in the future. BUT this doesn't necessarily mean the "best" or even "better" form of teaching people skills or training.

I think in the current environment we need to reinvent how we do things including training. I think it is essential to continue training and there are so many tools available like Zoom/Teams/Skype that most people would be familiar with & feel comfortable attending.

Privacy concerns

Patients noted privacy as a concern, particularly with regard to using telemedicine as a teaching modality. Security of the platform used to deliver telemedicine training was of great importance to the participants. Given that they would be sharing confidential and sensitive information they did note concerns about confidentiality being maintained and potential for widespread dissemination of such data online.

I have a slight concern about confidentiality being maintained but that risk is outweighed by the importance of the training.

I would have no problem participating in telemedicine as long as the platform is secure.

Face-to-face has the advantage of being accountable. I like to know who is examining me so I think face-to-face is less embarrassing. I would be more worried about tens or hundreds of people watching me online rather than 5-10 in person.

Discussion

This study demonstrates a positive patient attitude towards participation in medical education. There was a positive correlation between acceptability of teaching in general and both face-to-face and telemedicine teaching styles, however a statistically significant preference for the traditional approach due to differences in feeling of bother and reward. Free text responses suggested that perceptions of the need for in-person interaction for learning, a need for focus on communication / practical skills and concerns regarding privacy may underlie some of the differences in acceptability.

The setting of this work was a university teaching hospital, which may have influenced expectations of student involvement in patient care, however these findings are in accordance with previous studies which demonstrate that individuals are generally willing participants in clinical teaching and feel that students either have no impact on or may improve the quality of care they receive.^{21,22}

Although there was no association between age and acceptability of participating in teaching overall, secondary analyses suggest that older patients have more concerns regarding embarrassment and privacy. Furthermore, face-to-face teaching was deemed more bothersome for older patients which is in contrast to other studies which reported that older patients are generally sympathetic towards students.²³

Similar to previous studies, inpatients had a more positive attitude towards student teaching than outpatients.²⁴ Inpatient studies have shown that the majority of patients are comfortable with being asked to participate, and also show similar altruistic intentions however they may be in pain so an emphasis on consent to participate or withdraw at any time is important.²⁵ Interestingly, in the current study this attitude did not differ between emergency and elective patients, although patients who were acutely unwell or in the early post-operative period were excluded from participation.

The timing of this study during the COVID-19 pandemic is pertinent, not only due to the recent radical shifts in pedagogical approach to medical education, but also due to the risks of non-essential interactions in the healthcare environment. We found no association between COVID-19 concern and acceptability of teaching. There are a number of potential explanations for this finding, it may be due to type I error with failure of our tools to detect a real difference, or it may be due to confounding as the patients sampled from the outpatient department were those who were physically attending the hospital (those with greater concern may have chosen to delay/forgo appointments). However, the authors acknowledge that patient's

perceptions to telemedicine teaching are evolving as the pandemic persists and design of future undergraduate curricula will necessitate an understanding of these insights.

Thematic analysis of free text answers identified that although patients accepted the benefit of telemedicine teaching methods during the COVID-19 pandemic, they did not necessarily support its use as a permanent substitute for face-to-face approaches and that they had concerns regarding privacy and accountability. This is pertinent as educators begin to plan how to deliver education in the post-pandemic environment. It is however conceivable that these opinions may evolve as tele-networking platforms such as Zoom, WhatsApp and FaceTime (which were more widely adopted for social interactions during the pandemic) become a more routine part of daily life.

The authors acknowledge limitations of this study. Firstly, the lack of previous patient engagement with telemedicine teaching. Only 4% reported 'significant experience of telemedicine', it is likely that attitudes may be different in those who have had greater experience with technology. Additionally, as described previously, it is also likely that opinions will change over time with increasing integration of such techniques in daily clinical practice.

Secondly the single centre, narrow scope of the study. The study was limited to patients under the care of the surgical service and attitudes towards eLearning during sensitive consultations (breaking bad news, intimate clinical examinations) were not explored. Indeed, acceptability of teaching within medical specialties has been demonstrated in previous work, and studies have shown that patient satisfaction with medical student participation across various specialties is comparable.^{19,26} It is likely that other patient attributes / experiences (such as technological literacy) may influence acceptability however these were not explored in this study.

Thirdly are the inherent limitations of the questionnaire used. The qualitative analyses are based on two free text questions to explore telemedicine and face to face teaching with regards to the pedagogical theory of Zone of Proximal Development²⁹ and should be viewed as merely a pilot information gathering exercise for further in-depth interview analyses. A final limitation is the entry eligibility of the patient's reading attainment in order to take part in the questionnaire which may introduce selection bias. Indeed, those with literacy issues may have difficulty in using an online platform for the purposes of remote consultation, therefore their views may not be in line with those of our study participants.

Despite these limitations, the authors believe that this work highlights the patient voice during this time of educational transformation. The pedagogical theory of 'connectivism' acknowledges that learning resides in non-human appliances which can provide platforms for

‘collective intelligence’. Instead of viewing digital technology as a competitor to current teaching models, integration of telemedicine teaching of clinical cases encountered in the real world may allow reflection within ‘Education 3.0’, the digitised landscape of learning.²⁸ Although the preferences highlighted are slight, it is clear that though patients accept the necessity of moving towards distance learning for medical students at this time, most continue to see the advantages of ‘real life’ interaction for both students and patients. Further work is needed to expand on this initial study, by qualitatively exploring these themes in detail and expanding the scope to include patients with perspectives from diverse backgrounds. In addition, the students’ perspective should not be forgotten and further studies exploring engagement, effectiveness and utility of these novel adjuncts to learning should be conducted before any lasting decisions about radically altering medical pedagogy are made.

Declarations of Conflicts of Interest:

None declared.

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Acknowledgements:

The authors would like to acknowledge Mark Hoffman for assistance with statistical analysis.

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Supplementary Materials

Supplementary Materials 1 - Questionnaire

This section contains 5 questions about you and why you are in the hospital

How old are you?

18-24 years old

25-34 years old

35-44 years old

45-55 years old

55-64 years old

65-74 years old

75-84 years old

>85 years old

To which gender do you most identify?

Male

Female

Other/prefer not to say

What is the highest level of school you have completed or the highest degree you have received?

Less than leaving certificate/A levels/high school qualification

Leaving certificate/A levels/high school qualification

Some college but no degree

Bachelor's degree

Master's degree

Doctoral degree

What surgical team is responsible for your care today?

Colorectal /General surgery

Breast/General surgery

Bariatric/General surgery

Hepatobiliary/General Surgery

Plastic Surgery

Orthopaedic Surgery

Why are you in hospital today?

I am an emergency inpatient and to the hospital through A&E as an emergency

I am an elective inpatient and came to the hospital for planned surgery

I am an outpatient seeing the doctor for an appointment

This section contains 7 questions about how you feel about training of healthcare students (such as student doctors and nurses) in general

Have you ever come across healthcare students whilst receiving care as a patient in a hospital or GP surgery?

No, not as far as I'm aware

Yes, to a small degree

Yes, to a large degree

Please rate how much you agree or disagree with each of the following statements

I believe that training of healthcare students is important*

In general I am happy to take part in healthcare student training*

Taking part in healthcare student training is bothersome to me*

Taking part in healthcare student training is rewarding for me*

Taking part in healthcare student training is embarrassing to me*

Taking part in healthcare student training infringes on my privacy*

*Answers on 7-point Likert scale: Strongly agree; Agree; Somewhat agree;

Neither agree nor disagree; Somewhat disagree; Disagree; Strongly disagree

This section contains 5 questions about how you feel about COVID and how this has affected your view on teaching healthcare students

Please rate how much you agree or disagree with each of the following statements

I am worried about catching COVID in my day-to-day life*

I think that the more people I meet in the hospital the more likely I am to catch COVID*

I am worried that healthcare students being in the hospital unnecessarily increases my risk of catching COVID*

Since the COVID crisis healthcare student training has become more important to me *

Since the COVID crisis healthcare student training has become less important to me *

*Answers on 7-point Likert scale: Strongly agree; Agree; Somewhat agree;

Neither agree nor disagree; Somewhat disagree; Disagree; Strongly disagree

This section contains 5 questions about how you feel about face-to-face teaching of healthcare students

Examples of face-to-face training include:

Students observing outpatient appointments

Students attending ward rounds

Students talking to patients about their medical history

Students assisting with patient self-care (washing/dressing/moving around)

Students performing simple procedures such as taking of blood pressure measurements

Students observing complex procedures such as operations

Have you ever been involved in face-to-face teaching of healthcare students

No, not as far as I'm aware

Yes, to a small degree

Yes, to a large degree

Please rate how much you agree or disagree with each of the following statements

I would find face-to-face teaching of healthcare students bothersome*

I would find face-to-face teaching of healthcare students embarrassing*

I think face-to-face teaching of healthcare students would infringe on my privacy*

I would feel uncomfortable asking to opt out of face-to-face teaching of healthcare students*

I would find face-to-face teaching of healthcare students rewarding*

*Answers on 7-point Likert scale: Strongly agree; Agree; Somewhat agree;

Neither agree nor disagree; Somewhat disagree; Disagree; Strongly disagree

This section contains 5 questions about how you feel about telemedicine teaching of healthcare students

Examples of telemedicine training include:

Students observing an online/telephone consultation with your doctor

Students speaking to you in a planned online/telephone consultation

Students participating in an interactive teaching session over a secure video platform with you and a doctor

Students observing an operation over a secure video platform

Have you ever been involved in telemedicine teaching of healthcare students

No, not as far as I'm aware

Yes, to a small degree

Yes, to a large degree

Please rate how much you agree or disagree with each of the following statements

I would find telemedicine teaching of healthcare students bothersome*

I would find telemedicine teaching of healthcare students embarrassing*

I think telemedicine teaching of healthcare students would infringe on my privacy*

I would feel uncomfortable asking to opt out of telemedicine teaching of healthcare students

*

I would find telemedicine teaching of healthcare students rewarding*

*Answers on 7-point Likert scale: Strongly agree; Agree; Somewhat agree;

Neither agree nor disagree; Somewhat disagree; Disagree; Strongly disagree

Please use this area to share any positive or negative thoughts about face-to-face teaching of healthcare students that we did not cover in the questions above.

Please use this area to share any positive or negative thoughts about telemedicine teaching of healthcare students that we did not cover in the questions above.

Supplementary Materials 2 - Measures

COVID-19 Concern. Participants responded to the statements “I am worried about catching COVID in my day-to-day life” and “I think that the more people I meet in the hospital the more likely I am to catch COVID”. Responses were averaged, with higher scores indicating greater concern. This measure’s internal reliability ($\alpha = .66$) is just below the recommended internal reliability of .70 or higher.

General Impression of Student Training. Participants indicated their impression of healthcare student training with six items (e.g., “I believe that training of healthcare students is important”). Higher scores indicate a more positive impression. This measure has acceptable internal reliability ($\alpha = .73$).

Impression of Face-to-Face Training. Participants indicated their impression of telemedicine student training with five items (e.g., “I would find face-to-face teaching of healthcare students bothersome”, reverse-coded). Higher scores indicate a more positive impression. This measure has good internal reliability ($\alpha = .81$).

Impression of Telemedicine Training. Participants indicated their impression of telemedicine student training with five items (e.g., “I would find face-to-face teaching of healthcare students bothersome”, reverse-coded). Higher scores indicate a more positive impression. These items mirrored the wording from the impression of face-to-face training measure to allow for direct comparisons between face-to-face and telemedicine training. This measure also had good internal reliability ($\alpha = .81$).

Supplementary Materials 3 – Table of correlations among demographics, COVID-19 concern and impressions of teaching methods

	1.	2.	3.	4.	5.	6.
1. Age	1					
2. Education	-0.12	1				
3. COVID-19 Concern	0.11	-0.16	1			
4. General Impression of Student Teaching	-0.13	0.01	-0.16	1		
5. Impression of Face-to-Face Teaching	-0.15	0.08	-0.16	0.66***	1	
6. Impression of Telemedicine Teaching	-0.04	-0.15	-0.1	0.58***	0.67***	1
Mean	3.97	2.79	5.15	5.88	5.38	5.33
Standard Deviation	1.93	1.45	1.21	0.96	1.21	1.18

*** $p < .001$

Note. Pairwise deletion was used for missing data. Therefore, n's range from 68 to 75