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RESEARCH PAPER

Impact of Covid 19 in medical education

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Background and aims: Covid 19 has created havoc in the world. Its impact has been seen in every sphere of life including education. Medical education is also effected as a result of this pandemic. This study is aimed to find out impact of this pandemic in medical education and possible effects of changes in medical education. **Materials and methods:** The study was conducted in Gauhati Medical College, Guwahati in May, 2020. A questionnaire was prepared to collect data from faculties, residents and undergraduate students. It included questions relating to impact, use of technology, online teaching, face to face teaching, learning environment, self directed learning, communication and social skills, evaluation and future of medical education. A five point Likert Scale was used to record their responses. **Results:** Seventy five subjects responded (31 faculties, 44 students, 35 females, 40 males). 74(98.7%) agreed that medical education is hampered. All (100%) agreed adaption to technologies. Sixty respondents (80%) found online teaching helpful. 71 respondents (94.7%) found limitations in online teaching. 55 respondents (73.3%) found online didactic lecture helpful. 90.1% found found online tutorial useful. 65(86.7%) believe small group discussion in virtual setting. 71(94.7%) respondents believe on face to face teaching. 68 (90.7%) agreed upon asynchronous learning. 66(88%) suggested small group discussion maintaining social distance. 62(82.7%) advocated clinical skill training with PPE. All (100%) agreed learning in safe environments. Fifty-three respondents (70.7%) want deferral of bedside clinical skill training. 64 (85.3%) respondents favored deferring clinical posting. 56(74.7%) favored clinical skills training in modules, simulation or videos. 58(77.3%) agreed upon self directed learning. 67(89.3%) opined that communication skills can be taught by maintaining social distance. Ninety percent (68 respondents) believe it will be difficult to teach social skills like empathy, attitude etc. during pandemic. 97.3% agreed that students should be trained for educating society. 98.7% were in favor of evaluation of changes made. Sixty six (88%) opined on going back to earlier method. All respondents support combining virtual method with conventional teaching after pandemic. **Conclusion:** Covid-19 pandemic has forced us to review all aspects of medical education in terms of their feasibility and effectiveness. It is high time to deeply think about training of the future doctors. Some changes in methodology are necessary in current scenario. Help of online education and use of technology is the need of the hour.

Keywords: Medical education; Covid-19; impact; Likert scale.

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INTRODUCTION

The ongoing Covid-19 pandemic has become a health threat for all. It has affected every sphere of our personal and professional life.¹ There has been extensive effect on medical education. Medical education methodology is known because of its uniqueness. The medical pedagogy comprises of training in knowledge, skill, attitude, behavior and communication. Some part of the training require contact with patients. In absence of patients it is difficult to train students in these areas. In many disasters like fire, bomb blast, earthquakes, flood etc. medical education continued in spite of possible dangers. But current pandemic situation is different. During this time both educators and learners may contact the virus or spread the virus unknowingly because of its high contagious nature.²

Social distancing is now a norm, So the other forms of teaching learning process where no direct patient involvement required are also hampered.^{1,2} In such a situation medical education needs a rapid change from conventional methods of teaching to other forms of teaching.²⁻⁴ At this point of transformation teachers and students are of opinion that medical education must be continued in greater interest of the society. How effectively it can be done by using different methodologies in this time of pandemic is a great question. Till now no study is available on this subject in this region. This study aims at finding out role of different methodologies to impart medical education in terms of knowledge, skill, attitude, behavior and communication in current pandemic situation.

MATERIAL AND METHODS

The study was conducted in Gauhati Medical College and hospital, Guwahati between 1st May, 2020 to 15th May, 2020. A questionnaire was prepared on different aspects of feasible teaching methods in this time of pandemic to collect data from faculties and students. The questions were on impact of pandemic in medical education, adaption to technology, online teaching, conventional face to face teaching, teaching environment, self directed learning, attitude and communication skill training, evaluation and future of medical education. A five point 'Likert Scale' was used to record their responses as Strongly disagree-1, Disagree-2, Neither agree nor disagree-3, Agree-4 and Strongly agree-5.5. Knowledge can be delivered by didactic lecture, small group discussion and tutorials. Skill training requires physical examination, observing or assisting procedures. Attitude and communication training are taught at bedside. Faculties and postgraduate students and interns who are working in the hospital in this time of pandemic are randomly selected in their duty hours and questionnaires were distributed and requested them to fill them up in their own suitable time during. They were collected later on without having the responder's name or any identification sign in it. Statistical analysis of the findings were done.

A literature search done in pubmed, medline and google to find out relevant literature. Findings were discussed in the light of these literatures and a conclusion is made.

RESULTS

Seventy five subjects responded to the questionnaire out of which 31 were faculties and 44 were students (both postgraduates and undergraduates). Thirty five were females and forty were males. Seventy four (98.7%) respondents agreed that medical education is hampered by Covid 19 pandemic. Sixty eight (90.6%) fully agreed and sixteen (21.3 %) agreed upon it. All respondents (100%) agreed that our medical program should now adapt to new technologies. Sixty respondents (80%) found online teaching helpful. At the same time 71 respondents (94.7%) found that online teaching has limitations. Fifty five respondents (73.3%) found online didactic lecture helpful and 90.1% found (68 respondents) that online tutorial is useful. Sixty five respondents (86.7%) believe that small group discussion is possible in virtual setting. Seventy one (94.7 %) respondents agreed that face to face training is important in medical education. Sixty eight respondents (90.7%) agreed that asynchronous learning is important in this time of epidemic. Sixty six (88%) suggested small group discussion maintaining social distance. Sixty two (82.7%) advocated physical examination skill training with proper PPE. All respondents (100%) agreed that learning should be always provided in safe environments. 53 respondents (70.7%) want deferral of bedside clinical skill training. 64 (85.3%) respondents favored deferring clinical posting. Sixty four (85.3%) respondents are in favor of deferring clinical posting to a period when normalcy returns. Fifty six (74.7%) respondents are of opinion that clinical skills training should be in modules, through simulation or interactive videos. Fifty eight (77.3%) respondents agreed that self directed learning will be very helpful in this time. Sixty seven respondents (89.3%) are of opinion that communication skills can be taught by maintaining social distance. Ninety percent (68 respondents) believe that it will be difficult to teach social skills of empathy, attitude etc. during this time of pandemic. Most of responders (73 respondents, 97.3%) agree that students should be trained for educating society. There is a strong opinion (74 respondents, 98.7%) in favor of evaluation of the changes from time to time. Sixty six (88%) respondents believe that once the epidemic is over the medical education should go back to earlier method of teaching. All respondents (100%) support an idea of combining virtual method with conventional teaching even when the pandemic is over.

DISCUSSION

During pubmed, medline and keyword search in google no relevant research during the pandemic period was found. However, keywords search in google showed few articles relevant with the issues related to medical education in Covid 19 pandemic. Few scientific articles were also collected from pre-Covid period pertinent to some issues of the study.

At this time of transition students and educators should analyze effects of current changes and document it. Suzanne Rose says that it will help in learning of new principles which can be applicable in future settings.

There is gross disruption in medical education and training during this pandemic.⁴ It has badly affected residency and fellowship training.⁶ Medical educators are engaged in controlling the pandemic and it has reduced their teaching time.⁴ Face to face academic activities are stopped for ensuring

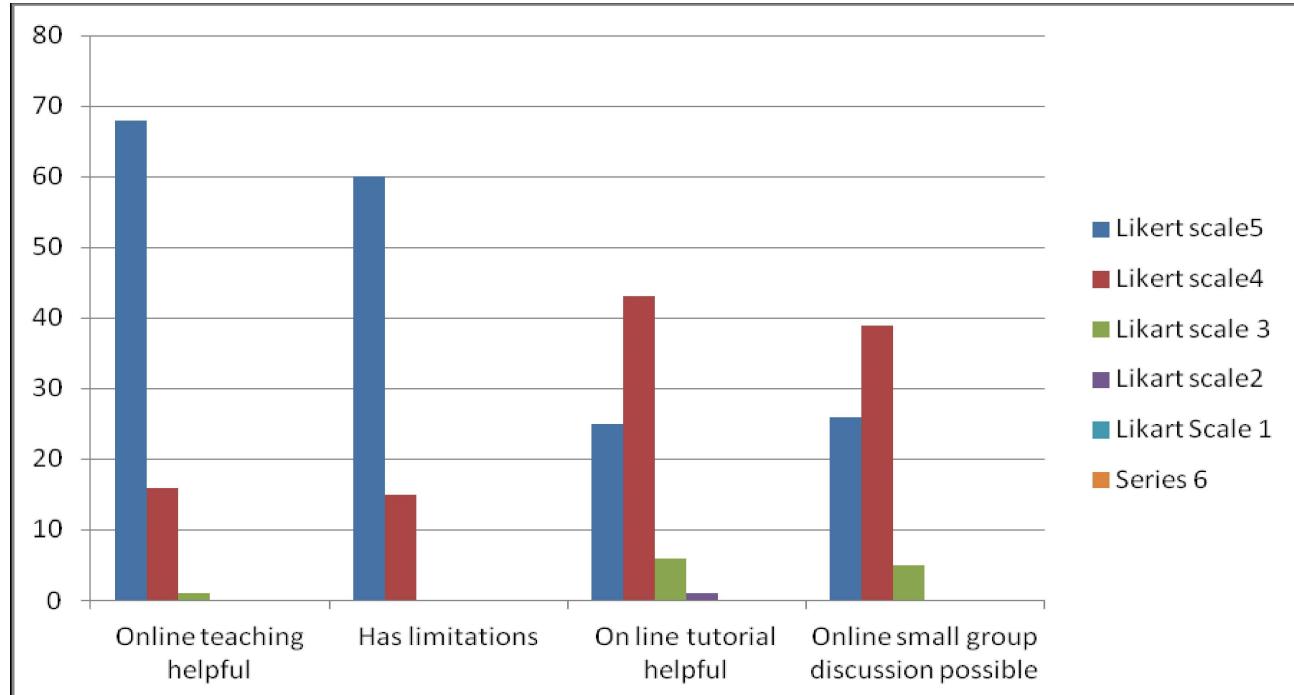


Figure 1 Response on online teaching (Y axis: Number of respondents)

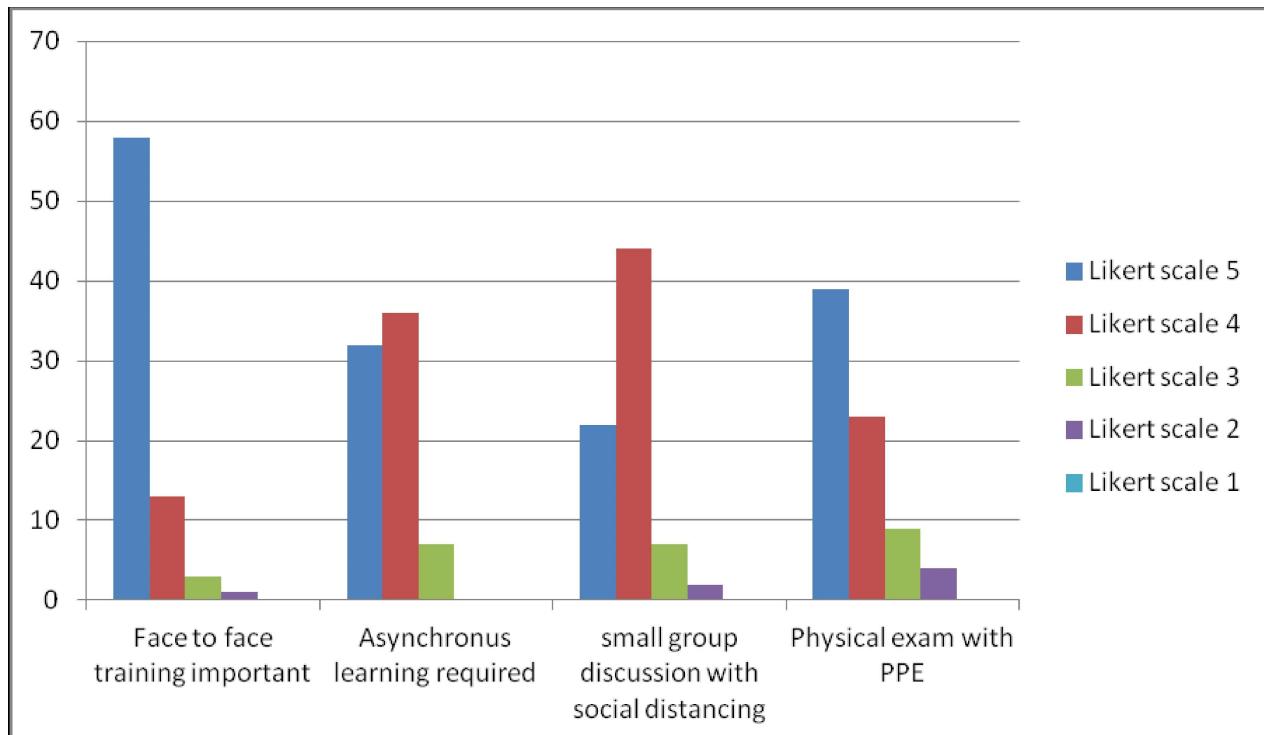


Figure 2 Face to face teaching (Y axis: Number of respondents)

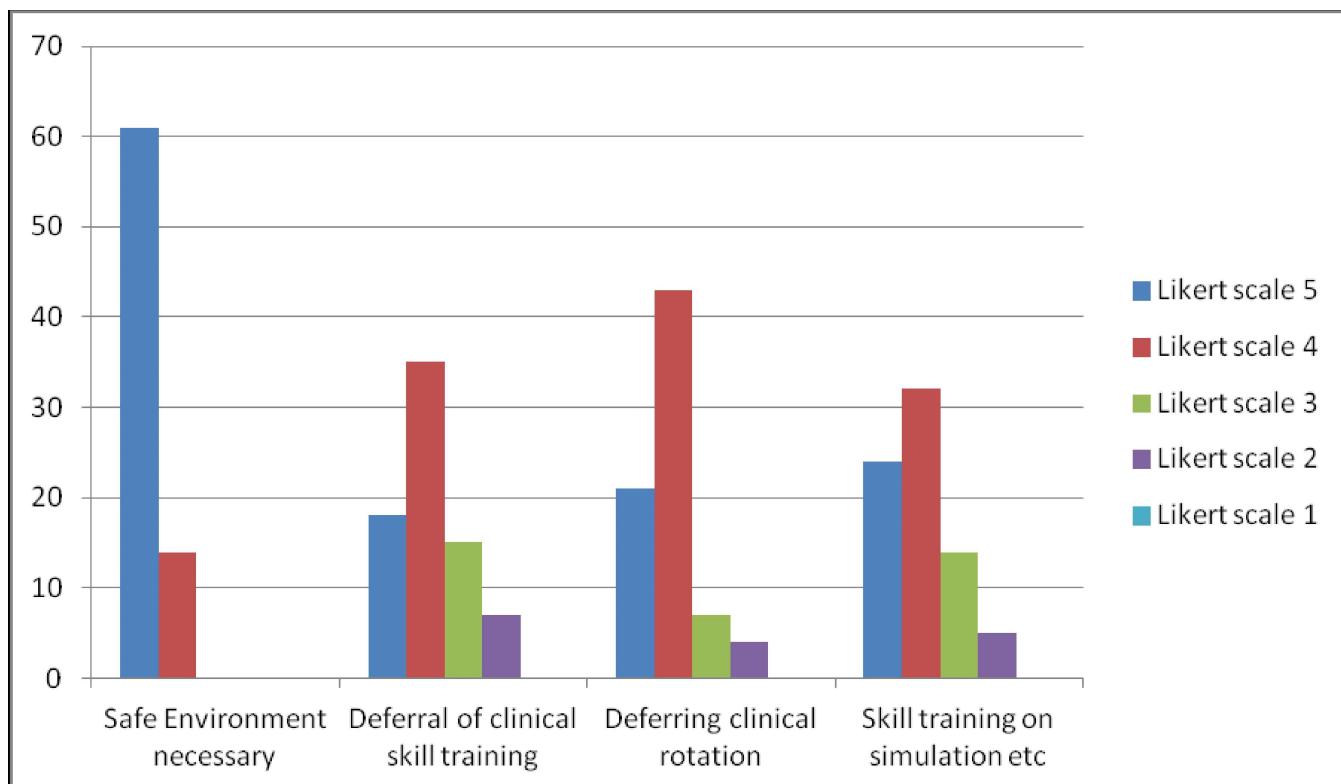


Figure 3 Learning environment (Y axis: Number of respondents)

social distancing. Online teaching is encouraged.⁴ All conferences, symposia, workshops, clinical attachment and visiting fellowship programs are cancelled.⁴ As a result the academic atmosphere is affected.⁶ Our region is also no exception to it. Sixty eight (90.6%) respondents fully agree and sixteen respondents (21.3%) agree that there is impact of Covid-19 in medical education. Disease control and patient care has become priority in this time of pandemic. Nicholas C Bambakidis et al.⁷ wrote in an editorial that a balance between patient care and education priorities is needed at this time of pandemic.

Carnegie Foundation for the Advancement of Teaching reported a decade back that medical schools were working on transforming medical pedagogy by using technology to eliminate or reduce lectures.^{8,9} However this transformation was very slow in many medical schools in India. Its importance is felt during this period of pandemic and medical educators and learners are putting emphasis on it. In this Covid-19 era there is a technological need for academic endeavors.⁶ In this study all respondents agreed that technology should be incorporated in medical education. Eighty percent of our respondents fully agreed and twenty percent agreed to it. In streamed online lectures, technologies for screen capture and online dissemination are in use.⁴ Other used technologies like Zoom (Zoom Video Communications, San Jose, California) and Slack (Slack Technologies, San Francisco, California)

need some improvement.⁶ Emerging technologies like artificial intelligence for adaptive learning and virtual reality are likely to be an integral components for future medical education.⁴ It is suggested that we should springboard on advances that are made during this period for improving our medical education.³

Online training has become relevant in this time of pandemic.⁶ The advantage of online teaching is that it can be continued by maintaining social distance.^{3,4,6} Online teaching includes learning from websites, online discussions forums, spaces, chat and different apps.⁴ Virtual cases can be made available in online teaching.² Different online tools and platforms can be used for formative and summative assessments of students for core knowledge.⁴

Sixty respondents (80%) in the study found online teaching helpful. One advantage of this learning is that resources can be easily accessed from mobile devices.⁴

Didactic lecture is an important way of providing core knowledge to the students. In this study fifty five respondents (73.3%) found online didactic lecture helpful. Torda AJ et al. observed that students found online learning activities highly satisfying.³

Online tutorials are useful in current situation.⁴ in this study 68 respondents (90.1%) found online tutorial useful. Suzanne says that if students are in telehealth environment, they can

learn critical situations.²

Small group discussion is an important method of learning in medical education. Many medical schools, professional bodies and education providers have developed modules and courses on line.⁴ In this study sixty five respondents (86.7%) believe that small group discussion is possible in virtual setting. To make it possible faculties should be trained in technology.⁴ Many small group discussions and tutorials are now replaced by interactive webinars.⁴

Online learning has many limitations too.³ Seventy one respondents (94.7%) in the study agreed that online teaching has limitations. Actual feel of clinical experience is not possible in online learning.⁴ Training in clinical skills, clinical encounters, interpersonal and inter professional communications is very essential in medical education.⁴ It is more challenging where procedure based learning like in surgical specialties is essential for training.¹ Without a patient this is a major challenge for medical educators at present.⁴ Few technologies like videos, podcasts, simple virtual reality, computer simulations and serious games can be used at present to fill this vacuum.⁴ There is also a possibility of troubleshooting technical problems disrupting online learning.⁶ Other hurdles for online teaching are faculty's unwillingness to embrace technology, costs (many technologies are often costly) and expertise.^{4,6} Many open free educational resources (OER) are available online. Educators and learners can use them.⁴

In spite of availability of medical education resources on line, learning by dealing with patients is best method of learning. Many believe that online teaching and learning is now a compulsion created by Covid-19. In this study seventy one (94.7%) respondents agreed that face to face training is important. Learners opined in a study that they learned skills of history taking,⁷ physical examination and clinical reasoning during bedside teaching where presence of a patient was mandatory¹⁰ Learning in form of role modeling is possible only in actual setting.²

Face to face learning experiences are not possible in virtual format.¹

Asynchronous learning ("anytime/anywhere") is part of teaching in residency programmes. Many educators are using this method.² During this pandemic it is useful. In this study Sixty eight respondents (90.7%) agreed that asynchronous learning is important.

Small group interactions with social distancing is an idea which may be useful during the epidemic. In this study sixty eight respondents (90.7%) agreed that asynchronous learning is important.

Physical examination of a patient is a very important part of medical education. In a study done by K Ahmed et al ninety nine percent of students opined that they learned the skill at bedside on a patient.¹¹ It is difficult to say how much benefit

a student will get by doing examination of a patient with PPE. Theoretically it is possible. But, actual feel of palpation by bare hands will not be there in an examination with PPE. Auscultation will be a technically difficult to teach and other physical examinations will be very cumbersome to do with PPE. There is risk of transmission of virus too. Moreover shortage of PPE is a worldwide phenomenon. Whether PPEs are to be used for education rather than for treatment is also a matter of debate. Medical students were barred from entering into operation theatre to preserve PPE in University of Washington from March 6, 2020.¹ Training medical students in use of PPE was advocated in SARS (severe acute respiratory syndrome) pandemic in Singapore in 2003.¹

An educator or a learner may contact the virus in course of training.² It is a challenge to create a safe environment in interest of patients, educators and learners.² All respondents in our study agreed on creating a safe environment. The Association of American Medical Colleges (AAMC) recommended that medical students should not come into contact with the patients during this epidemic.^{2,7}

If it is to happen, clinical skill training should be deferred. In this study 53 respondents (70.7%) wanted deferral of bedside clinical skill training. Suzanne pointed out one option where clinical didactic lessons would be started online earlier and clinical skill training later when it is conducive.²

Skills can be trained in other ways. Fifty six (74.7%) respondents in this study opined that clinical skills training should be given in modules, through simulation or interactive videos.

An opinion based study done in UK, shows that clinical simulation is a good tool for learning clinical skills.¹²

Clinical rotation were deferred in Hong Kong in the SARS pandemic in 2003. It was deferred until new cases ceased.⁷ It was done to protect students from contacting the virus and also to preserve PPE.⁷ In this study 64(85.3%) respondents favored deferring of clinical posting. Suzanne Rose suggested modifying the academic calendar in such a way that initially scholarly knowledge on authentic patient experiences should be shared. Clinical rotations should be deferred.² Problem may arise later⁸ because of two cohort classes of students (one with deferred rotation and another with normal rotation) in clinics causing density of learners at one point of time.²

Self directed learning is an active form of learning. Under guidance of the educator a learner can engage himself in learning. Fifty eight (77.3%) respondents in this study agree that self directed learning is helpful in present situation. Self-directed learning can promote individual and inter professional education.^{8,9}

Training in interpersonal and communication skill is a part of medical education. Enough evidences are there to show that these skills play a significant role in patient care.¹³⁻¹⁶ Students consider bedside teaching with a patient is very essential for

learning communication.¹⁷ Sixty seven respondents (89.3%) in this study believe that this skill can be taught to students maintaining social distance with the patients.

Educators and learners are showing their empathy and altruism in different ways by caring patients, taking part in educating society and helping people in distress.

Altruism is learnt only in actual patients.² The humanistic approach to a patient is learnt at bedside during communication and it is a great tool for building trust between the patient and the clinician. The humanistic aspects of medicine cannot be taught in a classroom.^{18,19} Ninety percent of respondents in this study believe that it will be difficult to teach social skills like empathy, attitude etc. during the pandemic.

The traditional way of showing empathy, altruism and other human compassionate behaviors must be redefined in this epidemic. As the disease is highly contagious any potential actions done in good intention with present culture of professionalism may cause harm. The situation is becoming more difficult because of limited availability of Covid 19 testings and PPE kits.²

Educators and learners are showing their empathy and altruism in different ways by caring patients, taking part in educating society and helping people in distress.² Suzanne Rose says that students can act as educators to their peers, patients, and communities in this pandemic. They can use social media and other available modalities to educate people in changing behaviors in the community in controlling the pandemic.² Seventy three (97.3%) respondents in this study agree that students should be trained in educating society.²

Any changes done in methods of training need subsequent evaluation.² In this study seventy four respondents (98.7%) are in favor of evaluation of the changing methods from time to time.

It is a common notion that one should learn from experiences and evaluation will help.²

Suzanne Rose suggests research publications for knowledge dissemination.² It is essential to analyse medical education in present scenario for making decisions about medical education in future.⁴

It is very uncertain to say that how long Covid-19 will prevail.² There is a possibility that people will have to live in a new normal environment where the virus will exist and use of mask, social distancing, quarantine and other anti covid measures will remain. In such a situation there will be a major change in future training of medical students.²

There is least possibility that medical education will return to previous approach once the epidemic is over. Technology will be used in teaching and learning in future.⁴ This transformation will depend on outlook of concerned individuals and societies.⁴ Both online and face to face teaching will fulfill expectation of the learners.^{3,6,9}

In this study sixty six (88%) respondents believe that once the epidemic is over the medical education will go back to earlier method of teaching. But, all respondents (100%) support an idea of combining virtual method with conventional teaching even when the pandemic is over. The conversion will depend on the need of expanding clinical workforce in near future. Other factors like availability of educators, number of educators and economic status will also play a great role.⁴

The co relational research guidelines published by Capilano University says that there should be at least 30 or more participants in such type of studies.²⁰ This study comprises of seventy five respondents and it can briefly reflect opinions of the educators and students on medical education during and after the pandemic.

The results of this study will help policy makers, medical administrators, educators and learners to decide their future course of actions. This study was done in one tertiary care teaching institute. So the findings may not be universally applicable to all medical institutes. A large multicentre study with larger sample size and more questions in questionnaire will be more informative and useful.

CONCLUSION

Covid 19 pandemic has forced us to review all aspects of medical education in terms of their feasibility and effectiveness. It is high time to deeply think about training of the future doctors. Some changes in methodology is necessary in current scenario. Help of online education and use of technology is the need of the hour. It is time to facilitate all forms of teaching methodology in a new situation of the Covid 19 epidemic and thereafter.

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Ethics Statement: This based is based on personal opinions and does not need Ethics Approval.

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