TRANSFORMATION IN THE MEDICAL EDUCATION SYSTEM DURING AND POST COVID-19

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Abstract

The medical education system in India was anticipated to undergo a paradigm shift from a traditional teacher centric model to a competency based or learner centric one focussed on skill acquisition as recommended and implemented by various global graduate medical education systems in other countries in the year 2019.This coincided with the COVID-19 pandemic which made it necessary to impose lockdown in order to follow social distancing and curb down the spread of the disease. This led to shifting of education to an online mode predominantly. We reviewed various research studies from around the world to gather data on perception of students and faculty in medical colleges towards this online or distance education. There are various advantages of online education like flexibility, allowing learners to revisit topics, availability of repository of information etc and posing minimal risk to students in the pandemic which are worth appreciating, however the students and faculty realise that for learning medicine interaction with patients is inevitable. This issue can be addressed through simulation to a certain extent but it definitely doesn't give the confidence to students to face the real world. After the relaxation in pandemic restrictions, now that the students have resumed offline classes, we as educators must think and learn from our experiences to design our teaching methodology in such a way that it reaps maximum benefits of both online and offline education.

Keywords: *Pandemic, Skill Qcquistion, Online Education,*

Introduction

The medical education system in India was anticipated to undergo a paradigm shift from a traditional teacher centric model to a competency based or learner centric one focussed on skill acquisition as recommended and implemented by various global graduate medical education systems in other countries in the year 2019.The competency based medical education proposed and made mandatory by the governing body NMC favours skill development and lays emphasis on training professionals in such a way that the Indian medical graduate (IMG) is a physician of first contact who is globally competent as well as relevant to the community. However, as some parts of the world started facing surge in cases of the SARS COVID-19 which then attained pandemic proportions, India too implemented lockdown in March 2020 in order to contain spread.

This coincided with the implementation of Competency based medical education which was planned to commence in the year 2019. The medical education system throughout the country had two challenges in front of it- first the implementation of a completely new system of training medical undergraduates and second, to do this in a way which did not jeopardize the safety of students with regard to spread of COVID -19. In addition to all this there was a constant pressure on the healthcare professionals of attending and treating patients with COVID-19. Final year students at many institutes were being roped in to do duties in COVID-19 wards as many doctors on duty were getting infected leading to acute shortage of attending doctors. Many institutes in the country were being directed by the government to be fully dedicated to COVID-19 which made the situation of undergraduate training markedly compromised in this global crisis. COVID-19 had become the topmost priority of the healthcare system and this caused disruption of general patient care, hindrance to research activities and a deleterious effect on medical education and training.

The medical undergraduates are set apart from other professional college students due to the fact that during the most important aspects of medical training – bedside clinics, OPD visits and patient interaction ,they face risk of contracting infection, causing spread and this makes continuing training in clinics and wards challenging.

The competency based medical education heavily involves immersion in patient care from an early stage in the undergraduate training with supervision and assessment inculcated alongside. The undergraduates advance from one phase to the other only after they complete the prescribed duration of training with evidence of attainment of prescribed skills in the absence of any significant shortcomings laid down by the National medical council.

However, with the surge in COVID-19 cases throughout the country social distancing was enforced leading to cancellation of routine ward rounds or Outpatient clinics, elective surgeries which used to form the majority of clinical teaching earlier. This led to dramatic reduction in overall case load and clinical exposure, hence reducing the learning opportunities for trainees in many subjects. The added case volume only consisted of confirmed or suspected COVID-19 individuals, for which there was deployment of residents and trainees from across other specialities to COVID wards leading to further compromise in the resources available for training of medical undergraduates.

This forced the stakeholders of various medical teaching institutions, including faculty to rethink, reinvent and reform the implementation of CBME which got constrained due to the restrictions imposed in the pandemic.

The importance of acquiring skills along with knowledge cannot be emphasized enough throughout the medical undergraduate training. Learning about health and disease needs interaction with patients to understand the nuances of history taking, physical examinationand cannot be acquired solely from books and literature. The lockdown made the students and teachers in medicine explore feasible alternatives of teaching/ learning, which included online learning to a great extent.

The utilization of online resources in medical institutions during pre COVID era was very limited which made awareness and knowledge about them restricted, however the pandemic forced all organizations, students and faculty to adapt to online as the predominant mode of teaching/learning. The concept of distant learning through various online platforms became a necessity and way of life for professional courses throughout the country but medical schools were the least equipped for it when the pandemic hit as technology, expertise and infrastructure were lacking. Resources were often diverted towards patient care rather than teaching/learning in pre COVID era.

As community spread of COVID-19 increased in the country all students returned to their hometowns. The organizations activated the means to resume training through online platforms and all necessary arrangements were made for the 'new normal'.The initial weeks had their share of teething problems considering faculty and some students were ill equipped but slowly things started getting streamlined and further planning for conduction of assessments and further training pertaining to clinical exposure was designed.

The types of online learning adopted by various institutes throughout the world were different and was in accordance with their resources and situation in terms of pandemic restrictions and COVID case numbers. The most widely accepted nomenclature of types of online learning was :

Conventional/face- face- same time same place.
Synchronous learning- same time different place.
Asynchronous learning- different time different place.
Blended learning- part combinations.

As has been experienced by all medical professionals undergoing and imparting training, online education has its share of advantages, challenges faced and disadvantages in undergraduate medical training.

Objectives

1. To review the studies published regarding experiences in medical education during COVID from various medical institutes around the world.
2. To discuss the advantages, disadvantages and challenges faced during implementation of online learning during COVID.

Review of literature- experiences from around the world

There have been a considerable number of researchers studying the change medical education has undergone due to the unprecedented disruption courtesy the COVID pandemic, in India as well as worldwide. We present herewith a brief review of the findings from these studies which have been conducted in diverse economic, social and geographical settings.

Gupta et al conducted a cross sectional survey amongst students and faculty across medical institutions in Delhi NCR region using an online google form questionnaire shared via social media. The questionnaire consisted of questions pertaining to various aspects of online learning, effect of lockdown on medical education, factors facilitating and hindering online classes etc. According to 85.4% students, medical education was severely affected during lockdown, and 88.3% students found online classes to be useful in facilitating education during this time. Opportunity to interact with educator during online sessions was sufficient according to 43.5% students only. A duration between thirty minutes to one hour was the most preferable for most (75.4%) students.43% students did not prefer online teaching and 54.4% students wanted online classes to continue in addition to offline classroom teaching. 65% of the faculty also felt that online classes should be included as a routinealong with classroomteaching. Almost similar proportion of faculty members thought that a 70:30 distribution of traditional and online classes would be beneficial and only 43.5% faculty recommended use of online platforms for internal assessments. Amongst the factors facilitating online learning students preferred the option of viewing the class resources later offline the most and poor connectivity was the frequently encounteredhindrance. The students identified lack of clinical skills exposure and peer learning as the disadvantage in online classes.

Jindal et al assessed impact of COVID-19 Lockdown on clinical training for Indian Medical students through cross sectional online survey obtained from 1000 students including prefinal and final year students of 191 medical colleges across the country. Most of the students (81.6%) were of the opinion that clinical training was better before COVID-19. They also observed that proportion of private medical colleges shifting to online clinical training during COVID-19 lockdown was significantly more than in government medical colleges. The students perceived some advantages of online clinical training as being more convenient, availability of time for self-study, availability of various audio-visual resources. The disadvantages highlighted by students were lack of interaction with patients, difficulty in simulating real clinical scenarios and more focus on theoretical knowledge.

Viswanathan et al studied the impact and perception of distant online learning on the educational environment COVID-19 using a cross sectional prevalidated DREEM

questionnaire from 465 students in 1st, 2nd and prefinal year from a medical college located in a rural area. Most (86.7%) of students used smartphone for attending lectures,63.4% faced internet connectivity issues,71% of students found Google classroom to be a useful repository for class material

Goyal et al studied student's perspective of online medical education in India during COVID-19 pandemic, where 1125 students from 52 medical colleges responded. 85% of students already had device for online classes. Non-urban students were more affected by network interruptions. 85% students complained of eye problems while 71% complained of postural issues. 77% of students did not have practical training, with problem increasing in higher professional years. Interaction with teachers and classmates was another area of concern highlighted by most of the students.

A study on effect of the pandemic on medical education was conducted by Alsoufi et al in which responses on a cross sectional survey included participants from 13 medical schools in Libya. A civil war and financial crisis in the country also affected the infrastructure apart from the pandemic. Thesurvey also included mental health assessment. Out of 3348 completed questionnaires, most (64.7%) of the respondents disagreed that e- learning could be easily implemented in Libya, and only 21% agreed that it could be used for clinical aspects.56.3% felt that interactive discussions were achievable by means of e- learning although 75.5 % felt that they had a poor understanding about e-learning. Approximately 31.3% respondents exhibited the Patient health questionnaire (PHQ-2) cut off score with high likelihood of depressive symptoms and 10.5% reported anxiety symptoms based on General Anxiety disorder assessment (GAD-7).

Another study conducted in Egypt by Mortagy et al assessed medical students' perception and usage of online learning through a 29-item online survey form circulated amongst participants from 26 medical schools. Ut of 4935 participants 87% were from public medical schools. Questions addressing the experiences of online teaching were based on the Dundee Ready Education Environment Measure (DREEM) in addition to some questions regarding anxiety amongst students. More than half of the students (63%) agreed that online recorded video tutorials through YouTube are the most effective aspect of online medical education. However, only 25% admitted that live tutorials through Zoom are most effective.31% students reported medium anxiety levels in the current scenario.

According to a survey study on preclinical remote undergraduate medical education in COVID-19 at University of CaliforniaSan Diego by Shahrvini et al the majority (>60%) students out of 104 respondents felt that of students felt remote learning had somewhat or very negatively affected their ability to participate in all other curricular

components.Almost two thirds (64.1%) of students preferred having the flexibility of learning material at their own pace rather than having required modules and set due dates.Over half (17/30, 56.7%) of second year students felt that their preparation for the United States Medical Licensing Examination (USMLE) Step 1 examination was negatively affected.

Gismalla et al studied medical students' perception towards E-learning during COVID 19 pandemic in a high burden developing country of Sudan, where they gathered information from 358 students and 50 faculty.The study used self-administered online questionnaire which was disseminated via various social media platforms. The level of medical students (Pre-clerkship and Clerkship) and place of residence had significant correlation with medical students opinion regards starting the E-learning. Majority of students were of the opinion that closure of medical school was necessary and E learning was the best way to continue their education. Some problems they felt were regarding Internet bandwidth and connectivity limitation, unfamiliarity with E-learning system, they were concerned about technical support and time flexibility in case of technical problems during online exams.

Dost et investigated perceptions of medical students on the role of online teaching in facilitating medical education during the COVID-19 pandemic through a nationwide survey across medical schools in UK which gathered data from 2721 students from across 39 medical schools. The most widely perceived benefit of online teaching platforms was the provision of flexibility. Whereas the frequently perceived inhibitors to using online learning platforms included family distraction (26.76%) and poor internet connection (21.53%).

Signoret et al studied perceptions of medical education by learners and teachers during COVID-19 pandemic in France through an anonymous cross sectional surveyon online teaching. There were total 172 respondents including 146 learners and 26 teachers .Learners included 5th year medical students , paediatric residents and fellows. Attendance was significantly greater for live classes than for asynchronous presentations. Majority of learners (58.6%) and teachers (69.2%) feel they have not received or provided a theoretical training of an equivalent level and quality as expected. The residents and fellows mentioned a gain of time, and all learners liked having the option to play back the lectures as major advantages perceived by them. Teachers also agreed on these and additionally conveyed improved quality of lessons because of the need to specifically adapt the course to online teaching.

Ramachandran et al carried out a cross sectional descriptive questionnaire based study with 122 first year medical students as the respondents. Nearly 87% of the participants feel that a regular PowerPoint method of teaching with audio or video

would be preferred. Only 9% preferred face to face lectures in online mode. The most significant challenge faced by the students was the problems associated with internet connectivity. Lack of co-curricular activities, inability to meet and interact with friends and difficulty to concentrate and keep focussed on online sessions were the next challenges faced.

Implications- Key Takeways

The COVID-19 pandemic has proved to not only be a disruption but also a catalyst for a long overdue change in medical education that was being discussed and planned at the side-lines for a while. Unprecedented events occurred throughout the world and called for unprecedented and innovative measures to tackle the situation in each and every field and education was no different. Educators across the country acknowledged that the physician workforce required for the 21st century must embrace the roles of an Indian Medical Graduate which are a clinician, leader and member of health care team, communicator, lifelong learner and a professional. It cannot be more relevant than in the situation of the pandemic which the world encountered. Across the country medical schools have embarked on curricular redesign to ensure that the physician workforce being trained is the workforce needed

The NMC document on CBME states that the Indian Medical Graduate should be able to address the community and their relevant public health issues; design and constantly improve health systems; incorporate data and technology to improve patient care, research, and education and ensure equitable distribution.

Steps needed to be taken steadily in this direction and online platforms and mode of education played a pivotal role in this situation. We all as educators can hardly think of any other way in which the continuity could be maintained for courses in our professional institutes. There are large number of platforms available now which were utilised during the pandemic not only for classes but also for conducting scientific meetings, CME, Webinars at numerous occasions for e.g. Microsoft teams, Zoom meetings, Webex meetings, google hangout etc. The advantages of shifting our instruction to an online mode were tremendous but the experience of doing that had its share of challenges for which many of us devised means to circumvent or minimize it. It also has certain inherent problems which students and faculty perceived as we have observed from the studies above. Key messages from these studies have been summarized below:

Advantages of online teaching- learning during covid-19 in medical education:

1. It occurs in real time for students even in remote locations and just requires an internet connection, it is effective compared to a pre-recorded session.

2. Flexibility of extending or scheduling time is more compared to offline.
3. There are opportunities for students to put forward their doubts or queries at the same time and get them resolved.
4. With the advent new platforms for educational purpose there are plethora of latest features available at the click of a button like
    - **Blackboard** - screens can be used in a similar way as a blackboard where instructor can draw, write with the hand in real-time.
    - **Videos** – easily videos and multimedia files can be uploaded and used for sessions
5. **Breakout rooms**- a feature which eases burden of conducting small group sessions of teaching on faculty. Faculty can divide students into small breakout rooms and allot specific tasks for group activity and peer assisted learning as well
6. **Assignments** – instructor can schedule assignments on these platforms and students can submit their work through their profiles, making it very convenient for both.
7. **Ease of accessing Resource material** – uploaded lectures, multimedia files serves as a repository which students can revisit or access at their convenience and can learn at their pace, this was one of the advantages perceived by maximum learners.
8. **Attendance** – recording of attendance is easy and convenient.
9. Planning, scheduling and conducting assessments is relatively seamless and convenient in such platforms.
10. More time available for self-study as no time wasted in distractions or commute.
11. Environment is most comfortable for learning and as per convenience of learner.

Disadvantages of online teaching- learning during Covid-19 in medical education:

1. Students tend to feel disinterested sitting in front of a computer screen due to lack of human interaction, eye contact.
2. Hands on Skill training not possible, lack of opportunity to simulate real clinical scenarios. More focus on theoretical knowledge than practical and clinical skills.
3. Summative assessments for in depth learning and skills assessment is difficult on it.
4. Teacher is not able to monitor learners' behaviour directly in large classroom setting and students might not really be engaged**.**

Challenges in online teaching- learning during Covid-19

1. At level of Organization -Infrastructure required has financial implication. Administration in consultation with faculty has to choose and decide which platform

to use and subscribe.

2. Robust internet connections required for these sessions. Students residing in non-urban areas more likely to face problems in audio or video clarity due to connectivity issues.
3. Requirement of smartphone/laptop- Economically weaker students may not be having access to a dedicated device causing negative impact on learning.
4. Inability to focus- Students' attendance does not ensure engagement. Distracting factors like family responsibilities in home setting may affect students' concentration.
5. Lack of familiarity with newer technologies especially faculty-studentsexpress dissatisfaction due to this reason and hinders with their attention. Need for faculty sensitization and training in these skills.
6. Prolonged hours on screen leading to eyesight problems, affects posture.
7. Mental health of students was affected due to ongoing pandemic and this may have affected their ability to concentrate on online sessions to a variable extent.
8. Technical problems during online examinations may lead to student frustration and dissatisfaction.
9. Academic dishonesty- some students may resort to unfair means during assessments.

There are many positive outcomes from having undergone this enormous change in the mode of instruction delivery at the time of COVID pandemic:

1. Computer literacy became a necessity for all faculty .
2. Most medical schools subscribed to an educational platform for resuming continuity in the courses. This process was accelerated by the imposed lockdown.
3. Online learning is instrumental in promoting self-directedlearning. Students felt more responsible for their learning. Even though online classes were being conducted as per institutional feasibility and curriculum requirements, students were now on their own at their homes and were being driven to be self-directed learners as well. This is one of the key attributes of an adult learner.
4. It has provided flexibility to both faculty and student in ways which the regular classroom teaching could not. The students can learn at their own pace and revisit whenever and whatever needed to be for them.
5. Online mode of education also helped in development of newer, innovative methods of teaching/learning as well as assessment. It made faculty understand many principles of pedagogy, constructive learning which may have been overlooked before.

6. Students earlier spent most of their time on internet for recreational purposes but now they have learnt to use this constructively as well as build up on their knowledge.

Future Implications:

After the pandemic we can ponder upon the experiences we, as educators have gone through in collaboration with our students and make use of the lessons learnt for the future. We cannot deny the fact that online education in COVID-19 was a boon in terms of putting both faculty and students at minimal risk. It can prove to be extremely useful for training in rural settings as well in shortage of resources on site. However, keeping in mind, the roles and goals to be achieved by the Indian Medical graduate, we cannot continue solely relying on the great benefits offered by the online learning. Online learning was undoubtedly an invaluable tool to bridge the gap in the circumstances, but it cannot replace the traditional classroom and hospital training. Students can never feel confident and prepared for the real world professionally with online education. Another very important aspect deserving mention here is the AETCOM module which aims to teach students soft skills pertaining to attitudes, ethics and communication beyond the academic curriculum. It is not possible for many of such competencies to be attained in online learning and needs bedside skill training. The MBBS curriculum emphasizes on attainment of these competencies which involve psychomotor domain at the end of their training in various phases.

Covid's disruption of undergraduate medical education offers some educational value, especially for senior years and interns including the broader clinical experience of inter departmental rotations as situation demanded, and this impact should be examined. However, the loss of planned, curriculum-based training will probably result in shortfalls in certain time-based requirements such as required rotations, number of OPD and ward rounds, and procedural minimums for some batches who are due to graduate. This event presents an urgent imperative to rethink graduation requirements and an opportunity to implement the competency-based approach.

As disruption to offline teaching may occur even in the future this situation must be utilized as an opportunity to learn to help us be better equipped to deal with any similar event. Even after the pandemic many students and faculty want online classes to continue along with the traditional interactive classes called a hybrid mode or Blended learning. Faculty in order to maximize benefits of online classes need to introduce newer ways to increase student engagement e.g. poll question at certain intervals in class time. Assessment methods also need to be innovative in alignment with the teaching learning methods. Curriculum committees at various institutes can sit and plan pilot projects for shifting teaching of some topics in each phase to the online mode and evaluate its efficacy

and acceptance for future implementation. Arranging special sessions for slow learners may be feasible with online mode for the institute and faculty due to the flexibility it offers. Mentoring and counselling activities for students who may be experiencing mental health issues may also be conveniently carried out in conjunction with face-to-face sessions. With the help of meaningful feedback faculty can be instrumental in redesigning the curriculum for a hybrid model in future.

Research into studying outcomes of students/interns who graduate immediately post pandemic, and investing in evidence-based methods to assess their competence, will help in charting the course ahead. Policies which are conducive to learning should be implemented, internet service and online educational platform providers should rethink about product pricing so as to make it widely available. Faculty development programs which include modules on improving online learning may be conducted. Collaborations at university level where some institutes can support others for rapid implementation in case of emergencies is a prospect which can be considered with online education. With sincere efforts in the right direction, we hope that the experience with the Covid crisis will be used to build on previous work and amplify planning for a strong system for Competency based medical education and see sustainable improvement in the undergraduate medical training.

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