Scoping review of published research on medical education in India during the Covid-19 pandemic

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ABSTRACT

Background. Medical educators in India made rapid adjustments to maintain continuity and integrity of medical education in the midst of disruption caused by the Covid-19 pandemic. However, there are concerns regarding achievement of competence by undergraduate medical students due to inadequate clinical exposure. We explored the focus of initiatives from medical educators in India by a scoping review of published articles on developments in medical education during the pandemic to map concepts, main sources and the literature available in PubMed.

Methods. We did this scoping review of published articles in PubMed database in four steps: (i) identification of research questions; (ii) identification of relevant studies; (iii) selection of studies meeting inclusion and exclusion criteria, and charting of data; and (iv) collating the summary and reporting of results. Manual content analysis was done to derive frequencies of variables.

Results. Of the 52 articles identified, 22 met the requirements. Most studies (68.2%) were published in 2020. Half of the studies were conducted among undergraduate students and the remaining among postgraduates (27.3%), faculty (18.2%) and interns (4.5%). All the studies were evaluations at Kirkpatrick level-1 (18; 81.8%) and level-2 (4; 18.2%). Most of the studies (9, 41%) focused on exploration of perspectives about online learning among students and faculty, 9 (27.3%) on teaching–learning, 4 (18.2%) on formative assessment and 3 (13.6%) on summative assessment.

Conclusions. Most studies were evaluations at Kirkpatrick level-1 and level-2 among undergraduate medical students with a focus on conceptual understanding.

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INTRODUCTION

The objective of medical education is to fashion learners into competent practitioners of medicine, impart medical knowledge and skills, and support professionalism. The Covid-19 pandemic resulted in unparalleled disruption in medical education worldwide including India. Social distancing measures prevented the conduct of classroom teaching and group discussions. Clinical rotations of undergraduate students were halted to avoid risk of exposure to Covid-19 patients.

Medical educators around the world and in India made rapid adjustments in the face of these challenges to maintain the continuity and integrity of medical education. Many have reported their initiatives of online teaching–learning in peer-reviewed journals. Gordon *et al*. reviewed educational response in the immediate fallout of the pandemic and pointed out lack of practical details and evaluation data in the published literature.[1] A recent scoping review of globally published articles on medical education by Daniel *et al*. identified regional distribution and focus of publications on developments in medical education in response to Covid-19 and offered direction on future developments in online learning.[2]

Medical educators in India have concerns regarding the implementation of competency-based undergraduate curriculum for medical students admitted since August 2019 and acquisition of clinical competence due to inadequate clinical exposure. Though they have shared their experiences about online medical education through publications, a comprehensive review is lacking. Therefore, we explored the initiatives from medical educators in India by conducting a scoping review of published articles on developments in medical education during the Covid-19 pandemic.

METHODS

Design

We conducted a scoping review to map the concepts, main sources, and the literature available in PubMed to get a broad picture of the developments in medical education in India during the pandemic. An exploratory content analysis approach to the published text articles was adopted.[3]

Data collection

The scoping review was carried out in four steps by using the York methodology of Arksey and O'Malley.[4,5]

1. *Identification of research questions*. The purpose of the review was pre-defined as stated above.
2. *Identification of relevant studies*. Original articles were selected from PubMed with the assumption of quality and rigour in the journals indexed with PubMed. The following search strategy was used: ((“medical education”[All Fields]) AND (“covid”[All Fields])) AND (“India”[All Fields]). Only the articles based on primary data from medical students, interns, postgraduates and faculty were considered for the review.
3. *Selection of studies that met inclusion and exclusion criteria and charting of data.* The preliminary review was done by two researchers to ensure trustworthiness. The results of the preliminary review were further appraised by a third researcher. All three researchers have more than a decade of experience in conducting research in medical education.
4. *Collating the summary and reporting of results*. A manual

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content analysis was done using a pre-defined codebook. If any new information emerged, it was adjusted in the framework that was developed in the form of emerging document of codebook. The results are presented as simple frequency for the selected variables.

The institutional ethics committee granted exempt review to this research work.

RESULTS

Of the 52 articles identified in PubMed, full text of 49 articles was obtained.[6–55] Of these, 22 articles met the inclusion and exclusion criteria (Fig. 1).

Most studies (15, 68.2%) were published in the year 2020. Half the studies were conducted among undergraduate medical students and the remaining among postgraduates (27.3%), faculty (18.2%) and interns (4.5%). Half the studies were reported from the northern, 6 (27.3%) from the southern, 3 (13.6%) from the eastern and 2 (9.1%) from the western regions of India. Among 22 studies, 19 (86.4%) used quantitative methods, 2 (9.1%) qualitative methods and only 1 used a mixed-methods approach. All the studies were evaluations at Kirkpatrick level-1 (18; 81.8%) and level-2 (4; 18.2%). Most studies were done in ophthalmology (6, 27.3%), 2 each (9.1%) in anatomy and physiology, and 1 each in neurology, neurosurgery, biochemistry, surgery and preclinical subjects. Five studies (22.7%) targeted undergraduate students across all phases of the MBBS course. Of the 22 studies, 14 (63.6%) were undertaken in government medical colleges, and 6 (27.3%) in private medical colleges. Thirteen (59%) studies used Google form for data collection and 2 (9.1%) used WhatsApp messages. Nine (41%) studies focused on the exploration of perspectives about online learning among students and faculty, 6 (27.3%) on teaching–learning activity (TL activity), 4 (18.2%) on formative assessment and 3 (13.6%) on summative assessment. Among the 6 studies on TL activity, 4 focused on knowledge and 2 on skills assessment. Also, 1 each was based on cognitivism and social-learning theory.

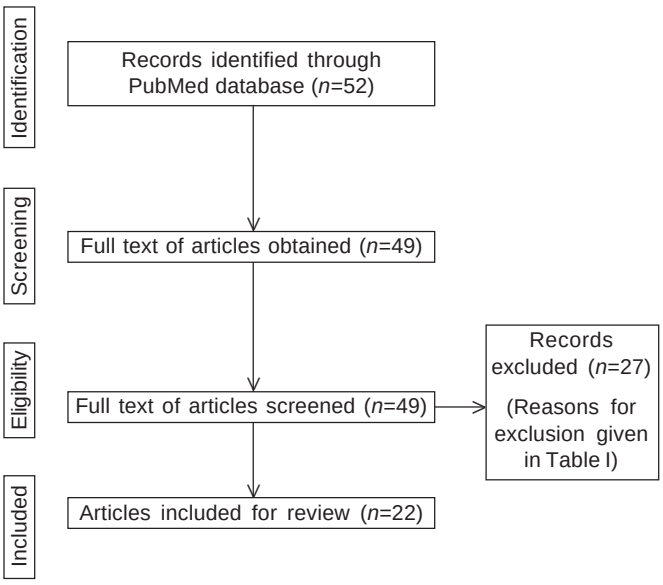

FIG 1. PRISMA (Preferred reporting items for systematic reviews and meta-analyses) flowchart to show the flow of search results

DISCUSSION

We could map the characteristics of various studies on medical education during the Covid-19 pandemic. The results show that medical educators from India adapted to online teaching at a short notice. Most studies were focused on online TL among undergraduate medical students. Medical educators in India mainly used various online and social media platforms. Most of the learning of undergraduate medical students took place in the virtual environment. Among 6 studies on TL activity, 1 each was based on cognitivism and social-learning theories. These findings are consistent with the scoping review by Daniel *et al*.[2]

We observed that the studies were not uniformly distributed across various components of curriculum and among the various stakeholders in medical education. Most of the studies were focused on online TL among undergraduate students. During the pandemic, undergraduate medical students in India had their learning experiences mostly through online platforms in settings away from medical schools and different from the workplace in which they will need to apply their learning in future. Since the learning has not happened in authentic clinical setting, all stakeholders would have concerns regarding acquisition of competencies by these batches of future Indian medical graduates (IMG), particularly when medical education in India is undergoing a transition from the traditional to competency-based medical education (CBME).[56]

It is also evident from the findings of this review that during the pandemic, students who had their education predominantly through online theory classes were deprived of opportunities of not just clinical exposure but also social interaction in authentic clinical settings through the learner–doctor method of clinical training, which would have been possible in normal times. This method of clinical training is based on application of educational theories such as situated learning and communities of practice, which are two interrelated sociocultural frameworks falling under the constructivist paradigm.[57]

Our review suggests that medical educators in India mainly used various online and social media platforms. Formal learning management systems (LMS) are considered better as they offer space for creating and sharing learning resources as well as a flexible learning environment. LMS also enable tracking of the learner's and the teacher's virtual footprints, and thereby curriculum evaluation.[58] A judicious blending of informal and formal LMS could enhance learning during normal times by using a hybrid of online and offline education.

Most studies were quantitative in nature as is the trend in medical educational research in India. All the studies in this review were evaluations and mostly at Kirkpatrick level-1. As the evaluations happened during the initial 16 months of the pandemic, the authors perhaps could not progress their studies to higher levels of evaluation.

It is likely that our study being based on articles from a single electronic database, might have missed developments reported by medical educators in other databases. It is also possible that several important developments initiated during the pandemic might not have been published at the time of our review. Though our study was based on articles from only one electronic database, the consistency of findings with the global study indicates its transferability to a similar context.

Conclusions and recommendations

During the Covid-19 pandemic, medical educators in India could quickly adapt and ensure cognitive learning of students

TABLE I. Articles based on primary data to be included (*n*=22)

Domain	Indicator	Frequency
Year of publication	2020	15 (68.2)
	2021 (till May 2021)	7 (31.8)
Target group	Undergraduate	11 (50)
	Intern	1 (4.5)
	Postgraduate	6 (27.3)
	Faculty	4 (18.2)
Region	Northern	11 (50)
	Southern	6 (27.3)
	Eastern	3 (13.6)
	Western	2 (9.1)
	Northeastern	0 (0)
Type of evaluation study design	Qualitative	2 (9.1)
	Quantitative	19 (86.4)
	Mixed-methods	1 (4.5)
Kirkpatrick level of evaluation study	Level-1	18 (81.8)
	Level-2	4 (18.2)
Subject (specialty)	Anatomy	2 (9.1)
	Physiology	2 (9.1)
	Ophthalmology	6 (27.3)
	Neurology	1 (4.5)
	Neurosurgery	1 (4.5)
	Biochemistry	1 (4.5)
	Surgery	1 (4.5)
	Preclinical subjects	1 (4.5)
	Otorhinolaryngology	1 (4.5)
	All subjects undergraduate students	5 (22.7)
	Clinical subjects	1 (4.5)
Type of organization	Government	14 (63.6)
	Private	6 (27.3)
	Non-governmental organization	1 (4.5)
	Multicentric	1 (4.5)
Online platform used (multiple responses)	G suite	1 (4.5)
	Google form	13 (59)
	WhatsApp	2 (9.1)
	Email	1 (4.5)
	Cisco web	1 (4.5)
	Video conferencing	1 (4.5)
	Go To Webinar	1 (4.5)
	Zoom	1 (4.5)
	Moodle	1 (4.5)
	Cloud-based link	1 (4.5)
Focus of the study (multiple response)	Exploration of perspectives (students/faculty)	9 (40.9)
	Experience sharing	1 (4.5)
	Knowledge, attitude and practice survey	2 (9.1)
	Teaching and learning	6 (27.3)
	Formative assessment	4 (18.2)
	Summative assessment	3 (13.6)
If teaching and learning, then specify (*n*=6)	Knowledge	4 (67)
	Skills	2 (33)
	Attitudes	0 (0)
Reasons for exclusion of article (*n*=27)	Review article	12 (44.4)
	Other country	4 (14.8)
	Letter to editor	5 (18.5)
	Not relevant to medical education	6 (22.2)

through online platforms away from authentic settings. Future research in this area should include a systematic review, preferably focused on educational outcomes of the innovations during the pandemic reported in multiple databases. To meet the challenges of creating real-life situations in virtual settings, a blending of informal and formal LMS could be continued even during normal times.

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