



What the Expert Says

Undergraduate medical education in India: Need for total modification

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Received : 30 September 2022

Accepted : 12 October 2022

Published : 29 October 2022

DOI

10.25259/JHAS_28_2022

Quick Response Code:



ABSTRACT

Background: With tremendous advances in medical and allied sciences and India passing through epidemiological transition, the need for overhauling undergraduate medical education was felt in the past 30–40 years. Around the world, both developed and developing nations felt similar needs. The present review evolved from the quest of how to overhaul medical education in our country.

Methods: All the references on medical education with key words such as teachers, Reforms, challenges, undergraduate teaching, qualities of good medical teachers, infrastructural requirements, and curriculum generation were taken out from “PubMed” published after January 1980. These articles were carefully read and summarized in this narrative review. The references which authors found most relevant for Indian undergraduate education and some perspectives on what the world is thinking about medical education in general are included in the study.

Results: Undergraduate medical education in India is in dire need of overhauling and this should start with preparing students from the high schools for good medical education. Morality, ethics, empathy, and social awareness should be inculcated from the schools in addition to good scientific education and communication capabilities. After developing proper selection process, the undergraduate medical students should undergo need-based dynamic curriculum with both theoretical and practical training in a college having proper infrastructure and teachers who have been trained in education technology. The overseeing body needs to be corruption free and should regularly oversee the progression of teaching. This body must liaise with university, state, and central government so that colleges are provided with everything required. Cost of medical education is high and there should be mechanism to smoothen this burden on the student. Student should learn at not only Individual patient management but also should have broad idea of epidemic investigation, community health, leadership qualities, and should learn elements of medical research. Students may be allowed to learn in his own pace within limits of time frame and training in silos must give away to broad-based interactive learning using all the learning tools including e-learning facilities.

Conclusion: There is a need for global overhaul of undergraduate medical education of India with emphasis on assessment of outcome than mere theoretical learning. A teacher should act as a mentor during the whole of medical training period.

Keywords: Student-teacher infrastructure, Teaching techniques, Need-based learning, Empathy training, Leadership training, Mentoring

INTRODUCTION

Undergraduate medical education has hardly undergone any change since Independence of India in 1947. In effect, we are continuing teaching our undergraduate students in the same way as

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we have been taught Western medicine for the past 100 years. There is no doubt that this education has produced some of the best doctors and teachers for this country but the number is too little for country's need. Moreover, over the past 30 years, the undergraduate curriculum has not only contracted by 1 year and underwent certain cosmetic changes in the time distribution of certain subjects as well as due to changes in admission requirement for postgraduate program and perceived need (which is false) by the students, teachers, parents, and patients that every successful undergraduate must pursue a postgraduate curriculum, has skewed, and disturbed the undergraduate medical education in our country.

Moreover, the stupendous advances in every area of basic medical sciences, that is, anatomy, physiology, biochemistry, molecular biology, microbiology, immunology, pharmacology, pathology, imaging sciences and its impact on laboratory diagnosis, and patient management which is unprecedented even 30–40 years back. Along with this, basic medical science course has contracted by almost 1 year. Hence, there is a need to rethink how these principles at least in its bare optimum could be taught well in undergraduate curriculum. This is very important as the future postgraduate courses will be built on this foundation. When we were studying medicine 50 years back we were told that there is no syllabi for MBBS, a doctor must know everything – may be something in greater details and something in general out lines. Nowadays, we cannot say that as such kind of education cannot be imparted in the prescribed time frame. Moreover, to help in medical education, many computer-assisted programs, internet-based teachings, teachings using video programs, virtual reality, etc., are flooding the market; an optimum use of such tools will also be important. In the ensuing paragraphs, I will try to deal with some of the challenges of undergraduate medical education in India using my experience of teaching and research in this field over a couple of decades: Changes in diseases in our country through epidemiological transition^[1] and development of different levels of tertiary care hospitals in this country. I will also use few references which has discussed certain dimensions of this problem in greater details.

IS MEDICAL EDUCATION IN INDIA GOOD?

In 2022, there are 612 medical colleges in India having more than 97,000 seats for MBBS degree. In addition, several thousand students take admission in medical colleges of Ukraine, Russia, China, the Philippines, and many other countries. Bangladesh also contributes to few of these seats. Even in India, there is a great dispersion of quality of teaching in different medical colleges in India not to speak of those of other countries. In India, there are more than 300 government medical colleges with about same number

of private medical colleges. These colleges include some of the best medical centers such as AIIMS, New Delhi, CMC, Vellore, and AFMC, Pune. Government of India has been opening 19 AIIMS across the country and along with that there are some of the best and oldest medical colleges run by government or charitable institutions as well as few private medical colleges in India where teaching standard is deemed to be very good. This was echoed by Dr. David Gordon, the president of World Medical Federation in 2016.^[2] However, even if we say that fewer than 10–15% of medical colleges offer good quality teaching, it does not answer some of the serious questions which was relevant yesterday as also today. What are the questions? – (1) Did the education adequately covered the needs of the society? (2) Are the medical teachers aware of dispersion and magnitude of this need? (3) Can our newly taught undergraduate practices what was taught in the medical colleges? (4) Is it possible for new medical graduates to take part adequately in public health programs^[3-5] which is either ill attended or are not taught well in the medical college environment where aspiring undergraduates wanted to be treating patients individual medical conditions? (5) Do the society as well as hierarchical process of referral smoothly joins the individual undergraduate doctors ability to refer the cases on the hierarchical medical referral center? This pathway is often unclear, unheeded and finally it is the patient's relatives or close associates who is/are asked to take the patient elsewhere? and (6) Is there a proportionate number of doctor, nurses, and paramedical staffs available to treat or attend such huge number of patients? Unfortunately, in spite of good teaching in a few medical colleges, the answer to above questions was in the negative 50 years back as well as now.

WHAT AILS UNDERGRADUATE MEDICAL EDUCATION IN INDIA?

Some of the challenges of undergraduate medical education have been put up as questions above. Now, let us get into some details of the process.

For the undergraduate medical education to impart quality knowledge with practical training which coopts with the requirement of the individual patient, society as well as the nation as a whole in an optimum economical way. This process has following components: (a) Student selection, (b) syllabi generation, (c) adequate number and quality of teachers in every department, (d) training of medical teachers in education technology, (e) inadequate infrastructure in the college to be capable of rendering such education, (f) evaluation process which assess the student in a balanced way, And (g) overseeing organization for medical education in India, that is, Medical Council of India (MCI) is supposed to see that medical colleges apply the norms developed by them in a regular and smooth way. However, that is hardly

done as this organization itself as well as some of the doctors heading the organization were accused of corrupt practices to advance some medical colleges which was lacking in many areas of medical education.

Selection of students for undergraduate curriculum

At present, this process is in absolute chaos. Each year, the process of selection undergoes subtle changes. As the medical admission is planned through nationwide single examination, many states voice concern because school education is a state subject and different states have different mix of state board schools, ICSE/ISE schools, and CBSE schools whose syllabi are not uniform. States fear that in such a situation a CBSE standard-based entrance examination may compromise the students from different states differently. Moreover, there are serious thoughts about whether marks only through “yes” and “no” question selects good quality students for medical education? What kind of student should be selected for medical education is an important question which Western countries are trying to grapple with since the 1980s.^[6-8] Unfortunately, it was also found that innate empathy to fellow-men which every human being has is reduced as the students’ progress through their study curriculum; pointing to serious defects in the undergraduate teaching methods.^[8] Most of the entrance examination looks for clear-cut answer in the form of “yes” or “no,” but in the real life, the medical practitioners eventually are going to practice in social milieu with many imponderables and empathy. None of the examinations really tests this faculty anywhere in the world. In the past, this behavior was learned by working under the mentorship of teachers who used to have this quality in ample amount. The school education system through which these students pass through is extremely variable and with reduction of time for basic medical sciences to mere 1 year, the students are often at a loss to cope with the subjects of biochemistry, immunology, statistics, pharmacology, and microbiology to name a few.

Syllabi generation

MCI on several occasions modified the syllabi to be taught in undergraduate medical education but in reality, these courses never faithfully represented the needs of the society. They were often copies of the syllabi of Western countries. Moreover, from the beginning, students had the idea that these foundational subjects of basic medical sciences (biochemistry, immunology, statistics, pharmacology, and microbiology to name a few) will not be important in their lives as they have to learn to treat the patients in private practice not to bother so much about social and community dimension of preventive medicine. As a result, even brighter students did not (and even today do not) study these subjects with required attention. In later years of medical training, the clinician professors unfortunately

emphasized individual patients treatment rather than a doctors responsibility of integrating individual treatment with community responsibilities. Anybody who have studied in any medical school in India will confirm that what they studied or saw as patients in medical colleges do not reflect the patients, they are going to see in their practice once they are out of the medical colleges. They saw different diseases, different social challenges, and lack of social infrastructure to support chronic, progressive, and incurable diseases. This obviously points to perpetual defect in producing a syllabus for undergraduate medical curriculum which reflected the social and disease realities in the community.^[9,10] Even a student who has travelled the roads of both undergraduate and postgraduate training programs passing through the portals of some of the best institutes in the country has very clearly articulated this big gap of what is taught and what should be taught.^[11] A broad idea of MCI syllabus for medical teaching was developed in 2015 [Table 1] but has not yet been widely implemented due to various deficiencies of heterogeneous nature in various medical colleges in India and imminent replacement of MCI by National Medical Commission (NMC). [Table 2] demonstrates various dimensions that affect the quality of health care in a society where in the current context of discussion of the doctor as a service provider assumes greater importance.

Table 1: MCI vision document 2015.

1. A preparatory foundation course
2. Curricular integration, both horizontal and vertical
3. Early clinical exposure
4. Student-doctor mode of hands-on clinical training
5. Electives and self-directed learning
6. Competency-based training with certified skills acquisition
7. Secondary hospital exposure
8. Adoption of contemporary education technologies
9. Integration of principles of family medicine
10. Integration of ethics and professional values in all phases of the course

Table 2: Factors influencing the quality of health care.

Category	Themes
Patient-related factors	Patient sociodemographic variables Patient cooperation Type of patient illness
Provider-related factors	Provider sociodemographic variables Provider competency Provider motivation and satisfaction
Environmental factors	Health-care system Resources and facilities Leadership and management Collaboration and partnership development

Inadequate number of teachers in different specialties

Even when we select teachers for primary and secondary schools in addition to basic qualification defining the knowledge base, we also need specialized training like Diploma in Education (D.Ed.) or Bachelor of Education (B.Ed.) so that teachers know educational Psychology/Teaching Techniques/Handling Delinquent children, etc. However, when we look into medical teachers selection in the country apart from postgraduate medical degree and some practical experience in patient care in the form of residency programs, we really do not have any in-house training program across the medical colleges in India or any such program constituted by MCI to produce good quality medical teachers in our country.^[12,13] In the past, when medical education was not separated from medical services in the states, the medical teachers used to come after long posting in rural and semi urban settings. This used to arm them with experience of needs of the society and geographical disease pattern of the locality and many more information which were teaching assets, though they used to forget some of the information which were in the text books. These teachers used to have long contact with the students during their internship and housestaffship years and considering the fact that there were limited investigative capabilities and limited number of medicines available to remember its application well, such long contact was in a way used to cover the deficits of training during student years. A good medical teacher needs to have many levels of knowledge and influencing capability to his students [Table 3] and additional qualities of – (i) inherent desire to be a good teacher, (ii) is student centric, (iii) is knowledgeable, (iv) does not seek recognition or compensation, (v) is enthusiastic, (vi) has humanity, (vii) innovative, and (viii) a motivator.^[13] Inadequate number of teachers compared to the number of students is also a big challenge. Partly, this

is related to the dissatisfaction of teachers with working environment, salary, and many other service-related issues and more than that presence of very poor infrastructure in many medical colleges to provide satisfactory teaching; parallelly many corporate hospitals provide better salary and better infrastructures.

Training of medical teachers in education technology

It was understood quite early in the last quarter of the 20th century that like primary and secondary schools medical teachers need to be trained in medical education technology and how to use the burgeoning number of tools, that is, software, electronic, non-electronic, artificial intelligence, virtual reality, videography, virtual and real libraries, modeling, and role playing to improve and harness medical teaching. To this end, efforts were ineffectually made to develop medical education technology department in the medical colleges of India. Few good medical colleges do have a medical education department but their activities do need more efforts and improvement.^[12]

Inadequate infrastructure in the college to be capable of rendering such education

Medical teaching does not occur in a vacuum. In addition to able and attentive students and teachers with expertise to teach the medical colleges at least need adequate minimum infrastructure to enable proper teaching. What does a medical college need to render proper teaching?

Basic medical sciences

Like anatomy, physiology, biochemistry, pharmacology, microbiology, and pathology, good quality dissection hall, museums, and laboratories are required. Many government medical colleges that have come up at district level hospitals are just changes in signboard and some cosmetic changes in staffs. In many private medical colleges, which constitute near 50% of all medical colleges in India, the facilities at this level are awfully inadequate and students try to cope through theoretical understanding of many of these practical subjects. In many such colleges, a general college which teaches physiology/biochemistry/pharmacy is attached as their teaching center for the subject. For a long time in many medical colleges across the world, medically qualified teachers for some of these subjects are not available in adequate numbers; hence, those posts are filled with non-medical teachers, some of them are really good but many of them do not have the perspective of the requirement of a medical student from those subjects. If medical colleges for basic medical sciences have poor infrastructure and some of the patient related laboratory work, that is, of microbiology/biochemistry/histopathology is out sourced from private

Table 3: Ideal roles of a medical teacher.

Information provider	Theoretical lectures
Practical/clinical/applied medicine Resource developer	Study guide developer Resource material creator using Various technology
Planner Assessor	Of the course curriculum Curriculum for student assessment
Facilitator	For learning As a mentor
Role model	As a teacher Empathizer/doctor/good human being

Modified from reference 13

laboratories then it is possible to run day-to-day work of such medical colleges but students learning is seriously compromised. Coming to teaching in community medicine and forensic medicine, less said is better. Very few medical colleges in India have good forensic set up and for most of their work depend on central forensic laboratories; however, students are hardly taken to those laboratories and museums to make them understand the length and breadth of forensic investigation a doctor is capable of. For community medicine, community is its ward as well as laboratory. Very few medical college is involved in investigations of many epidemics that embroils our land and most of the time state agencies are found inadequate and central agencies are called for.^[14]

Clinical subjects

Like general medicine, surgery, gynecology and obstetrics, ophthalmology (EYE), otorhinolaryngology (ENT), pediatrics, and orthopedics which are taught in undergraduate curriculum, all require good laboratories, imaging, and critical infrastructures for simultaneously managing patients and teaching students. If for every little bit of management challenge, a medical college has to refer its cases to other medical colleges/corporate hospitals for, better laboratory services or imaging facilities then again day-to-day work will stumble and move similarly students teaching will also be seriously compromised.

Patients

Patients in different medical colleges in India are accessed in different ways. Government medical colleges usually have their own hospitals. Medical colleges run by private entities or charitable organizations or through government/municipality organized trustees either have their own hospital for patient care or they access some government hospital for patient care. Because the patient care and management are extremely variable in quality as well as in quantity across this spectrum and some organization charges money for different services they provide, patients with different problems do not attend these hospitals in equal measures. This leads to lack of patient as teaching material in many medical colleges, especially private medical colleges.

Library/Audiovisual Aids/Computer/Video-based training, etc.

This is also inadequate in many medical colleges.

Evaluation process

After the requisite, amount of teaching and training a student is usually evaluated/assessed by an examination process. Although some marks are allotted for internal assessment.

This traditional assessment by few examination of theory, practical, and viva voce was probably adequate in older times but it seems no longer adequate now as various methods of teaching and evaluation processes are being experimented on.^[15-20] However, whatever evaluation process is put in place it should assess – (a) His understanding and knowledge in the area, (b) ability to apply the knowledge within the available resources, (c) ability to improvise when such resources are in short supply, (d) interact and provide leadership where community level health interaction is needed, and (e) generate new knowledge in his area of operation so that this knowledge can be integrated to advance the health care.

Role of MCI (or newly formed NMC) in overseeing this education

Conventionally, MCI in close association with universities and state governments (except for the Central Government Medical Institutions and autonomous medical Institutions) used to oversee the qualification and employment of teachers, inspect the facilities available at different medical colleges, and several general overall changes in the medical curriculum, there was really no day-to-day overseeing of the function of the medical colleges. Moreover, MCI and its representative state bodies which were regulated by professionals through their voting powers faced lots of complaints regarding their function as well as faced allegations of severe bribery and corruption.^[21] NMC was conceived to replace MCI with its modified composition and improved power to oversee medical education and doctor's registration in September 25, 2020. We have to wait to see how it changes and oversee 612 or more medical colleges in India for its educational content and teaching process.

WHY MEDICAL EDUCATION IN INDIA NEEDS URGENT REFORMS?

Whatever was discussed so far, needless to say that it is quite apparent that medical education in India needs urgent reforms-

- a. *By streamlining admission of students with a selection process that not only evaluates the factual knowledge but also evaluates the social viewpoints and empathy quotient of the candidate. This needs some modification in the syllabus of final years in the school with inclusion of society, citizens responsibility, responsible behavior, and development of empathy to fellow school students. In fact, this quality needs to be inculcated in every future citizen whether he/she studies medicine or not. For those who wants to study medicine, this should be an absolute requirement.^[8] How to develop empathy among the students and what are the barriers of its development has been beautifully described elsewhere.^[22]*

Effective empathy education requires seven core principles guided by strong and empathetic school leaders.

1. Ongoing: Educating for empathy is not a 1 time lesson, but a continual focus
2. Woven-In: Empathy competencies are integrated into content and interactions, not tacked on
3. Meaningful: Instruction is authentic, touches the heart and mind, and stretches “me” to “we”
4. Internalized: The goal is for students to adopt empathy competencies as lifelong habits
5. Student centered: Students’ needs, not curriculum, drive the lessons, and experiences
6. Respectful relationships: Empathy breeds in a culture of respect and caring
7. Empathic leadership: Empathy is modeled, expected, and core to a principle’s vision, purpose, style, and interactions.^[23]

This program needs to continue throughout the medical study period as it has been shown that empathy goes down as the student progress through their study period in medical colleges.^[8]

Second, with increasing population, the number of undergraduate medical doctors produced in India (around 970000) is still less than the required number as a large number of these doctors seek employment outside India. Third, curricular improvement, its alignment to community needs, improving ramshackle infrastructure in many medical colleges, and development of new medical colleges in India can no longer wait. This well need huge outlay of money probably both from public and private partnership. All electronic communication should be harnessed to improve teaching process in those centers where infrastructure is inadequate and corrective procedures should be applied to all the points described under the heading what ails our medical system.

Many students go out and takes undergraduate medical training in some developed countries such as Russia, China, Ukraine, Georgia, Romania, and few others; their disease patterns and teachings are even further away than the requirements and medical set up in our country. Many students each year are also going to some of the Asian countries such as Bangladesh, Nepal, Singapore, the Philippines, and Thailand not only because of cheaper options but also because of – (i) the similar climate, (ii) similar disease patterns as prevalent in India, (iii) the syllabi followed there are similar to MCI/NMC, and (iv) similar type of food habits, cost of living, etc. However, this program not only wastes foreign currencies, students time, and the frustrations, they face on returning to this country. This is an area of concern and needs immediate attention by the NMC. Even while studying in India because of perceived/real inadequacies of undergraduate, most of the undergraduate students competes for postgraduate examination, wastes time

and money in private coaching, and wastes very important time of learning medicine practically during internship as a result in whole carrier of medical education in India in the quest for getting specialized degrees beginning from MBBS, an aspiring student may lose additional 3–5 years in private coaching and still may not get admission in the desired specialty. This gross deficit in demand and supply needs to be urgently addressed.

THE PROHIBITIVE COST OF PRIVATE MEDICAL COLLEGES IN INDIA; THE MONEY ONE NEEDS TO SHELL OUT TO BECOME A DOCTOR IN INDIA

Medical education is not cheap in any developed country of the world. However, in India, the government medical colleges largely subsidized the course and those few who get admission in government medical colleges have lesser financial worries. Even then in an average family, medical education has been considered long, uncertain, and costly. However, with the entry of private medical colleges, cost of medical education sky-rocketed. Today, MBBS course in a private medical college is upward of 1 crore rupees; which is obviously beyond the capacity for a common man to pay. This has laid them to seek admission in cheaper medical colleges/institutes outside this country with uncomfortable consequences. There are needs to develop program through which a student can get cheaper loans which they can pay off in subsequent years. Each year, the parents of aspiring medical students complain about high fees charged by many private medical colleges in India. Nothing really happens as many of these medical colleges are run by “some or other way” powerful Individuals in the country. Mushrooming of private medical schools in India, the present student profile and cost of medical education and its impact on equity, health-care accessibility, cost, and perceived quality of healthcare need to be streamlined.

FUTURE OF MEDICAL EDUCATION IN INDIA

Several articles in the literature did describe the history of medical education in India, its pitfalls and fallacies in the current context of several areas of revolution in medical knowledge and requirements of the society.

Some studies have proposed elements of reforming the medical education, pitfalls, and also role of overseeing bodies.^[16-36] Need-based programs,^[17] innovative programs,^[18,19] competency-based medical education,^[20] how to transform the education,^[30] for example, (i) cultivation of skills in adaptive expertise and lifelong learning rather than rote memorization of medical knowledge; (ii) achievement of a range of competencies for effective practice within inter-professional health-care teams; and (iii) application of sound educational models adapted to

the local context, simulation-based medical education and research (SBME),^[32,33] What are the features and best practices of SBME? – (i) feedback; (ii) deliberate practice; (iii) curriculum integration; (iv) outcome measurement; (v) simulation fidelity; (vi) skill acquisition and maintenance; (vii) mastery learning; (viii) transfer to practice; (ix) team training; (x) high-stakes testing; (xi) instructor training, and (xii) educational and professional context fixing a mentor, Elements family practice, epidemic investigation, and culture of cooperative management rather than becoming a hero doctor, leadership training, management training, and understanding elements of medical research to undergraduates.^[35,36]

So what is the sum and substance of the great churning regarding medical education happening across the world and badly needed for our country. Broadly, it means – (i) students need to be prepared for medical education beginning from the past 2 years in school. Apart from science subjects, the education should emphasize social, ethical, and moral dimension of human existence and should embrace both in theory and practice the elements which entrench empathy as a behavioral change. Some of these dimensions of teachings in some way should continue throughout the medical education. (ii) There have been lots of discussion in Indian and Western literature what should be the content and curriculum of teaching? Is it going to be a fixed one as medical education is going on for over a century or it should be need based and dynamic. The need basically refers to changing disease pattern, changing behavior of the community impacting on the disease, a country like ours going through epidemiologic transition meaning thereby there is rapid changes in disease composition where infections of various kinds and epidemics^[2,4,5,14] have reduced but has not gone away along with lifestyle diseases, degenerative diseases, and need for different types of rehabilitation is increasing. Combined with the need the curriculum also should look at the competency of different students and education within the teaching years should be flexible enough to allow different students to go on at different learning rates (within limits) and the end point will be determined by assessing the skills learned. Various kinds of innovation are possible within this given requirements. (iii) Proper training of the medical teachers so as to how education will be imparted. This training will be continuous fitting the requirements of the society. Even after such training, every teachers in a way will develop his individual style of teaching, some of these styles have been identified and defined.^[37] (iv) As there are lots of subjects to be learned within shortened time given for undergraduate medical education, basic medical sciences should be carefully taught with well-designed syllabi so that in the future, the student faces no difficulty in implementing the basic sciences in his day-to-day clinical goals. Along with all the subjects taught, human nutrition should also get a prominent place in the curriculum. (v) A doctor in a society has to

wear many hats he has to treat patients, do administrative work, have leadership qualities, and should have broad understanding of medical research and preliminary epidemic investigation. If this is to be done efficiently, it cannot be done in individual silos [Table 1]. Medical education should be integrated and multiple methods need to be adopted to drive home the points that are being made. (vi) There are needs for huge infrastructure development in the form of many more medical schools and improve poor infrastructure that plagues many medical schools in the country. This cannot happen in a day, in addition to proper planning (uneven distribution of medical colleges in this huge country), the whole process requires close cooperation between central government, state government, universities, NMC, and charitable or private organization that would like to take part in the process. Till that, time comes well-endowed medical Institutions can start e-learning pathways to teach these infrastructurally deficient institutions [Table 4]. This has already been started in a small way. Various medical societies/organizations do conduct continuous medical education programs as a part of their

Table 4: List of 50 medical colleges under NMCN Project (Education and Research Network of India).

Name of medical college	State/UT
RRC east zone	Uttar Pradesh
Sanjay Gandhi Post Graduate Institute of Medical sciences (SGPGIMS), Lucknow (NRC)	
Baba Raghav Das Medical College, Gorakhpur	
Maharani Laxmibai Medical College (MLB) Medical College, Jhansi	
Veer Surendra Sai Institute of Medical Science and Research (VSS) Medical College, Sambalpur	Odisha
All India Institute of Medical Sciences (AIIMS), Bhubaneswar	
Institute of Medical Sciences (IMS), BHU, Varanasi (RRC)	Uttar Pradesh
All India Institute of Medical Sciences (AIIMS), Patna	Bihar
Darbhanga Medical College, Darbhanga	
Patliputra Medical College, Dhanbad	Jharkhand
Burdwan Medical College, Burdwan	West Bengal
RRC northeast zone	
North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences NEIGRIHMS), Shillong (RRC)	Meghalaya
Guwahati Medical College, Guwahati	
Assam Medical College, Dibrugarh	Assam
Regional Institute of Medical Sciences (RIMS), Imphal	Manipur
Christian Institute of Nursing Science and Research, Dimapur	Nagaland

(Contd...)

Table 4: (Continued).

Name of medical college	State/UT
Agartala Government Medical College, Agartala RRC west zone	Tripura
King Edward Memorial (KEM), Mumbai(RRC)	Maharashtra
Government Medical College, Nagpur	
Government Medical College, Aurangabad	
Goa Medical College, Bambolim, Goa	Goa
B.J. Medical College, Asarwa, Ahmedabad	Gujarat
Government Medical College, Surat	
RRC central zone	
All India Institute of Medical Sciences (AIIMS), New Delhi (RRC)	New Delhi
Vardhman Mahavir Medical College and Safdarjung Hospital, Delhi	New Delhi
Dr. Ram Manohar Lohia Hospital, Delhi	New Delhi
Lady Hardinge Medical College, New Delhi	New Delhi
All India Institute of Medical Science (AIIMS), Raipur	Chhattisgarh
Netaji Subhash Chandra Bose Medical College, Jabalpur	Madhya Pradesh
All India Institute of Medical Science (AIIMS), Bhopal	
Sawai Man Singh Medical College, Jaipur	Rajasthan
All India Institute of Medical Science (AIIMS), Jodhpur	
Government Medical College, Haldwani	Uttarakhand
RRC North Zone	
Postgraduate Institute of Medical Education And Research (PGIMER), Chandigarh (RRC)	Chandigarh (UT)
Dr. Rajendra Prasad Govt. Medical College, Tanda	Himachal Pradesh
Indira Gandhi Medical College, Shimla	
Post Graduate Institute (PGI), Rohtak	Haryana
Government Medical College, Jammu	Jammu and Kashmir
Government Medical College, Sri Nagar	
Guru Gobind Singh Medical College, Faridkot	Punjab
Govt. Medical College And Hospital, Amritsar	
RRC South-I zone	
Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry (RRC)	Puducherry (UT)
Siddhartha Medical College, Vijayawada	Andhra Pradesh
Andhra Medical College and King George Hospital, Visakhapatnam	
Gandhi Medical College, Secunderabad	Telangana
Madras Medical College, Chennai	Tamil Nadu
Madurai Medical College, Madurai	
RRC South-II zone	
Trivandrum Medical College, Thiruvananthapuram (RRC)	Kerala

(Contd...)

Table 4: (Continued).

Name of medical college	State/UT
Govt. Medical College, Kozhikode	
Karnataka Institute of Medical Sciences, Hubli	Karnataka
National Institute of Mental Health and Neuro Sciences (NIMHANS), Bengaluru	

annual programs. This can be strengthened to improve the learning process. (vii) Medical education is not cheap but now a days inappropriate fees and selection of inappropriate students for more money, has plagued the whole area of MBBS studies in the country. If private medical colleges do not have a fair and transparent fee structure, these colleges needs to be taken to task. The students should have access to acquire cheap bank loans and several different ways to pay back (here we need innovation) to the bank after graduation. Once a large number of medical schools are in place along with rationalized fee structure, there will be little need for Indian students to get medical education in a foreign land. (viii) Overseeing body, MCI (now NMC) so far has done precious little to oversee that the medical education in each undergraduate teaching centers in the country is dynamic, need based, practically oriented, and is offered by expert teachers in a properly enabled environment. In addition to factual knowledge assessment, this commission should develop proper assessment tools too for both teachers and students and wherever there is deficiency in the whole chain this NMC should have enough power not only to punish errant doctors but also to make good all the deficiencies in medical education described here by engaging relevant authorities.

Declaration of the patient consent

Patient's consent not required as there are no patients in this study.

Financial support and sponsorship

Nil.

Conflicts of interest

The author is the Patron of the journal.

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How to cite this article: Ghosh K. Undergraduate medical education in India: Need for total modification. *J Hematol Allied Sci* 2022;2:62-70.