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Undergraduate Medicine Curriculum in India: Untying the Gordian knot

Satish Suhas[1], BN Gangadhar[2], Aruna V Vanikar[3], Yogender Malik[4], N Girish[5], Vijayendra Kumar[6], Suresh Bada Math[7]

ABSTRACT

The medical education system in India is one of the largest in the world. Therefore, the quality of Indian medical education and the physicians it produces has implications on public health at large. Change is the necessity of evolution and growth. In this article, we address the challenges Indian undergraduate medical education faces and attempt to address them. The steps suggested are delineation of goals and objectives of education based upon the need of the country, adoption of innovative digital-based synchronous and asynchronous teaching, both in-person and digital learning methodology (hybrid model), early introduction of clinical postings, family adoption program, shortening the course of MBBS, problem-based learning, adjustments in the course structure, updating of course content, rationalizing assessment strategy, and emphasis on structured and skill-oriented internship.

Keywords: MBBS, Curriculum, India, Medicine, Under graduation

Introduction

India continues its struggle to meet the healthcare demands of nearly 1.4 billion people effectively. COVID-19 pandemic has strained the healthcare system beyond its capacity and exposed that rapid course correction is necessary to meet the long-standing challenges in infrastructure, human resources, and inadequate training.

The health indices of our country have admirably changed for the better over the past decades. There are several challenges in public health, that India has overcome[1] such as eradication of communicable diseases like polio, tetanus, guinea-worm disease and yaws[2]; increased life expectancy [which has nearly doubled since Indian independence] and decrease in key mortality indices.

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1. Assistant Professor of Psychiatry, Telemedicine Center, National Institute of Mental Health and Neurosciences [NIMHANS], Bangalore, Karnataka, India.- 560 029. **Email:** suhasedu@yahoo.in
2. Former Senior Professor of Psychiatry, Director & Vice-Chancellor; NIMHANS, Bangalore,- 560 029. **Email:** kalyanybg@yahoo.com
3. President, Undergraduate Medical Education Board, National Medical Commission, Professor and Head of the Department of Pathology, Laboratory Medicine, Transfusion Medicine and Immunohematology and Department of Stem Cell Therapy and Regenerative Medicine, G.R. Doshi and K.M. Mehta Institute of Kidney Diseases and Research Centre and Dr. H.L. Trivedi Institute of Transplantation Sciences (IKDRC-ITS), Gujarat, - 380016 **Email:** vanikararuna@yahoo.com
4. Professor of Forensic Medicine and Toxicology; Bhagat Phool Singh Govt Medical College for Women; Khanpur Kalan, Sonipat, Haryana-131301 **Email:** dryogendermalik@gmail.com
5. Professor of Epidemiology, N.I.M.H.A.N.S, Bangalore- 560029. **Email:** girishnrao@gmail.com
6. Member, Undergraduate Medical Education Board (UGMEB), National Medical Commission (NMC) (and Professor-Head, Department of Pediatric Surgery, Indira Gandhi Institute of Medical Sciences, Patna), Dwarka Pocket 14, Sector 8, New Delhi-110077, India. **Email:** drvijayendrakr@rediffmail.com
7. Professor of Psychiatry, Telemedicine Center, N.I.M.H.A.N.S., Bangalore, -560029. **Email:** sureshbm@gmail.com

Corresponding Author: Dr Suresh Bada Math, Professor of Psychiatry, Head of Telemedicine Center and Forensic Psychiatry, National Institute of Mental Health & Neurosciences [NIMHANS], Bangalore, 560029. **Email:** sureshbm@gmail.com

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Recently, the successful coverage of COVID-19 vaccination across most Indians has garnered praise.[3] However, the targets to be achieved in several health parameters are substantial. Inadequate budgetary allocation to the management of non-communicable diseases; social inequalities; lack of accessibility; poor affordability of healthcare; coupled with poor inter-sectoral, and interdisciplinary collaboration continues to plague the nation. Therefore, public healthcare delivery for non-communicable diseases is underdeveloped. Trauma, psychiatric disorders, drug abuse, pandemic, and disaster consequences have come to light as public health needs in recent years [4, 5] foreshadowing the problem of an ongoing silent epidemic.

To address the healthcare requirements and the problem of doctor-to-patient ratios, India's medical commission and government have been increasing the number of undergraduate and postgraduate medical seats over the past few decades. However, over the years, this model has not been entirely successful. However, the precious human resources of young medical professionals are wasted when they keep appearing for exams to get a seat of their choice. More and more doctors are waiting for 2-4 years between under-graduation and post graduation as they appear for multiple entrance exams. Integrating such entrances into a common National Eligibility Entrance Test / Institutes of National Importance Common Entrance Test examination is a welcome step.

India's primary health care system has evolved since independence. There is an elaborate network of approximately two lakh Government Primary Health Care Facilities in rural and urban areas [6]. However, it is noteworthy that a parliamentary committee expressed that the assessment of needs at the primary care level has to be conducted (Government of India, 2016).[7] This would guide the human resources readiness. The latter would involve health professionals and the curriculum to prepare the most skilful professionals. Among the different healthcare workers is the MBBS doctor, who can be considered the leader in each local community to understand the epidemiology, determinants of health in the community and deliver appropriate healthcare services.

The medical education system in India is one of the largest in the world and therefore, the quality of Indian medical education and the physicians it produces has implications on public health at large[8] . There is a need for an innovative medical curriculum model that will address integrating essential or primary skills into the curriculum. In addition to this there is a need to infuse leadership in the public health. A flexible model of education can allow undergraduates to acquire such competencies and decrease redundancies in existing curriculum. In this article, we address the challenges faced by Indian medical education, and attempt to offer suggestions for addressing these issues.

Understanding the public health needs at the primary care level

The Government of India rolled out Ayushman Bharat Program. This program has Health and Wellness Centers and the National Health Protection Scheme to increase accessibility, availability, and affordability of primary, secondary and tertiary-care health services[9]. Our population can be grossly divided into the urban and the rural. It may be noted that the demography of our country has changed rapidly over the last two decades [6]. We are no more a rural-dominated population. We may have a closely equal representation of both urban and rural. We may also see, not surprisingly in the coming decades, a reversal, i.e., urban dominance. There is a need to recognize this divide. Their needs may be different. The availability of resources is markedly different for these two populations. This calls for an emphasis on primary care.[10] Rural and urban populations must be firmly connected to the primary care service.[11] This is expected to lower the expensive and resource-intensive secondary and territory care services.

Together, the primary healthcare delivery should encompass the following minimum requirements

- education on the health conditions as well as service availability including several health programs of the country

- all preventive strategies like health education, awareness, addressing stigma etc.,
- maternal and child health care,
- different national and state health programs, and
- identifying and treating common disorders including emergencies.

What should be the competencies of MBBS graduates?

A young medical graduate is expected to perform several roles in healthcare upon graduation. Apart from core competency skills, these roles are not adequately emphasized in the medical curriculum. They are therefore termed the hidden curriculum. Doctors graduating from other disciplines of medicine also face diverse challenges. As a result, India now has doctors from different systems of medicine, expected to perform multiple roles and responsibilities that are not clearly defined, for which they are not adequately trained. Most doctors are trained in ivory towers of medicine instead of the community. They are expected to learn the essential skills required for medical practice and administration on the job even as they cater to a more aware, more educated society with high expectations.

After graduating from medical school, all doctors need to undertake some training activities lifelong to maintain, update or develop their knowledge, skills, and attitudes towards their professional practice.[12] Many efforts have been put in place over these decades. However, current undergraduate curriculum favours knowledge acquisition over skill acquisition.

These upskilling efforts should also percolate in undergraduate curriculum equipping the MBBS graduate to function effectively at the primary care level. The creation of training centres by the health services department is an example case. From time to time, the centres have parted additional skills and knowledge to the doctors to execute different programs of the state or centre. CME-like activities are also encouraged by the state administration and medical councils to instill required skills dynamically.[12] A national meet on implementation of reforms for Undergraduate and postgraduate Medical Education recommended the following - early clinical exposure from the first year of MBBS, elective subjects to allow flexible learning options, skills development and certification of skills before licensure and linking medical college with PHC and CHC for community learning (NMC, 2011).[13] There is an urgent need to train UGs & PGs in accredited and capable public hospitals, district hospitals, community health centres, and primary health care centres. The training should represent an accurate picture of the community rather than training in medical colleges.

Isn't it high time that the norms and functioning of a medical college be revisited?

A paradigm shift in medical college infrastructure and faculty requirements can be brought about by embracing telemedicine. Limited Medical Colleges availability restricts the number of trained physicians and specialists graduating each year. Shortage of qualified faculty, human resources, and physical infrastructure limit the operationalization and expansion of the available medical seats. The National medical commission and the erstwhile Medical Council of India have laid down minimum regulations for establishing medical colleges with specified guidelines. Let us examine three such clauses, which includes examples such as,

- Air-conditioned Central Library (4000 Sq.m) with seating arrangement for at least 500 students for reading and having good lighting and ventilation and space for stocking and display of books and journals.
- There shall be minimum of four lecture theatres preferably air conditioned, of gallery type in the Institution with seating capacity for 300 students each and one in the hospital with seating capacity of 300 students
- On an average the required staff strength per each department of 1 Professor, 3 Associate Professors, 4 assistant Professors, and 5 tutors.

Additionally, medical colleges often resort to last-minute hiring of faculty and increase bed occupancy rates at the time of MCI/ NMC inspections to meet the prerequisite criteria. Therefore, there is an inherent redundancy in "adherence" to these rules.

The parliamentary Standing Committee, in its 92nd Report, observed that the mandated requirements to establish a medical college such as the requirement of human resources (teacher), land, size of the examination hall, library, laboratory, lecture halls, auditorium, etc. maybe ideal on paper; However, they are irrational for real world implementation, rigid and there was an urgent need for flexibility in infrastructure requirements. It was argued that the flexibility in infrastructure requirements would bring down the cost of medical education, which is a considerable burden. Therefore, there is an urgent need for rationalizing infrastructure and faculty requirements, keeping in view the modern-day requirements and in digital world (Government of India, 2016).[7] Further, the committee believes that if a district hospital is converted into a medical college, it will not only be equipped with specialists of all disciplines, providing healthcare services across the whole spectrum but will also produce some doctors in its area of operation and will thus help reduce geographical mal-distribution of doctors (Government of India, 2016).[7]

Rethinking these criteria, especially the teachers per institute criteria in a virtually connected world is of an urgent priority. Vast majority of private medical colleges struggle to meet the requirements and norms for hiring faculty and teachers. It is an open secret that during the inspection by the authorities, medical colleges often go on hiring sprees to bulk up the staff strengths to meet requirements.

A look at the bigger picture reveals that the ultimate objective of the medical commission stating these prerequisite staff was to ensure good quality medical education. In a post-pandemic world, virtual learning has become the new norm. Additionally, institutes of excellence have started networking with other medical colleges in a hub and spoke model. A credit-based system based on e-learning modules can easily provide hassle-free education while offering maximum flexibility. This will also ease the human-resource constraints in teaching and ensure availability and accessibility to the best teachers and training methods. The obvious challenge for this is accessing and maintaining appropriate technology for e-learning. Therefore, this investment will serve multiple benefits, including tele-training and medicine, justified. The focus of promoting e-learning will be to enhance quality of the education. The national medical college network can provide a blueprint for rolling out this blended learning model.

Using training competencies across the nation, there needs to be reformation in teaching methodologies with blended learning, open learning and distance learning opportunities. Such tele-learning opportunities can bridge the gap in medical training and ensure easy access to the best teachers across platforms.

What does the revised National Education Policy 2020 recommend?

The third national education policy is being unveiled in independent India. Hailed as the most ambitious, paradigm shifting education policy in independent India, it is likely to lead to major structural and functional reforms in Indian education system. It aims to bring in holistic, multidisciplinary education at all levels of learning and dilution of watertight disciplinary compartmentalization. This dilution coupled with multiple entry and exit strategies allows learners to dictate the learning pace and choose the areas of learning from a multidisciplinary ecosystem. Medical and legal education policies are conspicuous by its absence in this policy. The ambit of medical education has been kept out, citing the policies' principle focus on primary and secondary education.

Issues with the existing undergraduate medical curriculum

This matter has been debated over many years. Unfortunately, most of our undergraduate curriculum revolves around providing knowledge and assessing knowledge. The teaching skills and assessment of skills and competence are

very few. At the end of UG, the question remains does the MBBS doctor have enough skills to handle the clinical services they are expected to meet in rural areas? These skills may be as a primary care doctor. Apart from the clinical skills, the primary care doctor needs to learn leadership skills, administrative skills, generating awareness, and human resource management, mainly if the primary care doctor is a government servant. Specifically, PHC doctors must be available 24/7 in the headquarters to attend emergency services, including conducting labour, managing PHC staff, administrative responsibilities, public relations in the locality, prevention and promotion activities, running national programs, and managing short-term inpatient care. These are duties required from a primary care doctor posted in the peripheral primary health centres. There is an urgent need that the role of primary care should not be defined in isolation but to the constituents of the health system in the rural population.[14]

The curriculum and teaching practices are knowledge predominant with less focus on skill acquisition and have almost no exposure to medical administration. Furthermore, most of the guidelines and standards of medical literature recommended in routine reading during under graduation are from western authors. While this is not bad, it is concerning considering that the doctors who are expected to take up roles of primary healthcare physicians or who go into private practice have almost no exposure to the practical nuances of these responsibilities. Furthermore, most of the incentives provided during the medical education training period are related to competency in knowledge. There is almost no focus on leadership, administration, and cross-disciplinary skill acquisition. Therefore, most young doctors pass out with It is criticized as a fractured medical curriculum .[15]

Furthermore, the existing medical education curriculum has been designed to educate the undergraduate medical student about preclinical, paraclinical and clinical sciences with exposure to clinical responsibilities over one year of rotatory internship. Most of the standards set for the curriculum are borrowed from western practices. Most textbooks and research papers read by undergraduates are from western authors. The curriculum is designed to expose all students of allopathy to most specialties' of medicine and a few optional subspecialties. Although we recommend that fundamental and necessary aspects of treatment should be compulsorily taught, some of the branches that the students learn over the years may be redundant, considering the nature of the profession they practice.

Until the system builds the general practitioner network, the population is left with the existing system.[16] In this system most MBBS doctors want to pursue specialization and subspecialization. This has led to a surge in postgraduate and super speciality seats without a substantial improvement in care at the primary level. To create a network of adequately trained primary care doctors or family practitioners, the curriculum requires to match the skill and talent to the prevailing immediate health care needs/ demands. Such a practitioner should detect a serious illness to provide emergency first-aid, appropriately refer them to a specialist, and efficiently treat common disorders. The family physician will also manage a chronic illness following referral by a specialist.

The healthcare needs, demands, and indices of India are unique. Thus, introducing the concept of public health at an earlier stage and the recommendations of standard textbooks to include Indian public health data is essential to other standard textbooks. Additionally, there is a need to prioritize skill acquisition from initial years of training as skills deserve primacy to suit public healthcare needs.

How should Competence-Based Medical Education (CBME) evolve?

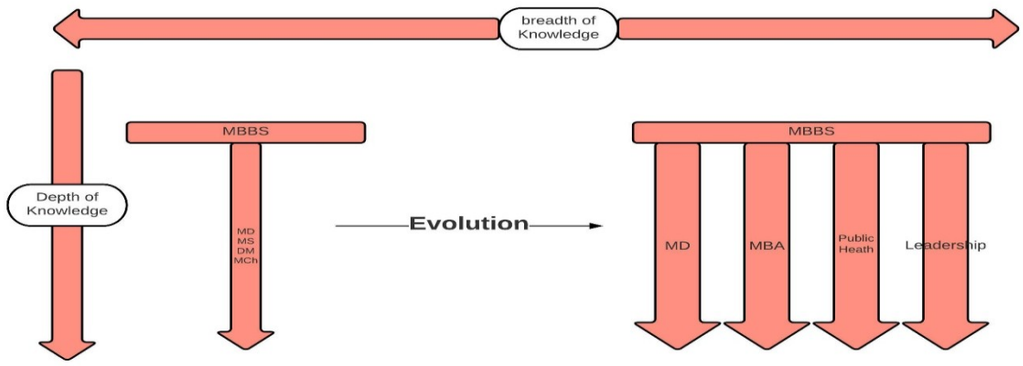
Keeping this in mind, the medical council of India and the Board of Governors in the previous years have implemented a very different System, CBME. This is a laudable and seemingly revolutionary system to impart the required knowledge and skills in particular.[17, 18, 19] Together this forms the competence. Each of these competencies has been structured, and nearly 5000 such competencies have been built into the curriculum. Apart from such dissection of the entire curriculum into more minor competencies, two significant changes were introduced in the MBBS program. The

didactic/lecture-based teaching was changed to learner-centric/small-group discussions and problem-based learning. Given the constraints in number of skilled faculty, this is challenging to implement in short term. Secondly, the training was reformed by introducing Early Clinical Exposure (ECE). Overall, ECE has been welcomed by students exposed to this new venture. CBME implementation required retraining the existing teaching staff to become familiar with this new strategy. Nodal and regional training centres in a few medical colleges were set up to impart this training (familiarisation) to the teachers.[20] Initial experience suggests that teachers have come forward to accept the training and have even become well trained to meet the expectations. However, large-scale changes need time, implementation, monitoring and handholding of medical education units of the colleges is being planned.[20]

The current curriculum is designed to equip specialist doctors with the necessary knowledge to gain a broad competency in health and develop in-depth expertise in a particular domain. This model has several advantages. However, given the requirement for multiple roles and competencies to meet the healthcare demands, there is a need to relook into physicians acquiring various competencies. This cannot be imposed on an already hectic medical curriculum as it stands. Moreover, most of these professional courses have limited dimensions of higher education. This conical model cannot serve to address the diverse requirements of healthcare in India. Therefore, the option of migration to facilitate multiple competencies should be built into the system.

Defining core competencies that are relevant across different fields of medicine, with equal emphasis on knowledge and skills and a broad general competency in the area. Fragmentation of curriculum into essential and optional courses would support the acquisition of credits from basic competencies and the option of switching to the stream of their choice. The initial few years of education can focus on fundamentals of medicine, public health, and wellness with an introduction to the healthcare problems that are relevant to the nation. These come under a multi competent agile model of learning.

Figure 1: Example of T shaped to a comb-shaped model of multiple competencies



Multiple migration options provided in the earlier part of the curriculum that offers young doctors to choose their areas of expertise. For example, after completing the core competency credits, a medical undergraduate can apply for a course on medical law and ethics and pursue a master's in administration. Such transdisciplinary competencies will enable the young professionals with the necessary skills to cater to unique healthcare needs. These migration options should have dual benefits of multiple entries and exits

Back to the future: The return of the family physician?

The CBME has also received criticism from other angles. The family practitioners opine that CBME is perhaps broadly speciality-driven.[20] Further, they have argued that keeping out family physicians and general practitioners from

the health system means a free flow of patients from the community to expensive tertiary care facilities without any structured referral system.[21] The CBME training has been in tertiary or secondary hospitals, and trained doctors are not well equipped to handle primary care patients. These tertiary centres attract conditions that are either well-formed or serious. The teachers are specialists or even super-specialists. This is quite different from a prototype presentation of patients at the primary care.

The dual problem of unavailable primary care doctors and family physicians, coupled with the growing tendency of first contact with a sub-specialist or a super-specialist without a proper sequential referral system in place, leads to speciality outpatients are increasingly getting crowded. The optimal use of specialities has suffered. The cost of care for common conditions has increased indirectly because of this phenomenon. It is known that specialists need more investigations that are also more expensive. A specialist is trained to exclude the less common but severe conditions lest they be blamed for missing such diagnoses. While consulting with a specialist is more valuable, it may not be most efficient for public health applications. This focus on super-specialization needs to be deemphasized, and more emphasis should be on primary care doctors.

The family physician or primary care system; efficient networking between the primary, secondary, and tertiary care services. The final impact of the recently launched Ayushman Bharat Pradhan Mantri Jan Arogya Yojana health insurance scheme by the health department remains to be seen. If well implemented and utilized, half the population may be expected to move into a networked healthcare system. Referral from a family physician would become necessary to benefit from higher/specialist centres.

Redefining skills and competence for MBBS

Training of medical students needs to shift from tertiary care hospitals to the training of clinical and healthcare skills at designated Public Health Centres [District Health Centres and Primary Health Centers]. This on-the-job observer ship and supervised training for half a day followed by half a day of online or in-person classes can provide early skill acquisition and help the medical students come up with innovative solutions to the healthcare problems in the country.

The required skills to operate at Rural Health Centres are not taught during undergraduate (MBBS) or postgraduate (MD/MS), which are the need of the hour. Hence, there should be a system in place to achieve higher standards of medical education, which will generate efficient medical graduates and consequently better health care delivery, resulting in the desired change in the healthcare sector of our country.[22] One of the goals of the Undergraduate Medical Education is to make services of medical professionals' access to all citizens across geographical boundaries, and this can be achieved through every medical college allotting about five households in a village to each of the first MBBS students under 'Family Adoption Programme' during the entire undergraduate program. This will help groom MBBS students as 'complete doctors' with empathy and confidence to be leaders in socio-health fronts (Vanikar & Vijayendra, 2021).[23] This program can be implemented in a phased manner from pilot to the full-fledged family adoption program. Although ambitious in its vision, the feasibility of this model needs to be piloted.

Shifting training from ivory towers:

Most of the medicine in undergraduate is taught in ivory towers of medical colleges and tertiary hospitals. Apart from government hospitals, the patient flow into private institutes may not be adequate to gain enough expertise for a medical student. Furthermore, the primary care centers, district and community hospitals provide exposure to public health challenges, policies, and innovations. Therefore, a paradigm shift in teaching bedside/ clinical medicine from these ivory towers to community and district hospitals must be considered. This will also serve the medical students to understand, innovate and contribute to the public health challenges in the country.

Substantial discussion is happening on the MBBS doctors' competence and the required syllabus. This is essential to match the skills needed to address the needs at the primary care level.[16] It must be realized that healthcare is teamwork, and several groups of workers operate. More staffs are needed to attend the primary care as the numbers needing care are high though the health concern in each is mild. The numbers requiring attention at higher centres drop, and hence fewer specialists may be needed.

Entry and Exit level attribute for medical graduation:

It may be interesting to note that in the present context, most of the students aspiring to be in healthcare sectors are not tested for their aptitude, skills, and competencies at the entry-level in the aspirants. The exit test for the new doctors from 2023 will be NEXT, which is expected to examine practical skills and knowledge. This process initiated by the NMC is indeed a landmark in Indian healthcare human resource preparation.[24] It is also time to consider aptitude, skill, and choice for selection at the entry-level. As part of their primary medical education, most of these new medical students need to be exposed and trained in wellness centres and primary health centres. Keeping this in mind, the desired element for a good UG medical college should be a bunch of wellness centres, PHCs or urban dispensaries, and where required, also CHCs. The PG training may demand the big multi-speciality hospital, though.

Nurse as entry-level eligibility:

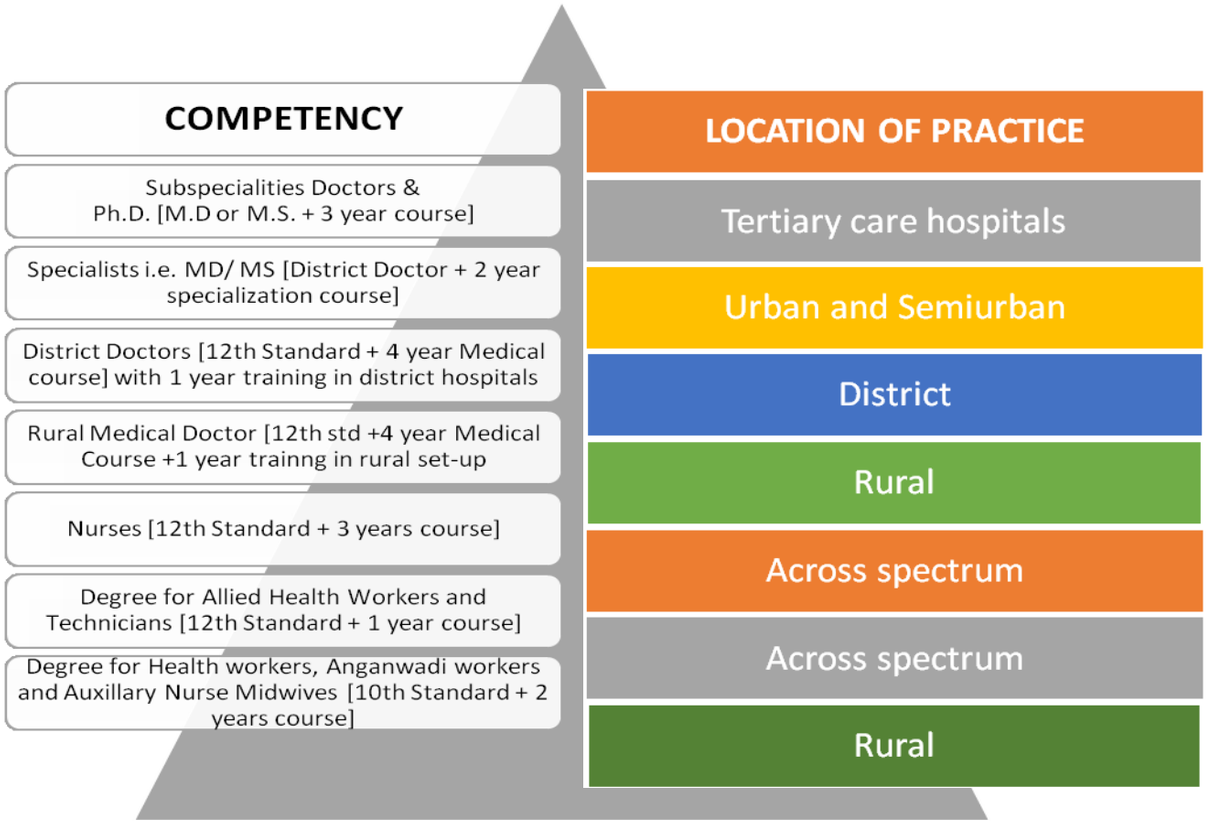
The nurses at the hospital and the community health workers, including the Accredited Social Health Activist (ASHA) workers at the community, form the human resource base for healthcare. The next level person is the primary care doctor or family practitioner. The latter need to be also conversant, if not applied, with the skills of the nurses and community health workers. Skills that a nurse or community health worker uses will either be necessary or complement a doctor's work. For that matter, the amount of time that the patient spends with the nurse is more than that with the doctor in most inpatient care services. However, the nurses are not empowered with prescribing power adds to the problem in rural settings. [25]

Should the entry-level of education to become a doctor be a nursing or health worker course? It is an alternative to be considered. The population of students who wish to choose a direct patient-care service as their career or profession may start as a nurse or community health worker and then build a career upwards as family doctors, nurse practitioners, specialists, medical faculty, and so on. The National Education Policy that was recently adopted has some leads to this kind of alternative or inclusive strategy.[26]

The MBBS and postgraduate doctors prefer to work in cities, creating a vacuum in the rural and peripheral areas. Also, many services may not require a full-fledged doctor at the primary and promotive healthcare level. Hence, there is an urgent need to prepare and sustain an army of grass-roots healthcare workers to provide care in rural areas. This can be achieved through nurse practitioners, mid-level healthcare workers, and shortening the course of MBBS. This workforce requires appropriate skills, competencies, and knowledge of persons with a background in medicine to provide healthcare services in rural areas and assigned with limited right to practice medicine and prescribing treatment in primary and preventive care under various national health programs and disasters.

Defining a multistage, multi-level entry and exit options that can seamlessly transition across the cadres will ensure a that the human resources across cadres will be able to pitch in with the demands of public healthcare delivery. It is summarized in figure 2.

Figure 2: A novel strategy to favour multidisciplinary multiple entry-exit hierarchical course in medicine



This shifts the training from specialist-driven teaching to skill-learning from the base-level service providers. The training should also change from tertiary hospitals to community health, primary care, and wellness centres. Early clinical exposure becomes an exposure to a real-life situation; 'early' meaning the presentations at primary care and early as trainees. It must be remembered that the doctor's skills also include communication skills.[27] The CBME has included this skill in the AETCOM module. However, this is best learned by practice. The practitioners need to have more than adequate exposure to hone the skill. Communication with the patients and or their kin is the exercise for building this skill. At the same time, emulating and learning from the skilled staff working with the patients is needed.

Conclusion

To conclude, the ever-increasing demand for healthcare workers has forced new medical colleges and nursing colleges attached to tertiary centres across the country. Still, the quality of Indian Medical Graduates produced needs a lot to think about and work upon.[18] Unfortunately, this eliminates the undergraduate's exposure to much-needed primary care and wellness centres. Reforms in medical curriculum and training should be taken seriously, and all efforts should be made to bring them to the reality of our country's need. Other steps that should be undertaken are medical education should be based upon the need of the country, adoption of innovative digital-based synchronous and asynchronous teaching, both in-person and digital learning methodology (hybrid model), early introduction of clinical postings, family

adoption program, shortening the course of MBBS, problem-based learning, adjustments in the course structure, updating of course content, rationalizing assessment strategy, and emphasis on structured and skill-oriented internship.

Declaration

All the authors declare that the views expressed through the manuscript and the content in the manuscript do not represent the views of the post or the office that the authors are holding.

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