Ann Natl Acad Med Sci (India), **53(4):** 179-193, 2017

Medical Education in India

Shridhar Sharma[1], Gautam Sharma[2]
National Academy of Medical Sciences, New Delhi[1],
Department Psychiatry, RML Hospital & PGIMER, New Delhi[2].

ABSTRACT

India, a country with rich cultural and health care heritage has progressed by leaps and bounds since independence. The health indices have improved and mortality and morbidity have come down significantly. The health care system of India is a mix of public and private sector. In 2017, there are 479 medical colleges in India with admission capacity of over 60,000 at the undergraduate level. The pattern of modern medical education is modeled after the British system and the first few medical schools were established in 19th century. Medical Council of India (MCI), the government-mandated regulatory agency for medical education, was formed in 1934. The Government of India is regularly reviewing the existing medical education policy to give it a new direction so as to make the curriculum relevant and responsive to the national needs. The MCI has also recognized the need to reduce the artificial compartmentalization of the curriculum into preclinical, para-clinical and clinical disciplines. Horizontal and vertical integration is being promoted but not practiced in most medical colleges. Instruction remains teacher-based and not much emphasis has been laid on self-directed learning. There is a paucity of innovative approaches and lack of adapting the recent technology into most medical schools in India. Skills such as related to communication and managerial domains, and professionalism are not imparted in the current curriculum. While the level of knowledge in the medical sciences is highly unsatisfactory, medical graduates are often found to be lacking in the clinical skills. So far, attempts to introduce innovations in medical education have been limited to certain institutions. Also, there is lack of adequate motivation and opportunities for faculty development. It is strongly felt that there is a need to redefine the goals of medical education in India depending upon the needs of the society. MCI has recently attempted designing a need-based curriculum. At present, medical education in India is at a significant juncture with initiatives coming from both external and internal influences, and the political will to attain the goal of health for all, India hopes to be in a better position to prepare physicians for the 21st century.

Keywords: History of medical education in India, health care system in India, traditional system of medicine, medical teaching curriculum, development of medical teachers, National Health Policy.

General

India is one of the oldest civilizations and has a rich cultural and health care heritage. It has achieved much socioeconomic progress during the 70 years of its independence. India has become self-sufficient in agricultural production and is now emerging as a fast developing country in the world. The country covers an area of 3,287,240 sq km and extends from the snow covered Himalayan heights to the tropical rain forests of the south. The mainland comprises four regions, namely the great mountain zone, the plains of the Ganga and the Indus, the desert region and the southern peninsula.

Correspondence : Prof. Shridhar Sharma, Emeritus Professor, D-127, Preet Vihar, Vikas Marg, Delhi-110092. Email: sharma.shridhar@gmail.com.

Situated entirely in the northern and eastern hemisphere, the mainland lies between latitudes 8.6 degrees and 37.6 degrees 'north, and between longitudes 68.7 degrees and 97.25 degrees east. The country is about 3050 km in length and 2950 km in breadth. The land frontiers total about 15,200 km while the total length of the coastline of the mainland, Lakshadweep Islands and Andaman and Nicobar Islands is 7516 km.

India's current population is 1,349,740,568 (1.34 billion) as of October 14, 2017. India has 638,000 villages and 72.2 percent of the total population lives in the rural areas (1). The national average for sex ratio in 2017 is 945 females per 1,000 males. The second most populous country in the world, India is the home of almost 17.90 per cent of the world's population; and the country accounts for 2.42 per cent of the world's total area.

India's constitution envisages the establishment of a new social order, and one of the primary duties of the individual states is to improve public health. Health is a national objective, but components such as population control, medical education, and drug control are under both the central and state governments. As such, constitutionally, the responsibility for health care lies with the state governments, while national health policy formulation and overall coordination of the work of the state health departments is managed by the Central Union Government.

Health Care System

The health care system of India is a mix of public and private sector. The public or the Government sector has three main levels: central, state and local. At the central level is the Ministry of Health and Family Welfare (IMHFWI), with the Directorate General of Health Services as the technical wing. The MHFW is headed by a cabinet minister, and consists of the two departments of Health and Family Welfare. The Department of Health is headed by a Secretary to the Government of India while the Directorate General of Health Services acts as advisor to the Government on both medical and public health matters. At the national level, a Central Council of Health and Family Welfare was set up in 1952 to act as an advisory body and to consider and make recommendations concerning all aspects of health policy.

India consists of 29 states and seven union territories. In each state and union territory, a ministry of health headed by a minister looks after health and family welfare. All the states have established directorates of health, and some states also have separate directorates of medical education. Each state is divided into districts, which total 676 in 2014 in the country. The district is the principal unit of administration in India, and the districts vary widely in size and population. In each district there is a district hospital and a district health officer, who is in overall charge of all elements of district health administration. The district is divided into sub districts talukas, each with a community health centre or upgraded primary health centre. At the end of March 2012 there were 4,833 community health centres, 24,049 primary health centres, and 148,366 sub-centres. There are 23,236 PHCs functioning as on March 2012 in the country as compared to 23109 in September 2004. The total number of functining subcentres for health facilities was 153,655 during 2015 (1). The primary health centres provide universally comprehensive health care services relevant to the actual needs and priorities of the communities at a cost which the people can afford. This includes preventive (vaccination, public health training, promotive (healthy health practices) and curative (medical-surgical services). Each primary health centre provides services for 20,000 to 30,000 people and is headed by a medical doctor. Under the primary health centres are the sub-centres, each of which covers a population of 3000 to 5000. Each Community health centre covers a population of 80,000 -1,00,000 and is spread over about 100 villages. A Medical Officer, Block Extension Educator, one female Health Assistant, a

compounder, a driver and laboratory technician look after the PHC. It is equipped with a jeep and necessary facilities to carry out small surgeries.

National health status indicators are shown in Table 1 (2-6).

Table 1: National Health Status Indicators

	1991	**2012**	**2017**
Population of India	846.302 million	1,220,200,000 (1.22 billion)	1,349,740,568 (1.34 billion) As of Oct. 14, 2017
Total male population	439.230	628,800,000 (628.8 million)	697,006,029 (697 million) (2017)
Total female population	407.072	591,400,000 (591.4 million)	652,734,538 (652 million) (2017)
Population growth rate		1.344 % (2011)	1.58%,
Infant mortality rate		47.57	30.15 deaths/1,000 live births (2009 estimated)
Sex ratio	927 females per 1,000 males	940 females per 1,000 males	943 females per 1,000 males
Crude birth rate		20.97 births/1000 population (2011 est.)	21.4 births/1000 population (2013)
Crude death rate		7.48 deaths/1000 population (July 2011 est.)	7.0 deaths/1,000 population (2013)
Density of population per sq. km	257	382	450 (2) (2017)
Proportion of urban population to total population	25.93	27.8	32.7 (3) (2011 Census)
Gross national product (Rs. in crores)		$4.16 Trillion PPP dollars, current prices- 2010	12034713 INR Tens of Million in 2016 (4) (8.594 trillion PPP dollars (2016) 99965.15 INR Billion in 2013 from 89328.92 INR Billion in 2012
GNP per capita			6490 (5) (2016)
Per capita expenditure on health and family welfare & water supply & sanitation (Rs.)	83.03	1312 Urban & 332 Rural	US$ 59.10 in 2011
Literacy rate (%)	52.11	74.04 (2011) Male (82.14% & Female (65.46%)	84.98% (6) in 2011
Work participation rate (%)	34.12	39.1% (2009)	Labor participation rate, male (% of male population ages 15+) in India was 80.70 as of 2011
Percentage of population below poverty line	29.9	Population below poverty line: 25% (2007 est.)	22% in 2011-12

No. of medical colleges		335 (2012)	In 2017, there were 479 Medical Colleges with admission capacity of 61,070 at undergraduate level. The total admission capacity for P.G. students is about 8684 in MS, 16195 in MD, 1280 in MCh, 1420 in DM and 3837 in various Diploma disciplines.
No. of hospitals/No. of beds in government hospitals (Including hospitals of local bodies)		475/435251	35,416 hospital with 13,76,013 beds as on 14 August 2013 in Govt. Hospitals
Population served per bed			879 as on 14 August 2013
No. of sub-centres			105451 (March 2011)
No. of PHCs			23,790 (March 2011)
No. of community health centres			4761(March 2011)
No. of doctors (registered with MCI)			9,36,488 up to 1.1.2015 which is estimated to be over 1 million doctors in India in 2018

As per information provided by Medical Council of India and Indian Nursing Council, the total number of registered doctors is 936,488 as on 31.12.2014, and as on 31.12.2013 auxiliary nurses midwives are 756,937 & registered nurses/midwives are 1673,338. "As per the Report of the Steering Committee on Health for the 12th Five Year Plan of the Planning Commission, India has 19 health workers (doctors – 6, nurses & midwives – 13) per 10,000 people in India, WHO norms provide for 25 per 10,000 people. Additionally, there are 7.9 lakh AYUSH including Homeopathic practitioners registered in the country (approximately 6.5 per 10,000)."

Evaluation

Efficient evaluation of medical education requires the use of both internal and external agencies; neither can completely replace the other. Used together properly they enable the medical school to evaluate the complex and ever changing field of medical education in a fair and equable manner first by the universities and then by Medical Council of India.

Brief History of Medical Education

Medical education in India has existed since ancient times. The philosophy of Ayurveda (traditional Indian system of medicine, which takes into account the holistic nature of health, was predominant between 800 BC and 600 AD and spread in all directions to other Asian countries, including Thailand, Malaysia, Cambodia, Indonesia and Mongolia.

Ayurveda is a traditional Indian system of medicine whose name literally means "Life" (*Ayuh*) "Knowledge" (*Veda*); in other words, knowledge of life. The origin of Ayurveda dates back to the later part of the Vedic period (1000-500 B.C.). There are two well-known Ayurvedic treatises, one by Charaka Samhita (compendiums), a physician, and the other by Sushruta Samhita, a surgeon who lived near the first millennium B.C. (8th - 7th century B.C.) (7-11). Out of the four Vedas which are supposed to be the oldest books known to the library of mankind, the Atharvaveda contains descriptions about the various medical problems and the concept of health (12). The most fascinating contribution in Ayurveda relates to

understanding the phenomenology of disease. A systematic attempt was made to classify diseases into eight broad disciplines. It was also thought that diseases are the result of imbalance of the "humors". Each disease was supposed to be influenced by a specific type of humor. Another interesting contribution of the Ayurveda was its knowledge regarding the relationship of diet and disease and on the role of environment (13).

The approach to training in Ayurveda was holistic and integrated. The state of health and disease is explained in this system based on the interplay of the constituent elements of the body: the general and alimentary regimen, and the influences of time and the season (13).

In the field of materia medica and pharmacy, the properties of drugs and foods were investigated. Diagnosis was to be made by the five senses, supplemented by interrogation. Diagnosis was based on cause (*karankaran*), prenomitary indications (*purva-rupa*), symptoms (*rupa*), therapeutic tests (*apace*) and natural history of the development of the disease (*samprapti*).

According to Shusruta, the physician (*chikitshak*), the drug (*dravya*), the attendants or the nursing personnel (*upasthata*), and the patient (*rogi*) are the four pillars on which rests the success of the therapy. It was a very holistic approach.

The science of Ayurveda received its highest patronage from Buddhist kings (400-200 B.C.). With the spread of Buddhism to Asian countries, Ayurveda also spread to those countries and was adapted to the local needs.

Siddha System

The Siddha system of medicine is quite akin to the Ayurvedic, but is practiced more in southern India. It gives greater importance to the preparation of potions, syrups, and the like, from herbs with medicinal value.

Unani Medicine

Unani medicine is Greek in origin and was brought to India by Muslim rulers. It is still practiced in certain parts of northern India.

Modern Medical Education

The pattern of medical education is modeled after the British system, for obvious reasons of colonial influence. The early medical schools were established at Calcutta (1822), Bombay (1826), and Madras (1827) with the limited objective of training apprentices with minimum qualifications to help the army personnel. The first full-fledged medical college was established at Calcutta in 1838 under the supervision of the General Medical Council of Britain after 1860. The period between 1838 and 1916 witnessed the establishment of approximately nineteen medical colleges with an annual intake of 1,000 students. Following the passage of the Indian Medical Council Act of 1933, the Medical Council of India (MCI) came

Table 2: Growth of Medical Education in Independent India (Allopathic System only)

Period	Increase in Number of Medical Institutes	Increase in Enrollment
1947 – 1965	17– 87	1,400 – 5,387
1965 – 1975	87 – 105	5,387 – 11,911
1975 – 1985	105 – 106	11,911 – 12,278
1985 – 1991	106 – 129	12,278 – 13,714
1991- 2012	129 – 335	13,714 – 41,569
2015 – 2017	335-479	41,569 – 61,070

into existence in 1934 (14,15). Along with the establishment of Medical Colleges, another category of institution, offering three to four years of training, was established by the provincial governments, missions and private organizations. These institutions trained students for the degree of Licentiate Medical Practitioner (LMP). Though LMPs helped in overcoming the acute shortage of trained medical manpower in India, they were subject to criticism as imperfectly trained health workers and therefore the system was discontinued after independence.

The appointment of the Health Survey and Development Committee, popularly called the Bhore Committee (1946) was the first attempt to lay down a comprehensive blueprint of health service in India, in the quest for Indianization of modem medical education (16-18). The Committee laid foundations for the development of a national system of health care based on primary health centers. It recommended expansion of medical colleges, abolition of Licentiate courses, upgrading medical schools into Medical Colleges, suggesting measures to improve the quality of training, and the establishment of an All India Institute of Medical Sciences (AllMS) (19). Following independence in 1947, and in pursuance of the recommendations of the Bhore Committee, India witnessed a phenomenal increase in the production of medical personnel (see Table 2).

However, in spite of this significant increase in the medical work force, the actual health needs of the people could not be satisfied as the distribution of doctors was erratic and irrational. For instance, the doctor - population ratio varies from state to state (from 1: 820 to 1:14015), with grossly unequal distribution between rural and urban areas (Table 3). The concentration of doctors in a few urban areas, the inadequacy and short supply of nurses and other health personnel, and the lack of relevance of training programmes to the actual health problems and needs of the population was a disturbing trend which resulted from the absence of a well planned health information system for regulating the development of human resources. The two major challenges for undergraduate medical education were therefore (i) to maintain standards and respond positively to modern concepts and methods in medical education, and (ii) to promote among graduates a sense of social responsibility and a spirit of dedication for serving the people, especially in rural areas. Unfortunately the infrastructure facilities in rural area are still very unsatisfactory.

Over the years, the government of India has appointed a number of committees and working groups to respond to these needs, Efforts to support and streamline the Indian medical education system have included the Health Survey and Planning Committee (Mudaliar Committee 1962) (20); the Committee on Multipurpose Workers under the Health and Family Planning programme (Kartar Singh Committee 1974) (21); the Group on Medical Education and Support Manpower (J. Shrivastav Committee 1975) (22); the Report of the Indian Council for Social Science Research - Indian Council for Medical Research (ICSSR-ICMR) Study Group (led by V Ramalingaswami

Table 3: Total number of doctors

Registered Doctors		**Number**
Modem Medicine	1.1.2015	9,36,079
Ayurveda	1.1.2015	4,02,079
Unani	1.1.2015	48,213
Siddha	1.1.2015	8,388
Homeopathy	1.1.2015	2,83,840
Naturopathy	1.1.2015	2,043

in 1981); the Adoption of the National Health Policy (1983) (23); the Medical Education Review Committee (Mehta Committee 1983)(24); working groups and planning commissions on medical education, training and manpower training; the National Policy on Education (1986) (25); and the Expert Committee on Health Manpower Planning, Production and Management (chaired by JS Bajaj 1987) (26, 27). More recently Niti Aayog has submitted a report to meet these challenges (28).

Reorientation of medical education (ROME) is a significant venture undertaken in India in collaboration with WHO SEARO with partial success. It was introduced in all the states of India in 1977 (29). Objectives of the ROME scheme are (i) to orient medical faculty, residents, interns and students to the conditions existing in rural communities and to provide training in the management of health problems encountered there; and (ii) to render comprehensive health care in the villages in collaboration with the concerned primary health centres. Accordingly, each medical college was to take on the responsibility for comprehensive health care in three community blocks (primary health centres) and was to gradually extend its coverage to the entire district. For this purpose, each medical college was to establish a well-knit rural referral system. Outreach activities, the posting of medical students in the community, the provision of mobile clinics, and the involvement of the entire faculty of the medical college were activities to be used for achieving the purpose of community based training.

The ROME Scheme has met with only partial success because of such factors as the lack of necessary infrastructure, logistics, the lukewarm attitude of medical faculty to participation in community based training, and the lack of concerted effort and institutional mechanisms for implementation. Moreover, neither a reward structure nor accountability and evaluation of ROME activities were part of the programme. On the positive side, some medical schools with effective leadership and faculty motivation have made significant progress towards community-oriented training (28).

Role of National Policy in Shaping Medical Education

The government of India instituted a National Health Policy in 1983 which was modified in 2002 emphasized that the effective delivery of health care services depended largely on the nature of the education and training received by the various categories of medical and health personnel, including its orientation towards community health, as well as on the capacity of the different types of health personnel to function in integrated teams, each member performing given tasks within a coordinated action programme (23,30). The National Health Policy reiterated that the entire basis of, and approach towards, medical and health education at all levels should be reviewed in terms of national needs and priorities. Curricula and training programmes were to be restructured (23,31) in order to produce personnel of various grades of skill and competence who are professionally equipped and socially motivated to effectively deal with day-to-day problems.

Towards this end, legislators believed it necessary to formulate a separate National Medical and Health Education Policy that (i) sets out the changes required in the curricular contents and training programmes for medical and health personnel of various levels of functioning; (ii) takes into account the need for establishing the extremely essential interrelations between functionaries of various grades; (iii) provides guidelines for the production of health personnel based on realistically assessed manpower requirements; (iv) seeks to resolve the existing sharp regional imbalances in availability of manpower; and (v) ensures that personnel at all levels are socially motivated toward rendering community health services.

The need for a national education policy in the health sciences was also expressed in the

reports of the Medical Education Review Committee in 1983 and the Expert Committee on Health Manpower, Planning, Production and Management in 1986 (24,25). The Committees brought into sharp focus the essential linkages between health and education policies, and emphasized that health planning and health services management should optimally interlock with the education and training of appropriate categories of health manpower through health related vocational courses.

The government of India is regularly reviewing the existing medical education policy to assess its strengths and weaknesses and give it a new direction, so that it has greater relevance and is more responsive to the national needs and health care system (31, 32). The emphasis is on balancing the availability of graduate and postgraduate doctors with their distribution (33-35). It has become necessary to correct the imbalance which has arisen and caused an over-abundance of many specialists and super specialists but a paucity of primary health care physicians. It is also necessary to control the increasing production of doctors (36-38).

As a part of this policy, the government of India in collaboration with the MCI has recently developed guidelines and regulations pertaining to the establishment of new medical colleges, the opening of higher cases of study, and greater control of the admission capacity of medical colleges (11). These guidelines also encompass objective assessment of the capabilities of medical institutions. It is envisaged that the MCI will assess both the desirability and the feasibility of starting new institutions, and will increase the number of courses in existing medical colleges. With this there is a shift in control from the state governments and universities to the federal government and the MCI. Some recent notifications like National Medical Commission Bill, which is awaiting Parliament approval is going to have far-reaching repercussion in different aspects of Medical Education and Health Care delivery in India.

Demographic Profile of Medical Undergraduates and Faculty

Regulations of the Medical Council of India

Regulations of the MCI require that, for admission to medical college, a candidate should be at least 17 years of age and should have passed the Higher Secondary qualifying examination, or the equivalent, held after 12 years of schooling (34-39). Most states have adopted a 10 plus 2 pattern of education, which means 10 years of secondary and two years of higher secondary education, which latter should include physics, chemistry, biology and mathematics or any other elective subject with English as the core subject. A candidate seeking admission to an MBBS course must have passed the qualifying examinations with a minimum of 50 per cent aggregate marks in English, physics, chemistry and biology.

Selection of students by medical colleges is based solely on the merit of the candidate. In states with only one medical college, the marks obtained in the qualifying examinations are used as the basis for admission. In states, where more than one university/examining body conducts qualifying examinations, an additional competitive entrance examination is held. The All India Institute of Medical Sciences (AIIMS) has its own multiple-choice entrance examination. Most states also have a residency requirement for admission to 75 per cent of the places, although in institutions such as AIIMS, all seats are open to candidates from all states and union territories. The Government in 1987 introduced an All India Entrance Examination to be used as the basis for selecting 15 per cent of candidates for each government medical college, and each medical school must reserve 15 per cent of its places for students from this national merit exam list. Thus, 15 per cent of students usually come from states other than that in which they study while 85 per cent live in the state in which they study. The Council has also established the minimum requirement for admission to medical college as 50 per cent aggregate marks in English, physics, chemistry

and biology, although this requirement is under review and, for candidates belonging to scheduled castes/scheduled tribes, the minimum aggregate marks required are 40 per cent. The Indian constitution guarantees that educational institutions will reserve places for applicants from specific scheduled castes and scheduled tribes that have traditionally lacked such opportunities). Recently (since 2016) the MCI has introduced an all India entrance examination for all seats of MBBS in all medical colleges to have uniformity and convenience to the students, called Undergraduate National Entrance and Eligibility Test (UG-NEET) conducted by the Central Board of Secondary Education (CBSE), New Delhi.

Certain self-financing non-government colleges admit 15 to 25 per cent students on merit as well as on donation as agreed by the Government: These institutions are run by private trusts or by societies and are not entitled to receive government grants. These private medical colleges could adopt their own fee structure and charge capitation fees. However, the charging of capitation fees has recently been banned by the Supreme Court of India while· the fee structure is now controlled by the Government and varies from state to state. The fee structure also varies widely between private medical colleges and government institutions.

Trends over the Years

A detailed demographic profile of medical students and medical faculty is not available. However, the general trend, as evidenced by the large number of applicants every year, is that medical school admission and a medical career is becoming more and more coveted. All increasing number of candidates belongs to the upper middle classes and more and more students whose parents are educated and employed in urban settings find places in medical school but there is also increasing number of Schedule Caste and Schedule Tribes students joining the medical college during the last two to three decades.

Guidelines by the Medical Council of India for Teachers

The MCI, as a national regulating body, lays down standards regarding the number of faculty for each discipline and the minimum qualifications and experience required for teachers at different levels. To be eligible for the lowest teaching positions (lecturer/assistant professor) in a medical college, a teacher must have a postgraduate qualification (MD/MS) as well as a graduate qualification (MBBS) and a minimum of three years experience as a registrar/senior resident.

To be eligible for a professorship, a teacher must have a minimum of ten years experience after obtaining an MD or MS, of which at least five years must be at assistant professor level or above. There are some variations in different universities, but each medical college must fulfill the minimum eligibility criteria. Recently the MCI has also included necessary research experience with research publications as eligibility criteria for teachers in their promotion. There is a dictum that when numbers increase the average tend to fall. Hence, there is decline in the standard of teachers (40).

Undergraduate Curriculum and Innovations

Description of Existing Curriculum

The nature of the medical curriculum falls within the purview of the MCI, which prescribes the curriculum, lays down procedures for admission and patterns of examinations and regulates the minimum requirements for physical space, equipment, staffing patterns, etc (39). While the Council sets down broad principles and minimum requirements, the details are left to the universities and colleges.

The medical course consists of four and a half years of undergraduate study followed by a one year compulsory rotating internship. The curriculum is discipline-based. The first 18 months (known as Phase I) includes the preclinical subjects of anatomy, human

physiology and biochemistry (15 months) and an introduction to perspectives of medical education (3 months). Phase II covers clinical subjects, and is taught over a period of 18 months. This course consists of pathology, microbiology, pharmacology, forensic medicine, and community medicine. Phase III, the continuation alongwith the study of paraclinical subjects, consists of medicine, surgery including orthopedics, obstetrics and gynecology, pediatrics including social pediatrics and eye and ENT (ear, nose and throat), and a community medicine posting.

Clinical postings begin in the Phase II years, i.e. after one and a half years of preclinical studies, and students are posted for not less than three hours per day. University examinations are usually held at the end of the preclinical and para-clinical phases. The examination for the clinical phase is held in two parts, the first consisting of community medicine, ophthalmology and ear, nose and throat; and the second part consisting of medicine, surgery, and obstetrics and gynecology. The examination includes theory and practical elements as well as an assessment for each student by the medical college teachers which accounts for approximately 10 per cent of the total marks.

After passing the MBBS examinations, candidates are granted provisional registration for one year, during which time they undergo a compulsory rotating internship. The internship is fulfilled in teaching and approved hospitals such as district hospitals and rural health training centres or upgraded primary health centres attached to training institutions. The internship includes hospital training for six months in medicine, surgery, and obstetrics and gynecology; and training' for six months in community health' work in an appropriate health centre, which also includes in-service training in family planning clinics for one month. The Council provides for training in any elective clinical subject such as pediatrics, ophthalmology, otorhinolaryngology, dermatology, psychiatry.

There is no structured curriculum for the training and evaluation of interns. However, broad guidelines have been provided by the MCI (39,40). The intern maintains a record of work that is verified and certified by the medical officer under whom he/she works. Based on the record of work, the dean of a medical college will issue a certificate of satisfactory completion of training, after which the university awards the MBBS degree. Full registration is given by the State Medical Council on the award of the MBBS degree by the university. The universities that medical colleges are affiliated to are responsible only for conducting examinations and awarding degrees.

Objective of Graduate Medical Education

The MCI has emphasized the objective of producing medical graduates who are capable of functioning independently and effectively in both rural and urban settings. The importance of social factors in relation to health and disease, the teaching of health education, the need for stressing population control and family planning, and the provision of teaching opportunities in outpatient departments, emergency departments, and community settings have all been highlighted (39).

Though a discipline-based curriculum has been suggested, the council has recognized the need, through the practice of integrated teaching, to reduce artificial compartmentalization of the curriculum into preclinical, para-clinical and clinical disciplines. For this purpose, the Council has recommended interdepartmental integrated teaching-learning activities. The MCI has recommended that a mechanism be established to promote both horizontal and vertical integration among the preclinical, para-clinical and clinical disciplines, but this recommendation has not yet been instituted in most medical colleges. Regarding the method of instruction, MCI favors reducing the amount of didactic teaching and increasing participation in such activities as small group discussions and seminars. Traditionally, however, instruction in

medical schools has been teacher-oriented rather than learner oriented, and attempts to reverse this trend have been limited to a handful of medical schools. The paucity of innovative approaches is attributed mainly to inadequate opportunities for teacher training and orientation, lack of incentive structures to recognize and reward the teaching effort, and preoccupation with patient care or research as a preferred activity.

Analysis of Strengths and Weaknesses of the Present System

Certain deficiencies need to be addressed when launching curricular innovations. Currently in India, teaching is not aligned with the morbidly pattern prevalent in the primary health care setting, and it is alleged that the topics of rare diseases and complicated cases take precedence over the topics of common interest that have great relevance to the public health situation. Although community health problems prevalent in India are covered in the syllabus for undergraduate medical education, instruction in, and evaluation of, these aspects of medicine are not adequately emphasized.

Other inadequacies in the medical school curriculum induce the fact that the activities and skills expected of a primary care physician, such as communication and managerial skills, working as a member of health team, rational drug therapy, and cost-effective interventions, are not addressed. As well, the sites of training, being predominantly hospital based, are not congenial for training in primary care.

While the level of knowledge in the medical sciences is highly satisfactory, medical graduates are often found to be lacking in the skills required for patient management, especially in regard to common emergencies. Development of communication skills and attitudes, including ethical and humanistic attitudes, is yet another area of concern, while the need for the introduction of psychological and social aspects of health and disease possibly through courses in behavioral sciences is keenly felt. The assessment system in vogue is held to be a main culprit of the shortcomings of medical graduates, as it tests recall of information rather than the ability to analyze facts, interpret data and arrive at conclusions regarding the meaningful application of knowledge gained for solving the real problems of the individual and the community. The greatest challenge for medical education in India, therefore, is to design a system that is deeply rooted in the scientific method and yet is profoundly influenced by the local health problems and by the social, cultural and economic settings in which they arise.

So far in India, attempts to introduce innovations into the curriculum have been limited to certain institutions, and sometimes even to individual departments of an institution. Nevertheless, these isolated and modest attempts to reflect an increasing awareness of the needs of modern medical education and the perseverance required to swim against the current.

Staff Development

One of the serious deficiencies of medical education in India, as in many other countries, is the lack of adequate motivation and opportunities for faculty development, which *results in indifference to research in teaching and education*. While medical teachers may be highly efficient professionals in their respective branches of specialization, they display a kind of amateurism in the role of educator. This might be because of the fact that teaching efforts are not rewarded or even considered a desirable criterion for selection or promotion compared *with clinical skills or contributions to research in the medical sciences*. It is for this reason that innovative approaches to curriculum planning, instructional design and application of educational technology have not received much stimulus in the past. However, there are reasons to believe that the trend is shifting. Recently, emphasis has been placed on faculty

development by the education policy on health sciences, and MCI is also taking a fresh look at faculty development. It is therefore likely that a significant impact on faculty development and research in medical education will be felt. However, National Academy of Medical Sciences (India), an autonomous organization under the Ministry of Health and Family Welfare (MoHFW) has been entrusted by the MoHFW to undertake continuing medical education (CME) programmes not only to enhance and updating the knowledge and skills of medical teachers and practicing health professionals but also to undertake research activities in medical education in the country (41).

Besides, at present, there are few National Teacher Training Centres (NTTCs) - in Pondicherry, Varanasi and Chandigarh. There is also a Centre for Medical Education and Technology (CMET) at AIIMS, New Delhi, and approximately a dozen other medical education units are attached to medical schools which are actively engaged in medical education activities. With the establishment of new universities in health sciences, in many states, a few more regional centres are expected to appear in the near future (42,43).

A group of medical schools in the country led by the four leading institutes - AIIMS, New Delhi, Institute of Medicine, Banaras Hindu University (BHU), Varanasi, Christian Medical College, Vellore and Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry - have organized a national Network for undertaking innovative projects in medical education. Currently there are twenty medical colleges which are members of this Consortium and it is planned to conduct Advance Courses on Fellowship in Medical Education (FIME) with the purpose of developing educational practitioners who can lead educational changes in their institution to make medical education responsive to the health needs of the country. Presently, ten Nodal Centres have been recognized by the MCI for this purpose (42, 43).

Teaching the Teacher to Teach (Training of Trainers)

Medical educationists agree that medical teachers need to be taught the methods and science of education. This should be made compulsory but is still an option. This approach should be inquiry driven and help in improving the teaching and technical skills. The efficiency and effectiveness of medical education will be influenced by incorporating these changes (42-44).

Role of the Government and Private Sectors

Traditionally, the Indian medical education system has been scarcely influenced by the private sector. However, of late there has been fresh thinking to encourage private initiative and investment, particularly in view of current resource constraints, provided the initiatives satisfy the minimum standards. However, with the sudden increase in the number of Private Medical Colleges, the quality of education is falling. While this has reduced the financial pressure on the government, it has also promoted a high technology culture, with excessive reliance on technology-oriented diagnostic tools / and techniques, making health care more expensive.

India is a signatory to the goal of Health for All and as such the production of physicians who are able to play their roles effectively as leaders of the health team in providing comprehensive primary health care is considered important in medical training. The points of view earlier raised at the Edinburgh Declaration of the World Federation for Medical Education (WFME) have been fully endorsed at the national level (44-46).

Issues and Trends (and Predictions)

The need to redefine Goals

The need to redefine goals of medical education is unequivocal and imperative. Such revision should be based upon careful study of

a) The health needs of society,
b) Philosophy of scientific thinking,
c) The professional characteristics of physicians.

Traditionally, education for any profession has been designed to

i) Recruit adequate numbers of qualified students,
ii) Educate and train them in the necessary areas of knowledge and application of that knowledge along with the skills and attitudes required,
iii) Certify for public protection and successful practice of that profession.

Further, health care needs of society are not static and are different for different societies and have remarkably changed within each society. Secondly, as new scientific knowledge is generated with concomitant growth of technology, so medical education grows longer in duration and more expensive. The apparent response of medical educators to these remarkable accreditations of knowledge to add them to the already overcrowded medical curriculum is not always smooth.

Shortage of medical and health care man powers might be no more than incorrect utilization of presently available manpower and inadequate understanding of health personnel needs. Significant patterns of delivery of health care have also changed over the last few decades and the goals of medical education surely must reflect these changes. The growth in communication technology has also greatly influenced the rapid advancement of scientific knowledge but also its application with democratization process. It has also changed the expectations of patients.

Some major initiatives that have taken place recently include suggestions for the planned constitution of a Medical Education Commission and recent attempts by MCI to design a needs-based curriculum. As well, a Consortium of Health Institutions involving the AIIMS, New Delhi, the Institute of Medical Sciences, BHU, Varanasi, JIPMER, Pondicherry, and the Christian Medical College, Vellore, in collaboration with the Department of medical Education, University of Illinois, Chicago, USA, has been established to spearhead the reorientation of medical education.

Thus, at present, medical education in India is at a significant juncture. With initiatives coming from both external and internal influences, and the political will to attain the goal of health for all, India hopes to be in a better position to mould physicians entering the twenty-first century. Although the Medical Education Commission constituted, it is expected to assume a three-fold function of analyzing the needs of education in medical health sciences, deciding a pattern of financing the same and establishing mechanisms of coordination among different professional councils and other bodies.

Well defined, broad-based revision of the rules and regulations governing undergraduate and postgraduate education is currently being undertaken by the Medical Council of India. This will help every medical school to improve training and teaching. After the dissolution of the Medical Council of India, the National Medical Commission will guide the medical education and health care in India.

References

1. https://data.gov.in/catalog/rural-health-statistics-2015.
2. https : // data. worldbank.org / indicator / EN.POP.DNST.
3. http://censusindia.gov.in/2011-prov-results/paper2/data_files/india/Rural_Urban_2011.pdf.
4. https : // tradingeconomics.com / india / gross-national-product.

5. https:// data.worldbank.org /indicator / NY.GNP.PCAP.PP.CD.

6. http://niti.gov.in/content/literacy-rate-7years#.

7. Charaka Samhita (1949). The Charaka Samhita. 6 Volumes. Sanskrit Text with Introduction and Translations in Hindi, Gujarati and English. Lamnagar / Jamnagar: Shri Gulabkunverba Ayuurvedic Society.

8. Acariya NR, Acharya JT, eds. (1945). The Susrutasamhita, with various readings, notes and appendices. Bombay: Nimaya Sagar.

9. Sharma PV (1972). Indian medicine in the classical age. The Chawkhamba Sanskrit Studies Volume 85. Varanasi: Chawkhamba.

10. Sharma SD (1962). Medical Education in India. *Intermedica* (London) **4**(1): 11.

11. Sharma S, Kacker SK (2014). Medical Education in India. An International Hand Book on Medical Education. Westport, Chicago: Green Book Publishing Group.

12. Atharva Veda Samhita (1962). The Hymns of the Atharva Veda. Translation with commentary by Griffith TH, Abhimanyu MJ, eds. 2 Volumes Reprint. Varanasi: Mosler Khelari Lal and Sons.

13. Dhanukar SA, Karandikar WM (1987). Tridosha concept in Ayurveda and scientific correlates in modern medicine. *Arogya J Health Sci* **13**: 102-109.

14. https://www.mciindia.org>introduction.

15. Keswani NH (1968). Medical education in India since ancient times. Talk presented at the International Symposium on the History of Medical Education, Los Angeles.

16. Report of the Health Survey and Develoment Committee (Bhore Committee) II and IV (1946). Delhi: Manager of Publication, Government of India (https://www.nhp.gov.in).

17. Anonymous (1982). Compendium of Recommendations of Various Committees on Health Manpower Development, 1943-1975. New Delhi: Government of India, Ministry of Health and Family Welfare.

18. Anonymous (1988). Medical Education in India. New Delhi: Government of India, Ministry of Health and Family Welfare.

19. Sharma SD (1991). Medical Education and Social Responsibility. Inquiries-driven Strategies for Innovation in Medical Education in India. SEARO-WHO Project. New Delhi: All India Institute of Medical Sciences, 56-59.

20. Mudaliar AL (1962). Health Survey and Planning Committee. New Delhi: Government of India, Ministry of Health and Family Welfare.

21. Singh K (1974). Report of the Committee on Multipurpose Workers Under the Health and Family Planning Programme. New Delhi: Government of India, Ministry of Health and Family Welfare (http://www.nihfw.org/NDC/Documentationservices/Committee (last accessed on Dec., 2017).

22. Shrivastava JB (1975). Report on Medical Education and Support Manpower. Bombay: Allied Publishers.

23. Anonymous (1983). The National Health Policy 1983. New Delhi: Government of India, Ministry of Health and Family Welfare.

24. Ministry of Health and Family Welfare (1987). Expert Committee (Bajaj) on Health Manpower Planning, Production and Development, New Delhi: Government of India, Ministry of Health and Family Welfare.

25. Report of the Medical Education Review Committee (1983). Dr. Shantilal J Mehta Committee on Medical Education Review, established vide Government of India Resolution, dated 8th September, 1981.

New Delhi: Government of India, Ministry of Health and Family Welfare.

26. Anonymous (1987). Report of Expert Committee on Health Manpower Planning, Production and Management. New Delhi: Medical Council of India.

27. Bajaj JS (1989). Draft National Education Policy for Health Sciences. *Indian J Med Edu* **29** (1&2).

28. National Health Policy (2002). Ahuja R (2016). Niti Ayog Vision Document: Does India need a National Health Policy, July 5, 2016. Financial Express (https://www.financialexpress.com).

29. Anonymous (1988). Reorientation of Medical Education (RoME). Booklets 1-4. New Delhi: World Health Organization, SEARO Publication No. 18.

30. National Health Policy (2002). https://www.apps.who.int.

31. Anonymous (1981). Recommendations on Graduate Medical Education. New Delhi: Medical Council of India.

32. Anonymous (1991). Medical Education Reexamined. MFC Anthology. Bombay: Medico Friends Circle.

33. Health Information of India (1992). Central Bureau of Health Intelligence. New Delhi: Government of India, Ministry of Health and Family Welfare.

34. Anonymous (1992). Draft Paper on Revised Curriculum for Undergraduate Medical Education. New Delhi: Medical Council of India.

35. Anonymous (1998). Recommendations on Postgraduate Medical Education. New Delhi: Medical Council of India.

36. Sharma SD (1972). Problems and perspectives in medical education. *Indian J Med Edu* **11**(2-3): 1-3.

37. Sharma SD (1989). National Policy on Education in Health Sciences. Regional Seminar on Higher Medical Education, Bhopal, India: National Board of Examinations.

38. Sharma SD (1990). National Policy on Education in Health Sciences. Regional Seminar on Higher Medical Education, Bhubaneswar: National Board of Examinations.

39. Sharma SD (1990). Medical Education and Medical Manpower Development. New Delhi: Inaugural Address of the Expert Group, Feb. 1990.

40. Medical Council of India (1997). Regulation on Graduate Medical Education. New Delhi: Medical Council of India.

41. Anonymous (1981). Continuing medical education programme - A compilation, 1968 – 1981. New Delhi, National Academy of Medical Sciences, 1981.

42. Medical Council of India (1998/2017). Minimum qualifications for Teachers in Medical Institutions Regulations, 1998 (Amended upto 8th June, 2017). New Delhi: Medical Council of India (https://www.mciindia.org/documents).

43. Medical Council of India (1997). National Faculty Development Programme. MCI Regulations on Graduate Medical Education, 1997. New Delhi: Medical Council of India (https://www.mciindia.org).

44. World Federation for Medical Education (1988). The Edinburgh Declaration. *Lancet* **8068**: 464.

45. World Health Assembly (1989). WHA Resolution 42.38. Geneva: WHO.

46. Singh K, Bajaj JS (2015). Using technology to deliver cost-effective continuing professional development (CPD). *Ann Natl Acad Med Sci (India)* **51**(1): 45-53.