**Systemic Deficiencies in Medical Education System of India: A Review with Radical Solutions**

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**Abstract:**

India struggles the concerns of poor quality of medical education, incompetent medical workforces, and insignificant research contribution to the world, which is due to the malfunctioning of Indian regulatory bodies. Many authors (domestic and foreign) have written extensively on the prevailing deficiencies of the medical education system of India in the last decade but essentially failed in offering effective and realistic solutions for the deficiencies cited by them. Our study undertakes a detailed review of the articles published in the last decade that critically analyses the various aspects of the medical education system of India with the objective to present the deficiencies in the medical education system in the country supported by statistical facts and figures. Our article also attempts to present effective solutions for the same as publicized by the regulatory bodies of medical education and health care system of India.

**Key Words:** Medical education, competency-based curriculum, globalization**,** privatization, medical council of India, national medical council, the regulatory body

1. **Background:**

Indian higher education system is one of the largest in the world, with 51,649 institutions (1). In terms of enrolment, India is second only to China (41.8 million) with 35.7 million students currently enrolled in universities and colleges (2). India continues to produce the largest number of doctors and nurses in the world. The overall doctor-population ratio stands as 1:1456, which falls behind the WHO recommendation of 1:1000 (3). The Center for Disease Dynamics, Economics, and Policy, in their report, estimates that the Indian government provided only one government doctor to every 10,189 people creating a deficit of 6,00,000 doctors (4). According to the Medical Council of India (MCI), medical colleges in India have increased from 20 at the time of independence admitting 1500 students to 542 medical colleges (government – 279, private -263) in 2020 admitting around 80,312 undergraduate students annually (5). The number of undergraduate medical seats has seen a jump of 48%, from 54,348 in 2014-15 to 80,312 in the academic year 2019-20. Post-graduate seats have also increased by 18,704 (a 65% jump) during the corresponding period. Therefore, close to 47,000 under-graduate doctors in the country annually are denied the opportunity of postgraduation, resulting in low employability and surge in migration overseas (5).

Despite the increased access to higher education, the challenges remain. The Indian regulatory bodies have miserably failed to discharge their responsibility towards the maintenance of standards of medical education and have erected formidable issues like intra-state and inter-state inequalities in the establishment of medical institutions and manpower, insufficient funding of government medical institutions, poor quality of medical education, incompetent medical professionals, insignificant research contribution to the world, low employability of medical graduates, etc.

Many authors (domestic and foreign) in recent years have written extensively on the medical education system of India but were unsuccessful in offering effective and realistic solutions for the deficiencies cited by them.

Our paper undertakes a review of all the articles published in the last decade that critically analyses the various aspects of the medical education system of India. The objective of our paper is to present the deficiencies in the medical education system in the country supported by statistical facts and figures to provide a framework to enable a better understanding of the complexity of the medical education system in India. Our article also attempts to provide effective solutions for the same as publicized by the regulatory bodies of higher education and the health care system of India thereby providing insight into the future directions in revolutionizing it.

1. **Methodology:**

We conducted a review of articles published from 2010 to 2020 utilizing an online literature search with PubMed Central, MEDLINE, Scopus, Google Scholar, using the key phrases: medical education system in India, competency-based curriculum in India, problems/faults/lacunae with medical council of India, future of medical education in India, national medical council, globalization/privatization/lack of research in Indian medical education, critical analysis of medical education. The inclusion and exclusion criteria for the selection of articles were established. Articles are written by both domestic and foreign authors that analyzed or critically analyzed the medical education system of India about the quality recommended curriculum, privatization, globalization, lack of funding, lack of good quality research, overseas migration of medical professionals, in India were included.

1. **Observations:**

Around 120 published articles were found related to the medical education system of India and the Medical Council of India. After applying inclusion and exclusion criteria, 80 articles were shortlisted. Finally, after reading the full text/abstract of the articles, 54 articles were selected that met the criteria for the synthesis of our review and hence was included in the study as presented in Table 1.

1. **Structure of the medical education system in India:**
   1. **Medical Council of India:**

The Medical Council of India (MCI) was established by ‘Ministry of Health and Family Welfare’ as a statutory body under the provisions of the Indian Medical Council Act (IMC Act), 1933, which was later, replaced by the Indian Medical Council Act (IMC), 1956 and was subsequently amended in 1964, 1993 and 2001 (60). By its powers, the establishment of a new medical college requires mandatory recognition by MCI, but during the inspection, MCI focuses only on documentation of infrastructure and human resources. There is no inspection of infrastructure proposed for research activities by the institution neither evaluation nor monitoring of student admission procedures, training, teaching-learning strategies, assessment system, student facilities & faculty adequacy, is conducted. (Establishment of Medical College Regulations, 1999: Amendment: July 2018).

**Vision 2015 report of MCI**, stated three main reasons for India's healthcare woes which were a shortage of physicians (both generalists and specialists), inequitable distribution of manpower and resources, and deficiencies in the quality of medical education (61). Needless to say, this vision remained a mere vision, even in 2018, without any marked improvement in ground reality.

**Ranjit Roy Chaudhury expert committee (2014)**recommended structural re-configuration of the MCI and proposed separation between the **regulation of medical education**from**the regulation of medical practice** both regulated by MCI (61).

**NITI Aayog Committee (2016)** raised allegations regarding the composition of MCI and recommended the appointment of regulators through an independent selection process than elections. The committee also recommended the removal of MCI, as the authority for fee regulation of private colleges as it led to corruption and increased capitation fees (61).

**Parliamentary Standing Committee on Health (2016)**observed that the present focus of the MCI was only on licensing of medical colleges and no emphasis was given to the enforcement of medical ethics in education (61).

Recent corruption allegations against MCI saw its suspension by the President of India on 15 May 2010 following the arrest of MCI's president Ketan Desai by the Central Bureau of India on 22 April 2010. MCI was reconstituted in 2013, presently governed by **the 'Board of Governors**’ followed by the introduction of the **National Medical Council (NMC) bill** in 2018 (61).

* 1. **Growth of higher education in India:** 
     1. **Till 1980:**

Before 1980, the government not only supported higher education by setting up universities and colleges but also took over the responsibility of running the institutions set up through the private sector.

* + 1. **From 1980 to 2000:**

In the 1980s, economic reforms brought an unprecedented demand for quality higher education from the middle class which grew bigger, younger, and richer which saw a rise in entrepreneurship in the country. During this period, very few universities and colleges were set up by the government sector, fewer were brought within the ambit of government funding and meagre institutions were set up by religious and charitable trusts of repute for philanthropic purposes. Individuals or family groups known as ‘private unaided Institutions’ set up most of the higher education institutions.

* + 1. **From 2000 onwards:**

Till the late 1990s, the affiliated colleges saw a rise in number. Advantage of the provision granted in terms of section 3 of the UGC Act, 1956, a surge in the number of ‘deemed to be universities’ was observed from only two in 1958 to twenty-six by the period 2000 -2005 (62).

* + 1. **The emergence of a new type of providers:**

During this period, the private institutions proliferated, the ‘distance education programs’ gained wider acceptance, the public universities and colleges started self-financing programs, and foreign institutions started offering programs either by themselves or in partnership with Indian institutions and the non-universitysector grew rapidly.

MCI was incompetent to deal with this influx without a proportionate increase in materialand intellectual resources leading to skyrocketed **capitation fee**s and inter-state and intra-state inequality in the distribution of medical colleges (62).

* 1. **Current scenario of medical colleges in India:**

**Report of Ministry of Statistics and Program Implementation (2011), Unique Identification Authority of India (2019) and Medical Council of India (2020)** asseverate that five states: Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, and Kerala represent 26 % of the population but has 40 % of medical seats across India whereas, six states: Uttar Pradesh, Bihar, West Bengal, Madhya Pradesh, Rajasthan and Gujarat representing 51% of the population has only 25 % of medical seats (63).

For the academic session 2018-19, the Union Ministry of Health has banned 82 medical colleges -70 private and 12 government-run from accepting students that meant more than 10,430 seats were blocked citing lack of adequate facilities (64). In addition to that, for the same academic session, the Union Ministry rejected 68 proposals of new medical colleges (Bihar - 4, West Bengal - 2) which would have added 9,000 MBBS seats (64).

* + 1. **Selection of medical students:**

Before 2013, there was no uniformity in the selection of students to medical colleges. A common entrance test at all India level (NEET) was introduced in 2013 to constrain unscrupulous and money-minded businessmen operating in the field of education and to help the deserving students. States like Tamil Nadu, Karnataka, Andra Pradesh openly objected to the move by citing reasons of large-scale variation in the syllabus and standards of the Central Board of Secondary and State boards.

As of 2020, NEET controlling authority faces serious allegations like proxy candidates were caught writing the examination on behalf of other candidates, translation errors in 49 out of the 180 questions in NEET Tamil paper 2018, and student protests claiming that four questions were out of syllabus in NEET 2019. Moreover, the NEET examination paper was leaked twice in the last four years (65). These allegations dented the reputation and authenticity of the 'Common Entrance Test' - NEET considerably.

* + 1. **Shortage of medical faculty:**

Acute shortage of medical faculty in Indian medical institutions is estimated to be currently 40 percent (8, 10, 27, 54, 66). MCI recommendation of the 1:10 teacher-student ratio is not maintained. To address this shortage, in the departments of Anatomy, Physiology, Biochemistry, Pharmacology, and Microbiology, MCI has permitted non-medical teachers for appointment to the extent of 30% of the total number of the posts in the department. In the Department of Biochemistry, non-medical teachers may be appointed to the extent of 50% of the total number of posts in the department. This decision received several criticisms from the medical fraternity as it led to increased unemployment and also deteriorated the quality of medical education. (Clause 2: MCI: Minimum Qualifications, for Teachers in Medical Education Regulations, 1998).

* + 1. **Poor faculty development:**

MCI Regulations on Graduate Medical Education, 1997, made it mandatory for all medical colleges to establish Medical Education Units (MEUs) to enable faculty members to avail modern education technology for teaching and established Twenty two Regional Centres, since July 2009. But lack of motivation amongst faculty and educational administrators, poor recognition, lack of reward are the impediments in successful faculty development. (Faculty Development Program: MCI)

Faculty development is a key determinant of successful curricular implementation. With the formulation of the new curriculum, the focus has shifted to the curriculum implementation support program (CISP). Many of the guiding principles and learning strategies involved in CBME require a basic exposure to medical education training, including adult learning principles, framing objectives, aligning objectives and teaching-learning methods to assessments, and various assessment methods. Many medical colleges still have a substantial backlog of faculty awaiting such basic training. CISP training without bare minimum sensitization to the fundamentals of medical education training may not prove rewarding (7, 8, 10, 31, 50, 51).

* + 1. **Shortage of clinical material:**

Costly & un-subsidized, medical services and insufficiency of medical facilities in medical colleges results in poor patient load with bed occupancy less than 30 per cent limiting the learning boundaries of the students. In the last 10 years, 21 private medical colleges have been derecognized due to a lack of basic minimum requirements (List of Closed Colleges/Institutions with MBBS courses: MCI).

* + 1. **Flawed assessment pattern:**

The existing assessment system evaluates only the cognitive domain with a minimal evaluation of psychomotor and attitude skills. ‘Observed Structured Clinical Examination’ (OSCE) and ‘Observed Structured Practical Examination’ (OSPE) are functional only in premier institutions (7, 8, 10).

* + 1. **Lack of research activities:**

Infrastructure for quality research activity in India is the least. Between 2005 and 2014, over 57% of the medical colleges did not have a single publication and only 25 (4.3%) of the institutions produced research papers that accounted for 40.3% of the country's total research output. Since 2015, after the obligatory requirement of publication of papers by MCI for promotion to higher posts, a surge in the number of poor-quality research articles was observed from Indian medical colleges; mostly published in predatory journals or journals indexed in Index Copernicus with a system of pay and publish. From about 53,000 “papers” in 2010, the nearly 8,000 active predatory journals in the world have published a mind-numbing 4,20,000 “articles” in 2014. Over 11,000 fake open access journals were identified. The number of fake journal publishers based in the country has grown several-fold in the last 4-5 years. Today, as much as 27 percent of fake journal publishers are based in India. India has the dubious distinction of being home to 42 percent of fake single-journal publishers (39).MCI must lay down specific research related minimum guidelines for institutions so that some responsibility is shared, and meaningful research is carried out (13, 14, 37, 53).

* 1. **Incorporation of Competency-based medical education (CBME):**

Implementation of Competency-based curriculum is mandatory in medical institutions since 2019, but efficient and successful implementation of CBME is impossible when there is a shortage of patients in hospitals, lack of adequate infrastructure to teach students in small groups and conduct multiple assessments, inadequate faculty strength, lack of commitment among managements to bring changes in the existing system and principally Inertia among faculty and students for change (7, 8, 10, 11, 12, 41, 48, 54, 55)

Basheer A7 (2020) states that the implemented program envisages interactive teaching-learning methods in the form of small-group learning, problem-based learning, and case-based learning, it is silent on assessment. It leaves assessment to the discretion of individual universities and institutions.  Students, in the long run, will soon realize this and ultimately, the learning becomes rote, fragmented, and short-term, defeating the principle and goal of CBME (7). Other deficits in the curriculum are related to the ambiguity regarding the role in internal assessment and exclusion of the concept of family medicine and family physicians. The curriculum program presents a list of certifiable competencies, but there is no clarity about what happens to a student who fails to get certified in a competency. Does he/she get a chance to try again until he/she is certified before he/she appears for a particular phase examination? (7).

1. **Solutions to the deficiencies in the medical education system:** 
   1. ‘**National Medical Commission’ (NMC), 2019**: Introduces four autonomous boards for separately governing undergraduate medical education, postgraduate medical education, assessment and rating of the medical institutions for their compliance with the standards laid down by the said Boards and for maintaining National Registers of all licensed medical practitioners and to regulate professional conduct and promote medical ethics.

NMC proposes a final-year MBBS examination (NEXT), for admission to post-graduate medical courses and for obtaining a license to practice medicine and as a screening test for foreign medical graduates like the common national entrance examination (NEET) (67).

The compulsory rotation internship, which has become virtually non-existent, will be reintroduced and made more robust and effective.

* 1. ‘**Ministry of Health and Family Welfare’, 2018-19**: Administers the schemes for ‘Strengthening and Up-gradation of State Government medical colleges for an increase of PG Seats’, schemes for ‘Establishment of new medical colleges attached with existing District/Referral Hospitals’ and schemes for ‘strengthening and up-gradation of State government medical colleges for an increase in intake capacity of MBBS Seats’ (68).
  2. **‘National Education Policy’, 2019:**
     1. **Increasing the intake of students in healthcare education:**

The 600 or so district hospitals in the country will be upgraded to teaching hospitals at the earliest by investing in infrastructure for targeted medical specialties and in stationing adequately qualified teaching faculty. Both the teaching institutions and the hospitals will be mandatorily accredited before they can begin functioning.

* + 1. **Expanding postgraduate education:**

These will be increased as quickly as the available infrastructure in hospitals around the country allows. New medical colleges and hospitals that have an adequate number of patients and well-trained teaching faculty will be allowed to start postgraduate courses and district hospitals will move towards having a medical college attached to them. Diploma courses such as the one being offered by the College of Physicians and Surgeons, Mumbai, will be promoted throughout the country, to help produce sufficient numbers of intermediate specialists.

* + 1. **Pluralistic healthcare education and delivery:** The first year or two of the MBBS course will be designed as a common period for all science graduates after which they can take up MBBS, BDS, Nursing, or other specializations. Common foundational courses based on medical pluralism will be followed by core courses focused on specific systems, and electives that encourage bridging across systems. Graduates from other medical disciplines such as nursing, dental, etc., will also be allowed ‘lateral entry into the MBBS course’. A medical education qualification framework to achieve this will be developed in conjunction with the NMC. Given the pluralistic health care legacy of the country, the different health systems such as Ayurveda, Yoga, and Naturopathy, Unani, Siddha and Homeopathy (AYUSH) will be mainstreamed, and better access to AYUSH treatment will be provided through co-location in public facilities (69).

1. **Conflict of Interest:**

We further state that we are free of any person, or business, association(s) that

could represent a conflict of interest regarding the article submitted, and we have

respected the ethical principles underpinning the research.

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