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Review Article

Health workforce in India: opportunities and challenges

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ABSTRACT

Health system reforms in India during the past decade yielded an impressive growth of medical, dental and nursing education opportunities, but health workforce density remains low in comparison to the World Health Organization (WHO) norms. Apart from shortage, retaining qualified health workforce in the rural and underserved areas remains a huge challenge. This crisis is likely to persist until and unless health system addresses the fundamental requirements of health workers as envisaged in health policies. Concerted attention and long term political commitments are required to overcome health system barriers to achieve rural recruitment and retention across various cadres in states. As the major share of health workforce belongs to the private sector, their resources need to be harnessed to meet health system goals through partnerships and collaborations. There is an urgent need for better regulation and enforcement of standards in medical education and delivery of health services across the public and private sectors.

Keywords: Health workforce, Public health sector, Private health sector, Medical education

INTRODUCTION

Adequate availability of appropriate health workforce is a necessary pre-requisite for achieving desired health outcomes in any country. World Health Organization (WHO) defines health workforce as “the stock of all individuals engaged in the promotion, protection or improvement of population health”. This includes both public and private sectors and different domains of health systems, such as curative and preventive care, non-personal public health interventions, disease prevention, health promotion services, research, management and support services.[1] Available estimates show that density of health workforce in India is much below the norms of 22.8 skilled professionals per 10000 population as recommended by the WHO.[2,3] In developing countries like India the shortage of workforce in health system is a reality. Many countries face the problems of composition and its distribution across various geographical areas and population groups.

The last decade witnessed a significant change in the size and composition of health workforce in India. The health sector reforms undertaken during the decade, particularly with the launch of the National Rural Health Mission (NRHM), subsequently renamed as the National Health Mission (NHM) have emphasized on strengthening health workforce in the government health system.[4,5] Under the NRHM, both central and state governments initiated strategies towards appointment of doctors in public health facilities in the rural areas. In order to bridge the gap in health workforce in rural areas, most state governments made contractual arrangements with private health sector and non-governmental organizations (NGOs). The decade also witnessed a rapid increase in the medical, nursing and paramedical institutions as well as admission capacity in various disciplines.

Health workforce in India comprise of a range of personnel who delivers health services in various specialties’ of medicines which broadly include allopathic doctors, AYUSH doctors (comprising

Ayurveda, Yoga, Unani, Siddha and Homeopathy), dentists, nurses, auxillary midwives, pharmacists, technicians and allied health personnel, community health workers, yoga and naturopathy, registered medical practitioners (RMPs), traditional medical practitioners and healers. Allopathic system consists of physicians, surgeons, specialists and medical graduates with a bachelor's or postgraduate specialist diploma or degree, who registered with the Medical Council of India (MCI). Dentists hold a bachelor's or postgraduate degree or specialist diplomas are registered with the Dental Council of India (DCI). AYUSH doctors who are an integral part of health workforce hold bachelor or postgraduate degree in AYUSH and are registered with the Central Council of Indian Medicine or the Central Council of Homoeopathy, and are authorized to dispense medicines and conduct surgery using their respective fields of specialization.[2,3,6] RMPs act as the first point of contact for treatment of a significant proportion of population living in rural and far flung areas.[7] Nurses have a diploma in general nursing and midwifery or a bachelor's degree or a postgraduate degree registered with the Indian Nursing Council (INC). Another group of health workforce consists of auxiliary nurses and midwives (ANMs), who work as subordinates to the main nurse, possess a diploma in auxiliary nurse midwifery. Also there are also community health workers who after 10 years of formal education and undergo a short training course.[7] Other categories include physiotherapists, diagnostic and other technicians with varied levels of diploma and certificate perform vital activities as healthcare workers.

METHODS

This paper is based on review of the latest information available through government documents; websites and studies related of the health workforce in India. Data on registered health professionals were collected from the websites of MCI, DCI, INC, Pharmacy Council of India, Indian Association of Physiotherapists, and the Ministry of Health and Family Welfare (MOHFW). Pertinently, these data suffer from various deficiencies like duplication of registrations, delisting of inactive workforce or those not available for work due to migration, disability, death etc. The existing publications of MOHFW provides number of major categories of health workforce namely, doctors, surgeons, AYUSH doctors, dentist, nurses, pharmacists and community health workers employed in the public health system. However, data related to health workforce in the private sector is seldom available in the public domain. Two major sources of information on health workforce actively employed in the health sector are available through census of India and the surveys of National Sample Survey Organization (NSSO). These sources classify the workforce by the national industrial classification (NIC) and national classification of occupation (NCO) and are updated with international systems. The estimates of health workforce based on these sources undertaken by recent studies have been used extensively.

HEALTH WORKFORCE IN INDIA: CURRENT STATUS

Size and composition

Currently there are no reliable and systematic information on the size and composition of health workforce in India and prevailing estimates were based on census of India and surveys of NSSO. Existing studies have shown a significant change in the size and composition of health workforce in India in the last decade. Motkuri and Mishra (2018) estimated the size of workforce in India based on NIC of workers for the past three census years.[8] According to their estimate there were 1.9 million workers engaged in health sector in 1991 that has increased to 2.35 million in 2001 and 4.6 million in 2011 (Table 1). The addition to total workforce in health sector was only 0.45 million in 2001, but there was rapid increase in health workforce during 2001-2011 which might be due to declining population growth in the decade.

Table 1: Health workforce in India as per census 1991, 2001 and 2011.

Location	Population (in millions)			Health workforce (in millions)			Health workers per 1000 population		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
All	846.3	1028.6	1210.9	1.9	2.35	4.6	2.25	2.28	3.80
Rural	628.7	742.5	833.7	0.76	0.9	2.11	1.21	1.21	2.53
Urban	217.6	286.1	377.1	1.14	1.45	2.49	5.24	5.08	6.60

Source: Adopted from Motkuri and Mishra (2018).

Using Census 2001 and the NSSO data 2004 -2005, Rao et al (2012) estimated that India had nearly 2.2 million heath workers in 2005.[6] Another estimate by Rao et al (2016) based on post reform data of NSSO (2011–2012) showed there were 2.5 million health workers in India.[9] It was found that 56.4% of all health workforce were unqualified which included 42.3% of allopathic physicians, 27.5% of dentists, 56% of AYUSH practitioners, 58.4% of nurses and midwives. However, a recent estimate based on NSSO data shows there were 3.82 million health workforce belonged to different categories in 2016.[7] This figure is lower by almost 33.45% of health workforce registered with various councils and associations in the country during 2017 (Table 2).

Table 2: Stock of health workforce in India by broad categories -based on NSSO data 2016.

Category	Estimated number	Health workforce registered up to 2017	% of estimated to registered
Allopathic doctors	770277	1023413	75.26
Dental practice	95959	197734	48.53
AYUSH system	530919	771468#	68.82
Physiotherapy, diagnosis and others	86508	60000*	144.18
Nursing and midwife	1317669	1980536	66.53
Pharmacists	214744	907132	23.67
Health associate professionals	811744	NA	NA
ANM	NA	811279	NA
All health workforce	3827820	5751562	66.55

Source: Second column estimate is based on NSSO data by Karan A et al (2018), third column data on registered health workforce taken from publications and records of respective associations and the Ministry of Health & Family Welfare, Government of India. *figure for 2015. #Out of 7,71,468 AYUSH practitioners in 2016, there were 4,19,217 ayurvedic doctors,48,196 unani practitioners, 8528 siddha, 2220 naturopathy, and 2,93,307 homeopathy practioners.

Table 3: Health worker density per 10000 population in states–estimates based on NSSO 2011-2012.

States	Doctors	Health associates	Nurses and midwives	All
Andhra Pradesh	5.9	11.5	7.9	25.4
Assam	1.8	1.0	8.0	11.3
Other north east states	6.7	7.8	10.6	25.1
Bihar	3.3	17.5	2.0	22.9
Chhattisgarh	18.3	3.5	10.7	32.4
Delhi	34.4	13.4	19.5	67.3
Goa	11.3	4.8	6.5	22.7
Gujarat	5.8	7.4	26.5	39.8
Haryana	16.8	18.3	9.0	44.1
Himachal Pradesh	1.9	7.9	6.0	15.9
Jammu & Kashmir	14.7	15.7	11.0	41.8
Jharkhand	3.0	0.3	3.3	6.7
Karnataka	17.1	8.0	10.0	35.1
Kerala	14.5	13.4	38.2	66.0
Madhya Pradesh	6.3	2.5	3.5	12.3
Maharashtra	19.7	6.7	9.6	36
Odisha	7.4	10.3	2.1	19.9
Punjab	17.8	21.3	12.5	51.7
Rajasthan	4.5	1.4	14.3	20.4
Tamilnadu	8.6	8.7	15.2	32.6
Uttar Pradesh	13.8	4.0	3.9	22.1
Uttarakhand	11.6	6.9	18.7	37.2
West Bengal	16.9	12.5	6.7	36.1
Union Territories	12.3	21.8	27.6	61.7
All India	11.3	8.4	9.4	29.1

Source: Estimates based on NSSO data 2011-12 by Karan A et al (2019).

Density of health workforce

Rao et al (2012) estimated India's health workforce density of 20 workers per 10000 populations in 2005.[6] The study based on NSSO (2011–2012) data estimated the density of 20.9 workers per 10000 population in India.[9] After adjusting for the right qualifications, density of health workforce reduced to 9.1 workers per 10000 population. Karan et al (2019) in their broad estimate of health workers including allied health professionals and support staff showed the density of doctors, nurses and midwives per 10 000 population as 20.6 according to the NSSO data and 26.7 based on the registry data.[7] All these estimates showed that country is fall short of WHO's recommendation of the minimum threshold of 22.8 skilled health professionals per 10 000 population. WHO, has revised the minimum need as 44.5 health professionals per 10 000 population.[3]

Regional variations

Regional distribution of health workforce reveals a huge variation across various states in India. Table 3 shows the number of health workers available per 1000 population based on NSSO data 2011-12 in different states in India. The estimates show that the density of doctors including dental and AYUSH practitioners per 10,000 population is much lower in states like Assam, Bihar, Himachal Pradesh Jharkhand and Rajasthan (Table 3). While Delhi recorded highest density of doctors (34), Kerala has recorded highest density of nurses and midwife (38).

Public-private distribution

Distribution of health workforce across the country shows that a huge share of them is employed in the private sector. The share of private sector among allopathic physicians, AYUSH and dental practitioners is huge in comparison to nurses and other categories. In contrast to public sector, India's private sector consists of wide range of service providers ranging from individual practitioners to for-profit hospitals, not-for-profit hospitals, non-government organizations, charitable trust institutions.[10,11] The estimate based on NSSO data for 2016 shows almost 53% of health workforce in the private sector is self-employed**.** More than 80% of doctors and 70% of nurses and midwives were employed in the private sector (Figure 1).

Rural-urban distribution

There is disproportionately higher concentration of health work force in urban areas. While rural areas constitute about 71% of the population in 2016, only 36% of health workforce was available in rural areas (Figure 2).

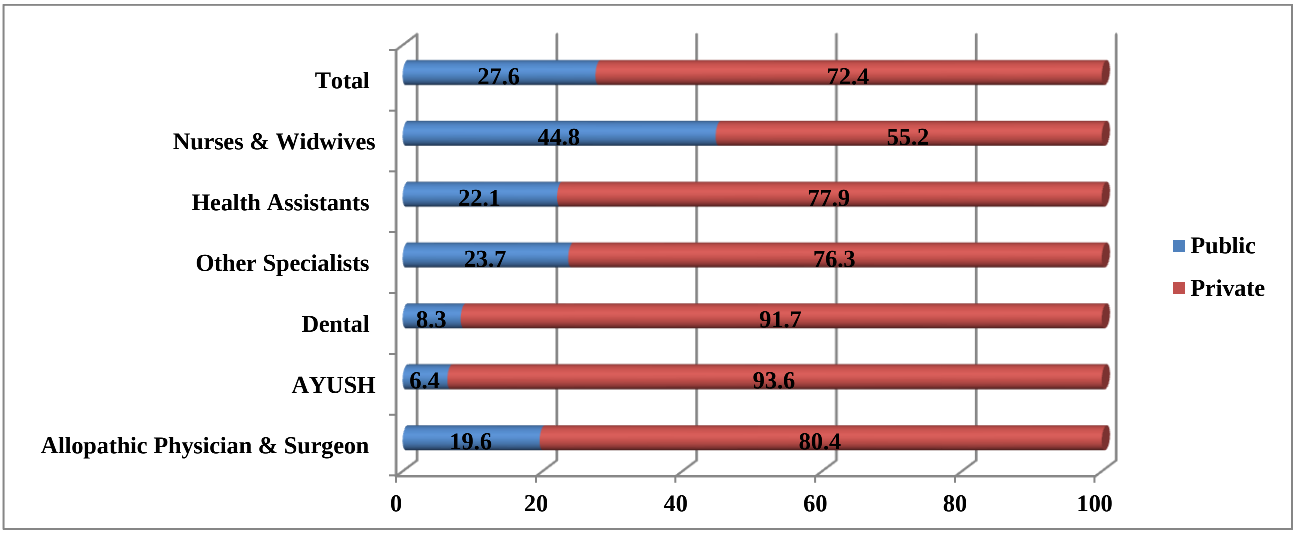

Figure 1: Distribution of health workforce between public and private sectors.

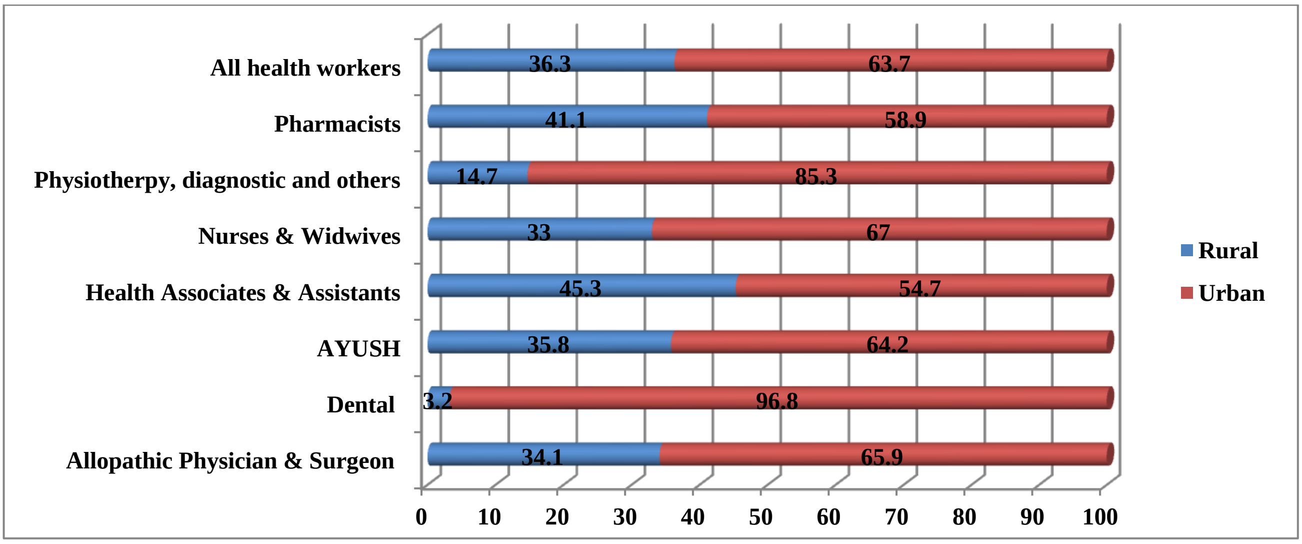

Figure 2: Distribution of health workforce between rural and urban areas.

HEALTH WORKFORCE SUPPLY

Last decade witnessed a steady expansion in medical and dental education in India. Presently India has 476 medical colleges, 313 dental colleges for bachelor and 249 colleges for masters of dental surgery (Figure 3).[12] Over the last two and a half decades, students' admissions to medical colleges increased from 22438 in 1991 to 52,646 in 2017.[12] Admissions in dental colleges' increased from 3100 to 33293 during the same period. As far as AYUSH systems are concerned there are 622 undergraduate colleges and 201 post graduate colleges with the admission capacity of 40151 and 5486 respectively. The number of recognized nursing colleges offering the bachelor degree in nursing has increased from 165 in 2004 to 1936 in 2017 with the admission capacity of 96475. There are 643 colleges providing admission to post graduate courses in nursing, 775 colleges for post basic degree nursing and 292 colleges for post basic diplomas and all these together provided admission to 41163 students in 2017. Besides there are 777 pharmacy institutions in the country imparting diploma to 46795 students.

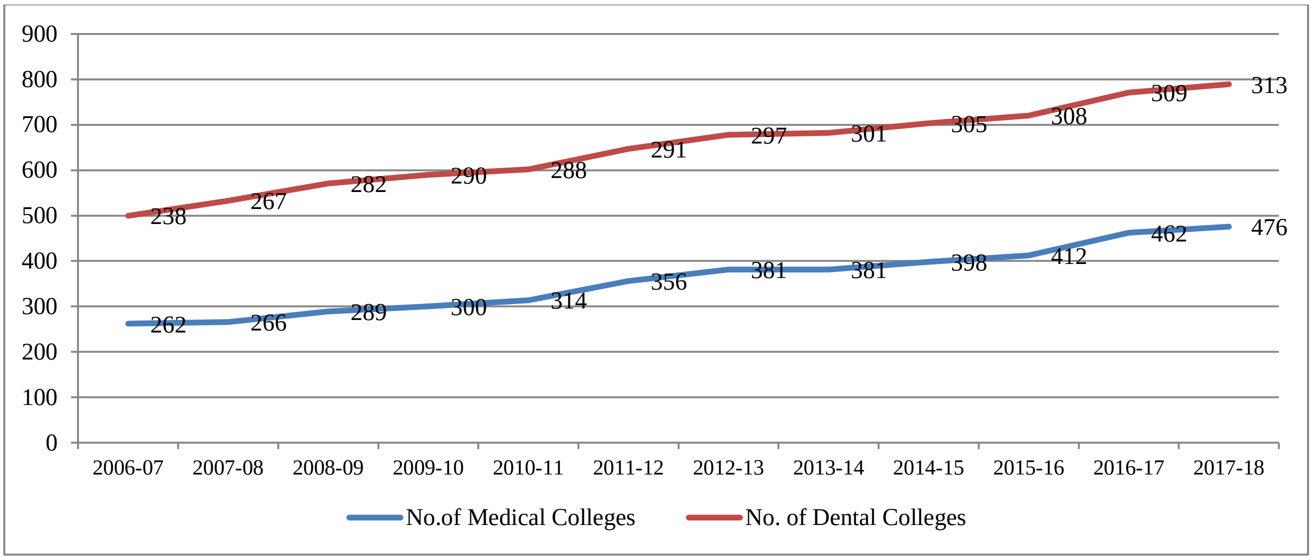

Figure 3: Growth of medical and dental colleges in India post NRHM period.

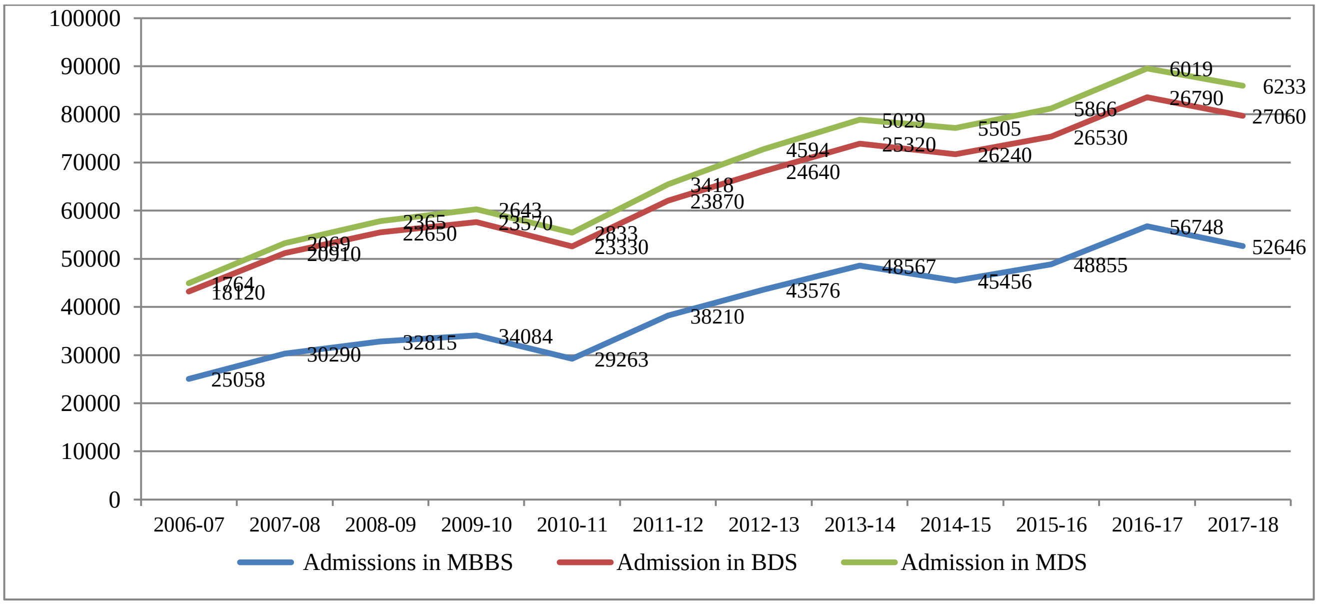

Figure 4: Admission capacity in medical and dental institutions–post NRHM period.

One of the major changes in the medical education has been a notable increase in the private sector's involvement in medical education. The number of private medical colleges recognized or approved by the MCI has increased from 30% (43 out of 144 colleges) in 1991 to 54.4% (259 out of 476 colleges) in 2017. Due to increasing demand for nurses nationally and internationally, India has witnessed a dramatic proliferation of nursing education institutions in the recent years. Almost 91% of nurses' education (ANM, GNM and BSc) is being delivered in the private sector.

The post NRHM era has seen major advances in expansion of medical education in India. This include amendment of regulations by MCI, revising norms for setting up of medical colleges and increasing number of PG seats, increased funding of state government medical colleges, establishment of AIIMS-like institutions and strengthening of state government medical colleges which resulted in increase in admission capacity (Figure 4). In order to strengthen nursing education, a number of initiatives were taken to upgrade nursing schools attached to medical colleges into nursing colleges, improved capacities and a faculty development program for nursing colleges, revision of norms for setting up nursing schools and colleges etc. Despite fast expansion in educational institutions in the country, there are gross deficiencies in medical institutions and admission capacity in different states (Table 4). For instance, larger states of Uttar Pradesh, Bihar, Rajasthan and West Bengal together account for 44.3% of population (census 2011) have 21.73% of medical admissions whereas five south Indian states like Andhra Pradesh, Telangana, Karnataka, Kerala and Tamil Nadu which account for 20.77% of population together has 42.89% of all medical admissions in the country.

Table 4: State-wise distribution of medical colleges by ownership and admission capacity.

State/union territory	No. of medical colleges	Government owned	Admission capacity	Share of population (2011)	Share of medical seats
A & N Islands	01	01	100	0.03	0.16
Andhra Pradesh	31	12	4450	4.07	7.28
Assam	06	05	726	2.58	1.18
Bihar	13	10	1350	8.58	2.21
Chandigarh	01	01	100	0.09	0.16
Chhattisgarh	10	07	950	2.11	1.56
Delhi	09	07	1050	1.38	1.72
Goa	01	01	150	0.12	0.24
Gujarat	24	09	3830	4.99	6.27
Haryana	11	05	1000	2.09	1.63
Himachal Pradesh	06	05	650	0.57	1.06
Jammu and Kashmir	04	03	500	1.04	0.82
Jharkhand	03	03	300	2.72	0.49
Karnataka	57	18	8695	5.05	14.24
Kerala	34	10	3450	2.76	5.65
Madhya Pradesh	19	07	2100	6.0	3.44
Maharashtra	50	22	6970	9.24	11.41
Manipur	02	02	200	0.22	0.33
Meghalaya	01	01	50	0.24	0.08
Odisha	10	06	1350	3.47	2.21
Puduchery	09	02	1400	0.10	2.29
Punjab	08	03	1125	2.29	1.84
Rajasthan	17	09	2400	5.67	3.92
Sikkim	01	0	50	0.05	0.08
Tamil Nadu	49	24	6400	5.96	10.48
Telangana	25	07	3200	2.93	5.24
Tripura	02	01	200	0.30	0.33
Uttar Pradesh	47	17	5124	16.49	8.39
Uttarakhand	07	04	900	0.84	1.47
West Bengal	18	15	2300	7.55	3.77
All India	476	217	61070		100

DISCUSSION

Despite manifold increase in supply of health workforce, India faces a huge shortage of health workforce particularly doctors and specialist in the rural areas of many states which is evident from the vacancy positions in the primary health system.[13,14] Existing studies in India have also explored the attitudes of medical students and in-service health workers towards rural service, and the factors at the individual level that act in favour of retention of health workers in rural areas.[15-17] Findings from these studies suggest that rural upbringing; personal values of service, professional interests, co-location with spouses, and availability of education for children are factors at the individual level that influence health-worker retention in rural areas. Poor financial remuneration, lack of good clinical infrastructure in rural areas, and organizational policies and management are some of the key challenges in rural retention of health workers. Studies have established that decision to join rural health service were strongly associated with rural background and attachment with community.[16] Yet, these decisions were challenged by factors such as poor working and living conditions in rural areas, low salary and incentives, and lack of professional growth and appreciation. In order to attract and retain health workforce in rural health systems many initiatives have been introduced by states. Preference in postgraduate admission for those serving in rural areas has been incorporated in the rules of a large number of states. This seems to be a very effective method of attracting doctors to rural areas for a fixed period as PG admission has been a priority for many young doctors. Increased remuneration to doctors willing to serve in rural areas has also been a principle followed in states with good results. Another initiative was identifying health facilities which are located at difficult or inaccessible places in every state and is introducing incentives for staff working there. The continuous efforts at skill development among the ASHA's and systems of getting them priority admission to ANM and nursing schools will be able to secure resident health workers in remote areas. New courses like the 18-week emergency obstetric and life-saving anesthetist skills and training programs to skill MBBS doctors with select specialist skills are innovative solutions to find specialist skills for rural areas.

There are criticisms against the present medical education system from various corners with respect to imparting knowledge, acquisition of professionals' skills, attitudes, and ethics and value.[18-22] Most part of teaching and training are at the tertiary care setting without exposure to rural and community settings. Quality of medical education is influenced many factors such as its setting, quality of the students, expertise of faculty and teaching methods, course curriculum, evaluation systems, teaching learning environment and the management of the institution.[18-20] The present education system is plagued with issues like low student–teacher ratios, inappropriate pedagogy, obsolete and irrelevant syllabi, inadequate library and online resources, substandard teaching faculty, lack of periodic appraisal of faculty and declining academic autonomy. Further, lack of skill and competence based training and inadequate emphasis on critical thinking has resulted in producing undergraduates who are incapable of delivering appropriate care. Commercialization of medical education and mushrooming of for-profit medical education institutions have further added to the complexities. Nevertheless, the government's effort to medical education reforms including initiatives to teach within the community settings, reservations for marginalized communities and harnessing of local and rural talent, changes to the medical curriculum, formal training of teachers, improvements in teaching– learning methods, modification of the examination systems, reorganization of universities, compulsory rural service, etc., have not produced any significant improvements in the health system,

Privatization of medical education helped to overcome the inadequacies of the training capacity in the public sector, but it has also raised issues related to the quality of medical education. With expansion of medical educational infrastructures, consistent increase in health workforce production, vacancies in government health facilities in rural areas remain unfilled. There are issues related to gross inequality in the distribution of the educational institutions in few states as these institutions are primarily clustered in few states where health workforce shortages are relatively less. There is also mismatch between production of health workforce and distribution in public health facilities within states which suggests that urgent need to adopt sustained and innovative strategies to address the current health-workforce crisis.

Migration of health workforce also depletes the available stock as well as availability of teaching staff which further hinders the production of medical professionals.[23,24] India has been the biggest exporter of physicians, accounting for about 4.9% of American and nearly 10 % of British Physicians. Nearly 54% of medical students who graduated from All India Institute of Medical Sciences (AIIMS) during 1989-2000 now reside outside India.[24] Though considerable information exists on the number of doctors emigrating from India to other countries, adequate information is not available on quality of those medical professionals who migrate, and compared to those who remain.

The existing inadequacies in production of different categories of health workforce in states have created significant inequalities in distribution. The states with poor health outcomes recorded a greater shortfall in the number of health workers which highlights the urgent action to develop and implement high quality, evidence-based health workforce development plans; Privatization of medical education in India has not yielded its intended outcomes. In order to improve quality of medical education steps like certification/ accreditation of medical educational institutions, fine tuning syllabus, training in decentralized community settings are necessary. To improve retention of workers in rural areas, recruitment of right health workforce through community structure has the most potential to serve the community needs. Other initiatives which were introduced under the NRHM like performance based incentives, rewards, social recognition, scholarships and bank loan facilities for those committed to service in rural and remote areas need to be continued. Career progression of manpower should be given due emphasis which can motivate them to work in rural areas. Strategies such as task shifting, multi skilling, training, and development of multidisciplinary team should be adopted to meet the holistic needs of population. Initiation of courses in areas of public health and rural health services should be conducted on priority basis. Finally implementation of continuing medical education program, computer networking of training institutions, promotion of IT-based e-health, tele-consultancy, tele-radiology and tele-pathology should be promoted.

CONCLUSION

Post NRHM witnessed a rapid increase in number of medical institutions and admission capacities across states. Existing estimates suggest that India does not meet the standard requirements of skilled workforce in the health system. There has been a severe shortage of health workforce in rural areas and challenges remain in bringing qualified human resources to rural, remote and underserved areas. Apart from taking efforts to increase numerical availability of human resources in rural areas across states with poor health outcomes, it is imminent to strengthen competencies of these workers at all levels.

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