Strategies for optimising doctor numbers in Western Pacific and Asian Countries: The path travelled

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Abstract

Introduction: Doctors are essential assets of healthcare institutions in ensuring optimum healthcare delivery to the people. The shortage of doctors has remained a concern worldwide. The Sustainable Development Goal 3(c) by the United Nations, targets substantially increased health financing and the recruitment, development, training and retention of the health workforce; however, progress has been slow. The paper highlights the different stages of development of doctors and interventions implemented for optimising doctor numbers in selected Western Pacific and Southeast Asian countries.

Method: A thorough literature search was carried out using PubMed, BMJ, Springer, BMC, and websites of the National Health databases. Articles assessing interventions aimed at recruiting or retaining physicians in Asian countries were included.

Results: Forty-three studies met the inclusion criteria; thirty intervention-based studies were retrieved in the final analysis. The research identified gaps and similarities in managing the doctor's workforce in Western Pacific and Southeast Asian countries. The proposed solutions were classified as "rural retention programmes for doctors", "career and professional development", "length of medical education", and "incentivised work-life" to manage the lack of doctors in India.

Conclusion: India requires a robust policy approach after understanding the motivations and barriers to retaining in the health system. The interventions proposed in this paper build on regional insights and strategies to help develop a concerted and targeted response to the doctor shortage.

Keywords: doctor shortage, retention policies, medical education, policy and programmes, rural retention

Introduction

Pathways towards universal health care are outlined in SDG target 3. Some Asian countries emphasize reducing the shortage of doctors as their most critical effort to ensure health coverage. The situation varies greatly in the Western Pacific and Southeast Asia. Some countries have a doctor-to-population ratio of more than 2:1,000, while others report figures that are below the WHO threshold of 1:1,000 (World Health Organization, 2020a). The factors considered in selecting this region of Asia are:

(1) They are at different stages of health workforce development;

(2) Multiple approaches established in these countries; and

(3) Availability of data.

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Comparing these adjusted figures to those available from other countries, we find that India has a lower density of doctors compared to China, South Korea, Singapore, Vietnam, and Thailand. A striking aspect of India's doctor situation is the low doctor-to-population ratio, as is the case in the Philippines and Myanmar. China, South Korea, and Singapore outnumber the density of doctors, while Indonesia and Cambodia have the lowest density of doctors. An effective combination of "education", "monetary", and "regulatory interventions" has been recommended. These countries incorporated several policy measures to recruit and retain doctors supporting the Global Strategy on Human Resources for Health. In reality, countries differ because they are strong in some areas and weak in others (World Health Organization, 2020b, Liu *et al.,* 2018). The study reviewed the literature/case studies that have mentioned the health care reforms and policies implemented for reducing the shortage of doctors in the region. The research identified the gaps and the similarities in the interventions deployed in different nations; that could be applied at home.

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Table 1: Overview of the countries represented and the included sources/citations from the review article

Country	Stage of Health workforce development	Sources of articles	Keywords given	Number of articles	Key citations
South Korea, Singapore, Malaysia and China	Above average	PubMed Central, BMJ, Elsevier, Springer, BMC, Taylor and Francis, World Health Organization	Shortage of doctors, rural health workforce, physician retention strategy, distribution of doctors	15	Journal articles, Reports and Review articles
Vietnam and Thailand	Average	The Lancet, Taylor & Francis, Europe PMC, World Health Organization	Human resource shortage, medical education, rural recruitment.	5	Journal articles, Review report
Philippines, India, Myanmar, Indonesia and Cambodia	Below average	World Health Organization, BMC, Kne Lifesciences, Pubmed, Elsevier, The World Bank, Springer and National report	health workforce retention, incentives, shortage of doctors, retention strategy	11	Journal review articles and reports

South Korea

There were only 0.5 doctors per 1000 people in South Korea's private health sector before 1971 because of the growing demand for healthcare services. With the increase in healthcare demand, the government introduced social health insurance, built many medical schools, and increased the entrance quota to medical schools threefold. In 1979, the Korean Public health doctors (PHP) program was introduced by placing medical students and doctors in areas with physician shortage to increase village doctors quickly. Through this programme, the doctors supplemented their military service of three years (for male adult citizens) under the Constitution of the Republic of Korea and physician shortage almost disappeared from the country by 1983. Moreover, through massive investment in Health, by 1989, South Korea had achieved universal health coverage. By 1994, doctors more than doubled to about 1.2 per 1000 population. These interventions also met the demand for equitable distribution of doctors in all areas (World Health Organization, 2015; Na, Lee, & Kim, 2017). Further, South Korea has a high demand for specialist services.

However, the process of Post Graduate (PG) entrance takes a six-year bachelor's degree followed by the national medical licensing examination, a one-year internship and 3-year residency course for more recognition. Therefore, in 2015, the government introduced a seven-year (3 + 4) postgraduate program for high school students. Students can directly enter a university through examinations for admission (Han, *et al*., 2016). Presently, this range of policy initiatives has increased the doctor-to-population ratio in South Korea to 2.4:1,000 in 2019, one of the highest for medical doctors in Western Pacific and Southeast Asian countries (World Health Organization, 2020a).

Singapore

Since the beginning, Singapore's Western-style Medical schooling has developed highly skilled specialists in advanced medicine. Before 1960, Singapore produced 150 doctors every year; however, less than 50 doctors were specialists. Therefore, in 1970, the government collaborated with healthcare organisations worldwide and sent its brightest doctors to the best medical institutions in the world for the development of tertiary care. Since 1980, Singapore has become a hub of highly trained specialists with a considerable increase of doctors, where 41 per cent were specialists. However, most of them were primarily concentrated in the private sector. In 1977, the immediate step taken by the government to alleviate the human resources shortage in the public sector was an increase intake of medical students from 150 to 180 while relaxing the registration of foreign training (Meng-Kin, 1998). Singapore reached 1.6 doctors per 1000 population by 2009. However, most of them were primarily concentrated in the private sector due to the public sector's low pay and long working hours. In 2009, to increase its number of doctors, the country targeted 1000 foreign-trained doctors through a formal advertisement for benefits in return for service so that

over 50% of doctors were foreign-trained (Zhu *et al*., 2019). In 2012, the Government of Singapore introduced a four to five year programme for compulsory service in the public sector combined with incentives such as heavily subsidised tuition fees, and the government paid the bulk of the operating costs besides the infrastructural costs to motivate the students (Earn, 2020). Consequently, it has considerably increased the number of doctors to 2.46 per 1000 population by 2019, majorly 63% work in the public sector (World Health Organization, 2020a).

Malaysia

In 1987, Malaysia had 0.35 doctors per 1000 population, primarily concentrated in the public sector. The increased domestic demand, poor salaries, lack of flexible working hours, and no personnel and professional support were strongly associated with doctors' intention to leave the government hospitals and join the private sector. Therefore, since 1992, several government policies have been introduced to increase the supply of doctors, such as recruiting foreign doctors on a contract basis, increasing the intake of medical students in local universities and utilisation of retired doctor's services in the public sector. Other incentives such as increased in-service training in the hospitals, housing facilities for performing on call-duties, higher specialist allowances and postgraduate training opportunities for career advancement and professional support have also been introduced. Since 1997, the rise of public sector doctors began to grow; significantly weakening the demand for private healthcare. There was a lack of attention to the quality of doctors and specialists. In 1998, Malaysia experienced a repeat shortfall of doctors because of the Asian financial crisis. To overcome the shortage, the specialists concentrated in the private hospitals joined back the public hospitals; the government hired more foreign and migrated doctors on their return between 2000 to 2005 (Hameed & Nor, 2014).

In 2007, the Ministry of Health introduced a Full Paying Patient service where the government got some public hospitals to establish private wards to overcome the shortage. The scheme rewarded doctors in the public sector by allowing them to charge most of their professional fees for treating private patients and senior doctors with additional revenue opportunities. Hence, the resignation rate reduced from 6.4 per cent in 2000 to 3.5% in 2016, keeping 70 per cent in the public sector by 2016 (Muhammad & Ezat, 2020). Moreover, by 2020, the number of doctors in the public sector increased to 2.28:1000 (World Health Organization, 2020a).

China

Back in 1950, China had only 0.69 doctors per 1,000 population. China's initial approach to overcome the shortage was a three-track medical education system for training mid-level Human Resources in Health (HRH). The three-track method comprises 3–6 months of training for primary medical practitioners, 2–3 years of training for intermediate practitioners, and 5-year training for advanced practitioners (shortened from earlier 6–8 years). By 1965, there was a significant increase of doctors to 1.05 per 1,000 population through these training channels. However, most of the doctors were primarily concentrated in urban areas. From 1968, a short training began to solve the substantial shortage of healthcare workers in rural China through other uncommon methods such as mobile teams, an internship in commune hospitals; half-farm and half-study schools and People's Liberation Army (PLA) running workshops called barefoot doctors. By the 1978s, the number of barefoot doctors increased dramatically to 1.02 doctors per 1000 population. Between 1980 to 1985, under pressure from China's state council, the title barefoot doctors vanished and changed to "village doctors" From 1990 to 2000, the state was pushed to charge user fees, put drug mark-ups, and pass regulation of licensing examinations and minimum secondary education requirement for meeting the standards of full-fledged assistant doctors. This discouraged doctors and decreased the number of village doctors to 0.8 million (Xu *et al*., 2013).

Later on, for a new intake of doctors, China dramatically expanded the enrolment of medical students by adopting a three-tier education system. There is an eight-year full-fledged medical training program for licensed doctors, a three-year tertiary vocational diploma for high school students, and a secondary vocational diploma (SVD) with minimal medical training after junior middle school. All three programmes successfully increased the number of doctors to 1.39 per 1000 population by 2009. The eight-year programme had become the mainstream source of the urban health workforce, but the tertiary and secondary vocational diplomas were the leading source for the rural health workforce. Consequently, there has been an increasing trend in the number of low-level doctors only, and some regions have no licensed doctors (Kedia, *et al*., 2020; Hsieh & Tang, 2019). Thus, in 2010, the Chinese government adopted a medical rural bonded scholarship to increase the supply of licensed doctors in rural areas. This plan-emphasised training of a graduate from rural backgrounds, providing multiple incentives such as free medical education for five years in local universities, a waiver to dormitory fees, a monthly

stipend, and financial aid for living expenses in exchange for obligatory service in rural areas. The biggest program successfully generated 2.05 doctors per 1000 population by 2013; however, some gaps were identified such as a lack of educational initiatives for career development (Hou *et al*., 2019). Still, through various policy initiatives, China reached 2.22 per 1000 population by 2019; we can say that the success is boundless (World Health Organization, 2020a).

Vietnam

Vietnam had only 0.52 doctors per 1000 people in 2001; it was determined that the increased autonomy of public hospitals and low salaries resulted in a shortage of doctors in rural areas. Since 2006, the government has constantly issued funds in a high capacity to meet the demand of the health workforce with equity. Further, the community-based programme was introduced to increase student recruitment locally through allocated quotas (increased salaries and allowances from the state budget). This policy encouraged doctors to work in remote and disadvantaged areas. Later on, the government implemented several procedures, such as collaborating local hospitals with medical schools to accelerate in-service training and employment. Task shifting or rotational movement from high-level to low-level facilities for 3-6 months. The government also has given 70% of the basic salary as allowance and other housing subsidies for the first 5 years of rural service. They were adding a designation of a civil servant if doctors serve in rural areas for more than three years (Kanchanachitra *et al*., 2011). In 2007, to increase clinical specialists, besides the 6-year medical school, a four-year medical training was introduced for assistant doctors to become full-fledged doctors without any entrance examinations. The 4-year training comprises general education for one year and professional education for three years. The approach is relatively less theoretical and more clinical for early best specialisation (Fan *et al*., 2012). As per the latest data, Vietnam has a 0.99:1,000 doctor-to-population ratio in 2019 (World Health Organization, 2020a).

Thailand

Thailand in 1994 experienced a critical doctor shortage with an approximate doctor density of 0.3 per 1,000 population due to lengthy medical education programmes and the least likely recruitments. Addressing the problems, since 1994, the Ministry of Education and the Ministry of Public Health (MOPH) have collaborated to increase the production of rural doctors who were to work for MOPH hospitals mandatorily for three years, which serves the large majority of the Thai population (Nithiapinyasakul *et al*., 2016). The Collaborative Project to Increase Production of Rural Doctors (CPIRD) was integrated into three core areas: rural recruitment, local training, and hometown placement. In 2005, the One District One Doctor (ODOD) program extended student recruitment by estimating the shortage in the more targeted rural and remote regions. It then distributed scholarships to pursue full-fledged 6-year medical training at a regional hospital near its hometown. However, job placement in their home districts is liable for a 12-yearlong mandatory service in the MOPH service hospitals. CPIRD/ODOD which are as good as the regular track of the medical school programme appeared to have better clinical competencies and were twice as likely to fulfil their 3-year mandatory service. As a result, since 2000, these strategies so far contributed to a significant increase of CPRID/ODOD track doctors to 95.6-99% by 2015, which accounts for 0.46 doctors per 1000 people with a reduced rural-urban gap3. For the success of this model, Thailand also offered a range of other incentives for rural doctors, such as monthly hardship allowances, Graded salary, preference for PG specialisation, housing, and career advancement to work in the public sector. It also gives a buyout option only after paying a considerable amount (Frehywot *et al*., 2010; Tangcharoensathien *et al*., 2013). At present, Thailand has reached 0.95 doctors for 1000 people, indicating reaching the WHO threshold limit very soon (World Health Organization, 2020a).

India

During independence, India had only 0.16 doctors per 1,000 population; however, the density of doctors was four times in urban areas, whereas 75 per cent of the population lived in rural areas. It started in the 1970s, through several experiments that took place in different parts of India to retain doctors in rural areas. Since independence, many medical schools were set up to increase graduates, and by 1991, India reached 1.22 doctors per 1000 population. Since 2002, the government emphasised various initiatives such as task shifting by a short training of specialised services to MBBS doctors for rural areas, PG reservation scheme for rural in-service quota under a bonded agreement, and compulsory bonded rural service with no attached incentive; however, these attempts were not successful. In 2010, a 3-year diploma course for the medical training programme was introduced to train a physician to serve rural and tribal areas and become Rural Medical Assistants (RMA). It was to train and recruit candidates from rural areas who would be more likely to return and serve in such areas. RMAs had

somewhat mitigated the issues of shortages and retention of doctors in underserved areas. However, it did not get universal support due to professional legal standards and was shut down (Liu & Tang, 2018; Rao & Ramani, 2013).

Similarly, medical students cornered other schemes, and they dishonoured the terms and conditions of the bond for rural service. They simply left, and while a small proportion paid the penalty fee, the majority become defaulters. Students were not attracted to employment in rural areas or the public sector due to high capitation and tuition fees in medical colleges but low salaries and inadequate rural monetary incentives, lack of personal and professional development during compulsory rural service, and imbalances in quotas for PG. Moreover, poor implementation, particularly in standardisation of the programmes and lack of monitoring, resulted in the limited success of compulsory service in India (National Health System Resource Centre, 2016). Consequently, India is falling behind the number of doctors it needs, i.e. 0.73 per 1,000 population. The production of doctors is limited to 1.01 million looking at increasing India's population of 1.34 billion, reduced from 1.08 million in 1991 (World Health Organization, 2020a).

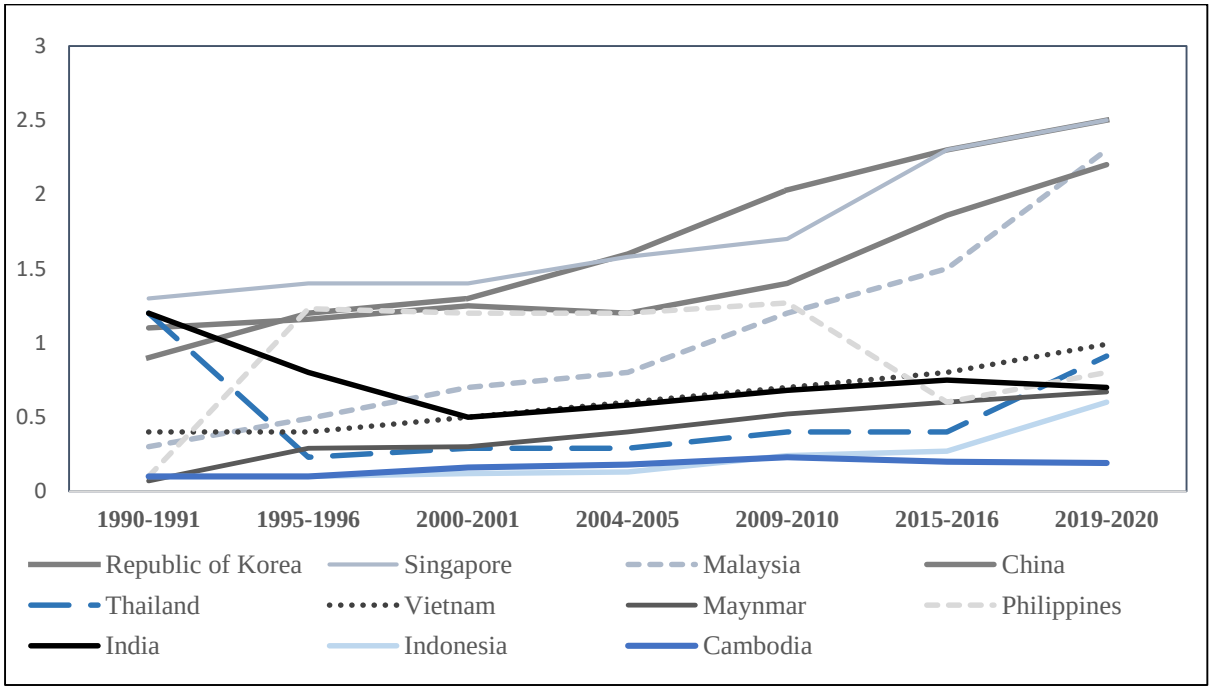

Fig 1. Number of Doctors per 1,000 population, selected countries, 1990–2020

Source: World Bank, World Health Indicators, 2020

Myanmar

After the 1988 crisis in the country, Myanmar 1990 was suffering from an acute doctor shortage, i.e. 0.1 doctors per 1000 population as many doctors left the workforce and migrated abroad. In 1994, compulsory entry into public service after graduation was introduced for at least three years, and only after three years of compulsory service would they be allowed to practice privately and emigrate. Incentives are given such as a graded salary, licence to practise, housing, and preference for PG specialization as an incentive for compulsory service (Tangcharoensathien *et al*., 2013; World Health Organization, 2014). Every year, doctors were increasing in Myanmar; however, retaining them remained a challenge because of unattractive remuneration, long working hours, and an unfavourable working environment leading to high resignation and absenteeism rates among medical doctors (Saw *et al*., 2019). Therefore, new medical schools were established to increase the production of doctors and increased compensation such as a hardship allowance for civil servants and for those working in hard-to-reach areas for offsetting the costs of relocation. The recruitment of doctors had increased to 0.52 doctors per 1,000 population by 2010 from 0.44 in 2006. However, these multiple incentives tend to have little impact on the long-term retention of doctors in Myanmar because they are insufficient to compensate for the difficulties associated with housing, transportation, conflict, and language barriers (Bhatti & Mcdonald, 2019). Myanmar still has a doctor-to-patient ratio, i.e. 0.73: 1,000 in 2019, which lacks the WHO prescribed ratio (World Health Organization, 2020a).

Philippines

In the Philippines, 80 per cent of all municipalities had no doctors; medical graduates either did not enter the workforce alternatively, migrated abroad. In 1993, the government implemented the Doctors to the Barrios programme (DTTB) as a response to this shortage to assign doctors to underserved and difficult-to-access municipalities for 2 years. The (DTTB) programme established many medical schools in rural locations, combined with complete financial security, improved working conditions and career advancement opportunities for doctors. A range of other incentives was also offered to retain doctors such as attractive salaries for two years, priority to Post graduation admission, and scholarships for mandatory rural service. Consequently, many graduates worked in rural areas for a longer duration and the health outcomes in all the municipalities also improved (Leonardia *et al*., 2012). Since 1994, a community-based medical educational approach is used to recruit medical graduates from rural backgrounds who chose to live and work in this underserved region for one year. By recruiting locally, the healthcare was delivered with clear ownership by local clinicians and community leaders and had reduced the shortage of doctors from 80% to 69% by 2011. From 2000, a sharp increase in the density of doctors to population ratio was seen from 1.21:1000 to 1.27: 1000 people by 2010 (Cristobal & Worley, 2012). Therefore, the density of doctors has reduced to 0.77 per 1000 population by 2020 (World Health Organization, 2020a).

Indonesia

Most Indonesian doctors worked in dual (government and private practices) to supplement their incomes. The Ministry of Health introduced a continuing education program in 1988 that would allow medical school graduates to work at least five years in a government university or as civil servants to complete their mandatory service. It allows dual practices as well as free access to specialist training. In 1991, contract staff or PTT policy was implemented for those who served in remote areas as civil servants for a minimum of 6 months and up to 3 years were rewarded with higher salaries and age extension as a criterion for scholarship eligibility for PG specialisation. However, in 1992, Indonesia had only 0.15 doctors per 1000 population due to unattractive incomes and delayed placements and lack of interest in public health. By 2003, the government gave freedom to choose their career or work location; hence, many not favoured places even then suffer shortages in the density of doctors, which was still at 0.13 doctors per 1000 people. Since 2003, medical schools have increased by 80% to allocate more students (Efendi, 2012). However, in 2006 it was found that more than 50% of community health centres in remote areas were without medical doctors. So, to motivate doctors, the government shortened the period of service from 2 to 1 year for remote areas and 6 months for very remote areas and increased the financial incentives based on location increasing the density to only 0.14 doctors per 1000 people by 2010. The progress was slow because most rural universities in Indonesia have only given importance to financial incentives however low accreditation status, low passing grades, few licences to practice and lack of focus on non-financial incentives have caused retention problems (Kartika, 2018) keeping doctors to population ratio in Indonesia low at 0.62:1000 in 2020 (World Health Organization, 2020a).

Cambodia

Cambodia in 1998 had only 0.14 doctors per 1000 population. The primary reason for few doctors in the public health system was job dissatisfaction and low and irregular income, which forced them to seek alternative sources of income for their survival. About 90% of doctors were concentrated in private sectors and urban areas whereas only 15% of people lived in rural areas. In response to the shortage, the government announced a free medical education programme for mid-level health workers for one year and three years to encourage students in rural areas. Since 2000, health departments have also allocated short-term financial incentives with basic salaries, i.e., user fees, health equity funds as incentives, and official development assistance (ODA) to attract doctors to rural settings (Zhu *et al*., 2019). In 2005, the government implemented a contract service for three months to reward civil servants with higher pay following a performance-based management system that successfully raised the ratio to 0.22 doctors per 1000 population by 2011 (Henderson & Tulloch, 2008). However, Cambodia had the lowest density of doctors, i.e. 0.2 doctors per 1000 population, among all Western Pacific and Southeast Asian countries, as the effectiveness and success of financial incentives were limited in its ability to attract and retain doctors (World Health Organization, 2020a).

Discussion

Improving the recruitment and retention of health workers in rural areas is a complex policy challenge. This study examined vital strategies and underlying factors affecting doctor recruitment and retention. These strategies of different healthcare systems in the region effectively address the shortage of doctors. However, there are widespread policy gaps.

Research findings indicate that the implementation of various policies and programmes can be supported through public-private partnerships, contract doctors, early specialisation, local rural placements, and more considerable financial and educational benefits. Drawing on examples from these countries, this note proposes a multidimensional policy approach.

The success of some countries largely depends on incentive packages such as in-service training in the hospitals, housing facilities for performing on call-duties, higher specialist allowances and post-graduate training opportunities for career advancement and professional support that attract retain and motivate doctors. Apart from that, the education cost shared by the government also motivates the students to take medicine as a career. Given an opportunity of being a civil servant ensures job security for the doctors, which helps, in their career and professional development. There are also favourable effects of targeted recruitment policy to enrol students with rural backgrounds and locating medical schools in those areas to motivate the recruitment of the students to their community. Compulsory service requirements in rural and remote areas could also help increase recruitment and subsequent retention of doctors if well planned with incentives. Policy failures on financial incentives probably did not give better experiences in retaining doctors, there are other difficulties related to housing, transportation, conflict, and language barriers in these areas. Apart from that, those who have no interest in public health but are forced to work compulsorily without incentives and career development often leave the rural areas. Another reason is the low accreditation status of universities, which slows down the supply of medical doctors.

Conclusion

Such a critical but constructive perspective offers valuable insights into the production and management of doctors. Evidence-based approaches have the potential to improve the desired number of doctors if the policy implementation combines a short-term focus on targeting financial and non-financial incentives to cost-effectively attract and retain doctors, who possess the most valuable skills with a longer-term focus on building a sustainable pipeline of the locally available workforce. Despite all of that, the study found that we need rigorous working conditions, adequate remuneration, and personal and professional support for the ethical integration of these health reforms.

Limitations

The findings of the study focused solely on strategies to increase the availability of motivated and skilled health workers in remote and rural areas through improved attraction, recruitment and retention of health workers in these areas. However, the strategies will only be relevant if the country assesses the health needs of its population, plans for the future needs of doctors, and considers strategies for their production, distribution and retention based on geographical distribution and requirements.

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