



Health workforce retention in low-income settings: an application of the Root Stem Model

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Abstract

The World Health Organization (WHO) recognizes a critical shortage of health workers as a growing global crisis. The shortage persists despite local and global efforts to recruit health workers ethically. Unequal migration of healthcare professionals, most often from low to high-resource countries, overwhelmingly defeats the objective of achieving Universal Health Coverage (UHC). If not addressed, especially given emerging global pandemics like COVID-19, the critical shortage of health workers could decimate vulnerable public health systems. This Viewpoint describes the Root-Stem Model, a six-stage process of strategic factors affecting work life that could help policymakers address the challenge of brain-drain among healthcare workers in low-income countries.

Keywords Universal Health Coverage · Low-income countries · Brain-drain · Health workforce retention · Human resources for health · Root-Stem Model · Human resource management

Key messages

- Critical shortage of healthcare workers driven by brain-drain is a growing global health crisis with important public health effects in low-resource settings.
- The Root Stem Model (RSM) of workforce retention uses a multistage cyclic process encompassing education, recruitment, job training, work environment, remuneration, and investment of work gains, and resources for analyzing work life and opportunities for improvement.

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- The RSM enables effective policy interventions against brain drain by offering an integrated view of the workers' needs, a framework for measuring and comparing the effectiveness of human resource programs or policies simultaneously, or both.

Introduction

The World Health Organization defines 'health system' as the combination of all organizations, people, and actions whose primary intent is to promote, restore or maintain health [1]. Health care workers (HCW) are the most important component of a health system [2]. Equitable distribution of HCWs and their services across populations is paramount to meeting health needs. Since the colonial era, historians have documented the migration of HCWs from low-income regions to affluent parts of the globe. In 1972, approximately 6% of doctors worldwide were expatriates; 75% of them worked in the United States of America (US), the United Kingdom (UK), and Canada [3]. Anyangwe and Mtonga reported that in 2007, the US had 14% of the global population, 10% of the global disease burden, 37% of the world's health workforce, and 50% of worldwide expenditure of funds for health. Sub-Saharan Africa, with about 11% of the global population, had 24% of the world's disease burden, but only 3% of the world's health personnel, and accounted for less than 1% of the global expenditures on health [4]. This situation has not improved. As Haakanestad et al., reported, more than half of the global shortfall in each healthcare cadre is in sub-Saharan Africa and south Asia [5].

Even in high-resource countries, a shortage of healthcare workers is a notable public health concern, especially in rural settings. Globally, 75% of physicians and 65% of nurses work in urban areas, even though half of the world's population lives in rural areas [6]. The United States has an average of 30.8 physicians (MDs) per 10,000 people in urban areas compared to 10.9 in rural areas [7, 8]. In Australia, rural populations (mostly Aboriginal and Torres Strait Islanders) constitute 28% of the entire population but studies show that policymakers address their public health concerns 22% below the expected national average [9]. As a result, this remote population receives less quantity and quality of health services than that enjoyed by other Australians [10]. Industrialized countries recruit international medical graduates (IMGs) and other HCWs for their rural populations mainly from low-resource countries. In the US, the Conrad State 30 Program permits each of the 50 states to use special immigration provisions (the J-1 Visa Waivers) to employ up to 30 international medical graduates (IMGs) [11, 12]. UK-trained doctors dislike working in low-resource settings, even in the UK, hence concentrate in cities, leaving the National Health Service (NHS) to depend on IMGs in such areas [13]. Countries including the US, UK, Canada [14, 15], New Zealand and Australia [16–18] annually recruit foreign-trained HCWs from low-resource countries to compensate for their growing deficit in the rural medical workforce. This practice creates an even more serious deficit than would exist if all graduates were to remain in the supplying countries. Who will compensate for the gaps in national health systems?



Universal Health Coverage

Universal Health Coverage is both a technical framework and a hope, especially for underserved populations. The hope is to create societies globally characterized by justice and equity in the provision of services. Adequate availability and distribution of healthcare staff, especially physicians, are key to increasing access to essential health services and to achieve the desired health outcomes. The WHO recommends a doctor-to-population ratio of 1:1000 [19], but in 2017 approximately 40% of its member countries remained below this ratio [6].

Recent emergence of the COVID-19 pandemic underscores the undeniable fact that public health is ‘non-divisible’ and ‘non-excludable’ among groups constituting a population, hence it fits the definition of ‘public good’ [20]. Public goods, once produced, benefit all and the price of eliminating nonpayers from enjoying the benefits of the good or service inhibits achieving full welfare value for all [21]. In 1976, Dr. Halfdan Mahler, then Director General of the World Health Organization (WHO) proclaimed his vision for a *Health for All by 2000* policy initiative [22]. In 1978, he set out his vision in a more functional and explicit way that led the world to sign the Declaration of Alma-Ata [23]. The Declaration proclaimed access to basic health services to be a fundamental human right. It also coined the term ‘primary health care’ (PHC), and called it a universal, community-based public health model focusing on preventive and curative services [24]. The concept of 2010 WHO’s Universal Health Coverage (UHC) stems from Dr. Mahler’s *Health for All by 2000* initiative. In 2008, Dr. Mahler confessed that his intention had not been to eradicate all diseases and illnesses by 2000 but to draw the world’s attention on health inequities [22]. By ensuring a continued battle against health inequalities, UHC seeks to:

ensure that all people can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship (WHO, 2010) [25].

The UHC model has three pillars: equal population coverage, provision of a variety of health services, and reduction of out-of-pocket health expenditures [26]. All three depend on the availability of skilled healthcare workers. Investment in recruiting, training, and retaining healthcare workers is essential if governments are to improve their primary healthcare systems. Unbalanced migration of health workers wastes investment in national medical education as well as causing critical shortages of the health workforces where they are most needed.



COVID-19 an accelerating or inhibiting context for health worker's migration

During the pandemic of COVID-19, the world has experienced rising mortality rates, attributable directly and indirectly to coronavirus infection [27]. This situation has overwhelmed healthcare systems by filling hospital beds with COVID-19 patients, reducing care for those with serious non-COVID-19 conditions, while limiting admissions and accelerating earlier patient discharges from hospitals. These necessities crippled other hospital functions and strained human resources [28–31]. The need for health care workers increased during the pandemic, even more in lower resource countries than elsewhere. The COVID-19 pandemic inhibited the usual migration of healthcare workers through travel restrictions and border closures around the world. In some way these travel restrictions helped developing economies, if temporarily, to retain health workers, and opened a window for creating policies to retain workers post-pandemic.

High-resource countries eased their usual ways of employing foreign medical doctors during the pandemic. The US removed a requirement for these doctors to pass the United States Medical Licensing Examination (USMLE) STEP 2 Clinical Skills examination to practice in their country [32]. The suspended exam was part of the second phase of the three-step examination process for physicians' medical licensure in the U.S. The European Commission, UK, and all other member countries of the Organization for Economic Co-operation and Development (OECD) introduced policies that facilitated border crossing for foreign health professionals and recognition of their qualifications. Both expedited addition of these HCWs to work in their health systems [33]. These high resources increased efficiency in recruiting to compensate for a shortage of HCWs while maintaining COVID-19 precautions.

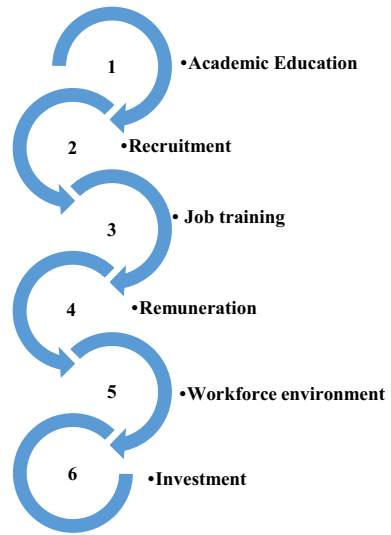
Thus, pandemic restrictions slowed the brain drain, and afforded an opportunity for policymakers from both spheres to reflect on the health worker's migration inequalities. The post-pandemic period requires the formulation of an ethical global policy framework, to assist WHO's Global Health Workforce Network to engage in practical steps against HCWs brain drain.

The Root Stem Model of health worker's retention

To gain insights into how health systems in lower resource settings can retain their workforces, especially during the COVID19 pandemic and under similar circumstances in the future, we propose the use of the Root Stem Model (RSM). It offers a holistic approach for exploring workforce retention by strategically targeting the workforce process stages: (1) Academic education (2) recruitment; (3) job training; (4) remuneration; (5) workforce environment; (6) investment in skills and resources. This model treats work life as affected by various related factors, in a multistage cyclic process (Fig. 1). Below we illustrate the importance of each step.



Fig. 1 An illustration of the holistic interrelatedness of the six factors required to reduce health workers migration in disadvantaged areas



Academic education

The former President of South Africa, Nelson Rolihlahla Mandela, once said “Education is the most powerful weapon which you can use to change the world.” [34]. Neither the United States [35] nor Ireland [36] solved its problem of retaining its medical workforce for underserved areas by increasing the numbers of medical students. The qualities of doctors proved to be more important. Medical education strategies most likely to influence graduating physicians to work in rural or low resource settings include: providing medical curricula in rural settings, improving admission policies to enroll more rural students, providing conditional scholarships in deprived areas, establishing rural preceptorships, and enhancing undergraduate rural medicine programs [37, 38].

Worldwide most medical schools remain in urban areas [35, 39] and adapt medical students to urban environments. Medical schools could establish satellite rural campuses for at least some courses. And governments should construct new medical schools in rural areas and recruit more local rural students to serve their own communities. A recent Australian study of medical students found that rural practice self-efficacy is positively related to current rural practice and future intention to practice rurally [40].

Recruitment and job training

Thailand suffered a critical shortage and maldistribution of the health workforce for a long time before making major policy changes. In 1994 and 2005, the Ministry of Education and the Ministry of Public Health (MOPH) sponsored two national programs: the Collaborative Project to Increase Production of Rural Doctors (CPIRD) and One District One Doctor (ODOD), respectively [41–43]. CPIRD



recruits medical students from their rural domiciles; ODOD recruits from more targeted remote rural areas and provides full government scholarships. Both are ‘bonding schemes.’ That is, they obligate health professional beneficiaries of government scholarships to work in public service for a specified period of time after graduating. Assessments of the Thai programs in 2015 and 2017 revealed that 92% of medical graduates stayed in rural areas and were likely to continue there [43, 44]. These results imply that policy strategies focused on rural recruitment of medical students, community-based medical education, mandatory service, and hometown placement contribute to improving retention.

Job training refers to “a planned effort by a company to facilitate employees’ learning of job-related competencies” [45]. It requires continuous investment in human resources to acquire up-to-date skills, knowledge, and expertise to achieve organizational goals [45]. A competent human resource is easily motivated, autonomous, and makes substantial contributions to the organization’s productivity. Such people help organizations cope with competing forces affecting the workplace by cultivating employee competence at required levels. Continuing professional development training programs and social and emotional support programs for rural HCWs are both effective for retention [6]. On-job and off-job training are key for employee job satisfaction; both play pivotal roles in grooming, retaining and attracting well-qualified personnel, especially in medical institutions where specialist training and retention are highly important [46]. Job training promotes learning and a positive change in employee professional behavior [47]. It is a key factor for retaining workers.

Workforce environment

Favorable workforce environments require collaboration among policy stakeholders at departmental, district, national, regional, and global levels [48]. Strategies that target improving the external socio-physical environment as well as psycho-personal needs of health workers are more effective than either alone [49]. Efforts to recruit and retain health workers in remote areas are more effective if governments address work environment issues including housing, communication systems, running water, road conditions, adequacy of medical supplies, quantity and quality of medical facilities, and continuing educational opportunities [50, 51]. And to make rural communities appeal to HCWs, policymakers should create desirable work environments with supportive management, safe and well-equipped clinical work environments, and broadband internet [52].

Motivating factors for job satisfaction include recognition, involvement in decision-making processes, promotions, achievement, autonomy, communication, job importance, degree of professionalism, organizational climate, interpersonal relationships, working for a reputable agency, supervisory support, positive affectivity, job security, workplace flexibility, working within a team environment and reasonable working hours [46].



Remuneration

Tanzania, Rwanda, and Burundi, among others, have tried Pay for Performance (P4P) schemes, also called Performance-based financing (PBF), to improve poor health worker performance and shortages [53]. Performance-based financing means funding healthcare workers, in part, based on performance to encourage health workers and management to improve efficiency, quality of care, and retention in low-resource countries [54]. Research indicates added benefits if managers ask workers for feedback and involve them in policy-making processes [46].

Paying rural allowances sufficient to compensate for health worker's inability to engage in extra jobs for more income can support retention. If such compensation is too small and infrequent, however, it may result in demotivation [55, 56]. In Israel, incentives affected residency location decisions for young doctors, particularly among those who grew up in remote areas; 65% of these doctors opted to continue working there. Combining recruitment of medical students from remote areas and meaningful incentives can improve their intention to stay [57]. Thus, it is important to combine targeted incentives with other retention measures.

Investment

A 2016 study to investigate the importance of motivation factors in rural health workers in Sierra Leone found that poor working conditions, financial costs of separation from families, limited access to further training, longer working hours (due to staff shortages), and inability to earn from other sources made working in rural areas less attractive [55]. A study in the US showed that an increase in healthcare expenditure resulted in better economic performance that boosted income, national gross domestic product (GDP), productivity, and poverty alleviation [58]. Expansion of medical tourism expansion may also boost foreign currency reserves that LIC countries can use to help retain skilled health workers [59]. Authors of a study in Uganda concluded that policymakers should prioritize adequate remuneration, equitable job promotions, and leadership opportunities for rural health workers by financial investments to increase opportunities for rural health workers to equal or exceed those of their urban counterparts [60]. For low- and middle-income countries investing in public health for all improves social welfare and stimulates economic growth [61].

Next steps

The Root Stem Model (RSM), highlighting the interconnectivity of stages for preparing and retaining HWCs, could be applied as a conceptual policy framework to early-stage processes of reforming health policy. It takes into account important factors in the global health workforce labor markets and can help guide macro and micro-policy-making processes and simulations [62]. As a microsimulation model it



can help its users to analyze the effects of health care reform on “improved health-care access”—cost and coverage of care and compare the effectiveness of human resource programs or policies simultaneously, or at different times and/or places. As to drawbacks, this model provides only low specificity on particular issues, and hence cannot be used alone to assess specialized programs. Altogether, RSM can be instrumental in offering a quick cross-sectional view and guide which functions to determine, and develop efficient policy strategies and sequences that can deliver favorable outcomes in human resources, health services, and health finance management policies for governments, and non-state actors in public health.

Conclusion

This Viewpoint presented measures to ease the consequences of ‘brain drain’, unequal migration, and ill-distribution of healthcare workers between developed and developing countries, and between urban and rural areas. We propose the adoption of the Root Stem Model to guide formulation, monitoring, and evaluation of policies and programs to relieve shortages of health workers in low-resource settings. Comprehensive policies should target all parts of the process to bring job satisfaction, organizational commitment, and, ultimately, retention of healthcare workers.

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Declarations

Competing interest The author declare no competing interests.

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