



Sustaining Resilience: Tackling the Challenges of Maintaining a Robust Health Workforce and Improving Healthcare Delivery

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ABSTRACT

The global healthcare workforce is facing an unprecedented crisis characterized by shortages, uneven distribution, and increasing burnout, particularly in low- and middle-income countries (LMICs). These challenges threaten healthcare delivery, deepen health disparities, and restrict access to essential services, especially in rural and underserved regions. With an estimated shortfall of 18 million healthcare workers by 2030, urgent action is needed to build a resilient and sustainable workforce.

This review examines strategies to strengthen the healthcare workforce by highlighting evidence-based approaches that enhance retention, professional development, and mental well-being. Key areas of focus include workforce education and training, fair compensation, mental health support, and the integration of digital health technologies like telemedicine. Additionally, international collaboration and public-private partnerships (PPPs) play a crucial role in mobilizing resources and driving healthcare innovation.

To provide a comprehensive analysis, this study employs a systematic review methodology, synthesizing peer-reviewed literature, policy reports, and case studies from various regions. The research primarily focuses on LMICs, where workforce shortages are most severe, while drawing comparisons from high-income countries to identify adaptable best practices. Thematic analysis categorizes findings into key intervention areas, including workforce training, retention strategies, digital health adoption, and governance reforms.

By evaluating successful models and identifying gaps in current workforce strategies, this review offers practical, evidence-based recommendations to guide policymakers and healthcare leaders in building a more resilient and equitable healthcare workforce. Addressing these pressing issues is essential for ensuring that health systems can withstand future global health challenges.

Keywords: *Health workforce resilience; healthcare worker burnout; health inequities; Public-Private Partnerships (PPPs); workforce shortages.*

1. INTRODUCTION

The global healthcare workforce is experiencing an unprecedented crisis, driven by shortages, maldistribution, and rising burnout, particularly in low- and middle-income countries (LMICs). This crisis threatens healthcare delivery, exacerbating health disparities and limiting access to essential services, particularly in rural and underserved areas. The projected shortage of 18 million healthcare workers by 2030 underscores the urgent need for sustainable solutions that enhance workforce resilience and ensure equitable healthcare access.

This review explores strategies to strengthen the healthcare workforce by highlighting evidence-based approaches that enhance retention, professional development, and mental well-being. Key areas of focus include workforce education and training, fair compensation, mental health support, and the integration of digital health technologies, such as telemedicine. Additionally, international collaboration and public-private partnerships (PPPs) play a crucial role in mobilizing resources and fostering innovation in healthcare delivery.

A resilient healthcare system relies on its ability to absorb, adapt, and transform in response to

challenges, as demonstrated during the COVID-19 pandemic. To ensure long-term sustainability, policymakers must prioritize investments in workforce infrastructure, improve retention strategies, expand training opportunities, and establish fair compensation structures. Addressing these critical issues is essential to preparing health systems for future global health emergencies.

To provide a comprehensive analysis, this study adopts a systematic review methodology, synthesizing existing literature, policy reports, and case studies from various regions. The research primarily focuses on LMICs, where workforce shortages are most pronounced, while also drawing comparisons from high-income countries to identify adaptable best practices. By evaluating successful models and identifying gaps in current workforce strategies, this review aims to inform policymakers and healthcare leaders on actionable solutions to build a resilient and sustainable healthcare workforce.

2. METHODOLOGY

A systematic review was conducted, drawing from peer-reviewed journal articles, policy reports from global health organizations (e.g., WHO,

World Bank), and country-specific case studies. The inclusion criteria focused on studies published within the last 10 years that address workforce shortages, resilience-building strategies, and healthcare system adaptations. Both qualitative and quantitative research were considered to ensure a well-rounded perspective. Data was synthesized using thematic analysis, categorizing findings into key intervention areas: workforce education and training, retention strategies, digital health adoption, and governance improvements. By integrating insights from multiple contexts, this study aims to offer practical recommendations that can be adapted to diverse healthcare settings worldwide.

2.1 The Global Health Workforce: Current Status

2.1.1 Health workforce statistics

There is a severe shortage of health workers worldwide, which presents a critical challenge to healthcare systems. The World Health Organization (WHO) projects that to fulfil the demands of an ageing population and the rising burden of chronic diseases, the global healthcare workforce would require an additional 18 million workers by 2030 (World Health Organization, 2016). Low- and middle-income countries (LMICs), especially those in Africa and Southeast Asia, are more severely affected by this scarcity (Campbell et al., 2020). According to Scheffler et al. (2018), the WHO African region, for instance, has only 3% of the world's healthcare personnel, although accounting for 25% of the worldwide disease burden. Another major shortfall is shown in Southeast Asia, where many nations are unable to meet the minimum threshold of 4.45 doctors, nurses, and midwives per 1,000 population required to attain universal health coverage (Liu et al., 2017).

Even while the total number of healthcare personnel in high-income countries may seem adequate, these nations nevertheless have difficulties in some areas, such as the delivery of healthcare in rural areas. There are noticeable differences in the distribution of the workforce in nations like the US and Canada, with a significant lack of healthcare professionals in rural areas (Garcia & Weiss, 2020). The National Health Service (NHS) has been dealing with persistent recruiting issues, especially for nursing staff, with a reported shortfall of over 40,000 nurses as of 2020 (Buchan et al., 2020). These

issues have occurred even in nations with strong healthcare systems, like the United Kingdom.

2.1.2 Impact of workforce shortages

The impact of a workforce shortage on patient outcomes, the resilience of health systems, and the delivery of healthcare is extensive. Understaffed healthcare systems provide lower-quality care, which increases the risk of medical errors, longer waiting times, and restricts access to services (Jackson et al., 2018). According to a 2019 study by Drennan and Ross (2019), healthcare systems experiencing a severe staffing shortfall report worse health outcomes and lower patient satisfaction, especially when it comes to maternal and neonatal care. Lack of workers also undermines the resilience of healthcare systems, particularly during crises. As an illustration, nations that had experienced shortages found it difficult to handle the increase in patients during the COVID-19 pandemic. One of the hardest-hit nations in early 2020 was Italy, where a shortage of medical workers caused increased mortality rates due to overcrowding in healthcare institutions (Rangachari & Woods, 2020). A vicious cycle that weakens health systems' ability to handle future crises is also created by persistent shortages, which put extra strain on the workforce already in place and increase the risk of burnout and workforce deficiencies.

2.1.3 Health worker distribution

One important problem that makes the effects of general workforce shortages worse is the maldistribution of healthcare professionals. At the national and international levels, disparities exist in the distribution of health personnel. Healthcare professionals are concentrated in urban areas in many low-income nations, drastically underserving rural communities (Diallo, 2020). For instance, even though many people in sub-Saharan Africa live in rural areas, over 50% of healthcare staff are employed in urban areas (Roxburgh et al., 2019). This urban-rural gap greatly limits access to healthcare for rural communities, adding to health disparities.

Similar gaps occur in high-income countries; however, the underlying causes may be different. There is an extreme shortage of primary care physicians, dentists, and mental health professionals in rural areas of the United States. Due to reasons like lower compensation, professional isolation, and fewer prospects for advancement in the profession, rural places

frequently struggle to draw and keep healthcare professionals (MacDowell et al., 2019). Globally, the movement of healthcare professionals from low- and middle-income to high-income nations exacerbates the maldistribution of the workforce. While the countries of origin experience brain drain, nations like the United States, Canada, and the United Kingdom gain from the influx of highly skilled foreign professionals (Aluttis et al., 2014).

2.1.4 Health worker burnout

The emotional demands of patient care, long work hours, low staffing, unfavorable working environment, and other factors contribute to the widespread struggle with burnout among healthcare workers. The COVID-19 pandemic caused healthcare personnel to deal with unprecedented workloads, threats to their personal health, and a lack of resources, which brought the problem of burnout into stark relief. During the pandemic, a global survey revealed that more than 70% of healthcare professionals had burnout, with many expressing elevated levels of stress, anxiety, and depression (Lai et al., 2020). The effects of burnout on healthcare professionals and the institutions they work in are profound. Employees that are burnt out are more likely to be unsatisfied with their jobs, be less productive, and be more likely to quit their jobs. This ultimately increases the scarcity of workers and compromises the standard of patient treatment (Shanafelt et al., 2020). In addition to its emotional cost, burnout can worsen already overcrowded health systems by raising absenteeism and mental health issues among healthcare professionals. The problem is made worse by weak support networks, restricted access to mental health treatments, and an absence of organizational burnout solutions. Because they frequently operate in settings with limited resources and few opportunities for professional growth or mental health care, health professionals in low- and middle-income nations are especially vulnerable (Kim et al., 2018). A multimodal strategy is needed to address burnout, including bettering working conditions, hiring more people, and giving healthcare workers access to mental health resources.

2.2 Challenges in Maintaining a Robust Health Workforce

2.2.1 Workforce retention issues

Workforce retention is one of the biggest obstacles to keeping a strong health workforce.

Numerous interconnected factors contribute to the high attrition rates that persist in many healthcare systems. In low- and middle-income countries (LMICs), where healthcare professionals are frequently underpaid despite the crucial nature of their work, low remuneration are a serious problem. For example, a lot of healthcare personnel in sub-Saharan Africa go for work overseas because their pay is much lower than that of their colleagues in high-income nations (Dussault & Franceschini, 2006). Low compensation in comparison to living expenses can cause unhappiness and eventual attrition, especially in high-income nations.

In addition to salary issues, one of the main causes of employee attrition is a shortage of professional development opportunities. Due to the lack of options for career growth or specialization, many healthcare personnel feel as though their careers are stagnating. This lack of opportunity for advancement can cause burnout and job unhappiness, which in turn can raise turnover rates (Huntington et al., 2011). The problem is made worse by unfavorable working conditions, which include low personnel levels, lengthy working hours, and a shortage of resources. Healthcare workers around the world were compelled to work in overstressed systems with inadequate staffing, a shortage of personal protective equipment (PPE), and excessive caseloads during the COVID-19 pandemic. Many healthcare personnel chose to leave the field totally because of these issues, which greatly raised burnout and attrition (Hanna et al., 2020).

2.2.2 Training and education gaps

The mismatch between healthcare demands and existing training and education programs is a major obstacle to sustaining a competent health workforce. The demands of today's healthcare systems, which increasingly call for technical competency, expertise in specialized fields and a multidisciplinary approach to patient care, are too great for many of the training programs now in place to effectively prepare healthcare workers. For instance, a severe lack of medical professionals qualified to treat chronic diseases like cardiovascular illness and diabetes has been made evident by the fast increase of noncommunicable diseases (NCDs) in low- and middle-income countries (LMICs) (Mills et al., 2020).

Furthermore, there is frequently a mismatch between the demands of healthcare systems and

academic institutions, which leaves recently graduated professionals unprepared to handle urgent healthcare issues. While the need for medical professionals with expertise in palliative care, mental health, and preventative care is growing, medical education in many countries still emphasizes acute treatment. This mismatch will continue unless medical education is reformed to better meet the demands of the healthcare system, further taxing already burdened healthcare systems with a workforce shortage (Frenk et al., 2010).

2.2.3 Aging workforce and retirement

One major factor exacerbating the global scarcity of healthcare workers is the ageing of the workforce. A large percentage of the healthcare workforce in many high-income countries is getting close to retirement age, which is creating an increasing need for younger professionals to fill the gap. For example, almost one-third of practicing physicians in the United States are over 60, and many of them are anticipated to retire during the next ten years (Auerbach et al., 2020). Similar patterns are seen in nations such as the UK and Japan, where ageing workforce contribute to concerns about the sustainability of the workforce (Marc et al., 2019). The retirement of seasoned healthcare professionals creates a double problem: it reduces the workforce numerically while also eradicating important institutional knowledge and experience. This may influence the standard of healthcare services, especially in specialized areas where there may not be enough senior staff knowledge transfer to junior personnel. A significant infusion of younger healthcare professionals will be needed to fill the gaps in the workforce caused by the ageing population's increased demand for healthcare services, despite efforts to persuade older experts to stay in the profession longer.

2.2.4 Global migration of healthcare workers

Considered a "brain drain," the worldwide movement of healthcare professionals poses a serious threat to many low- and middle-income nations. Medical personnel from low-resource environments frequently leave their home nations for high-income ones in quest of better prospects, leaving behind healthcare systems already beset by acute workforce shortages. In nations like the US, the UK, and Australia, more than one-third of physicians and nurses have received training abroad, with many of them

coming from low- and middle-income countries (World Health Organization, 2016).

The healthcare systems in the skilled professionals' home countries are significantly impacted by this movement. Frequently, low-income countries (LMICs) expend significant resources on educating healthcare professionals, only to witness their emigration to countries with greater wages and better working conditions, where they can pursue better career prospects. In contexts with low resources, the loss of qualified professionals erodes healthcare systems, resulting in worse health outcomes and less access to care for vulnerable populations (Miyagiwa, 2020). Retention programs, better working conditions, and bilateral agreements between nations to govern migrant flows have all been tried to stop brain drain, but their effectiveness in halting the trend has been inconsistent (Dodani & LaPorte, 2005).

2.2.5 Policy gaps and poor workforce planning

Keeping a strong health workforce is further hampered by insufficient workforce planning and a shortage of comprehensive national policy. Many nations have reactive workforce planning as opposed to proactive planning, which makes it difficult for healthcare systems to satisfy present demands and ill-prepared for future challenges. For instance, chronic understaffing and a shortage of specialized healthcare personnel are the consequences of workforce planning that ignores demographic transitions, such as ageing populations or the rising burden of NCDs (Cometto et al., 2013). Moreover, inadequate government funding and poor infrastructure plague many LMICs' healthcare systems, making it challenging to create long-term plans for workforce sustainability. This includes a lack of funding for healthcare professional recruitment, training, and retention as well as a lack of coordination between the different levels of government and healthcare facilities. As demonstrated by the COVID-19 pandemic, when inadequate workforce planning caused severe disruptions in service delivery in numerous countries, the lack of cogent policies also makes healthcare systems frequently unable to quickly adjust to developing health emergencies (McKee et al., 2021). Building a resilient healthcare workforce requires thorough workforce planning that considers changing demographics, global health trends, and future healthcare needs.

2.3 Strategies for Sustaining a Resilient Health Workforce

2.3.1 Improving health workforce education and training

Enhancing education and training programs to match the changing needs of the healthcare industry is one of the best ways to maintain a resilient health workforce. To guarantee that healthcare professionals have the information and abilities to handle new health issues, educational curricula must be in line with the demands of the healthcare industry. The demand for healthcare personnel with expertise in specialized care, technological competence, and multidisciplinary approaches is rising due to the rise in chronic diseases, technological breakthroughs in the field, and global health emergencies like pandemics. For example, to train future healthcare workers for the demographic and epidemiological transitions occurring internationally, the curriculum should incorporate modules on mental health, noncommunicable diseases, and geriatric care (Joyne, 2020).

Increasing access to programs for continuous professional development (CPD) is another essential aspect of workforce education. Healthcare workers need to have access to continual learning opportunities to stay current on new treatments, technologies, and best practices in a quickly evolving healthcare environment. To accommodate busy healthcare professionals, CPD programs should be adaptable and easily available, making use of digital platforms and remote learning. According to a study by Frenk et al., (2021), ongoing professional development improves patient outcomes, lowers medical errors, and boosts job satisfaction for healthcare professionals all of which eventually strengthen the resilience of the workforce.

2.3.2 Enhancing workforce retention

Retaining healthcare workers is crucial for maintaining a robust workforce. Improving working conditions, offering fair compensation, and providing career advancement opportunities are key to enhancing workforce retention. In many healthcare systems, healthcare workers face long hours, high patient loads, and unsafe working environments, leading to burnout and attrition. Addressing these issues by ensuring safe staffing levels, providing access to necessary resources, and offering competitive

salaries can significantly improve retention rates. A study by Aiken et al., (2020) found that healthcare workers who felt supported by their organizations and had access to professional development opportunities were more likely to remain in their positions, even in high-stress environments.

Support for mental health is yet another important component of workforce retention. The COVID-19 pandemic brought to light the psychological toll that working in healthcare may have, especially in times of emergency. By making counselling services, peer support groups, and stress management training accessible, healthcare organizations can demonstrate their commitment to mental health. Preventing burnout also requires encouraging a healthy work-life balance through flexible scheduling, manageable workloads, and time for rest and recovery. Organizational strategies should incorporate mental health measures and stress how crucial they are to preserving a resilient workforce (Chen et al., 2021).

2.3.3 Strengthening leadership and governance

Building a robust health workforce requires strong governance and leadership. Strong leadership is essential to creating a welcoming and inclusive workplace where healthcare professionals feel appreciated and empowered. The welfare of their employees, open communication, and collaborative decision-making must be given top priority by leaders in the healthcare industry. Job satisfaction and attrition rates can be greatly increased and decreased by a supportive leadership style that emphasizes diversity, empathy, and collaboration (Bailey & West, 2019). Furthermore, putting policies in place that promote worker sustainability requires sound governance. This entails establishing structures for hiring, retaining, and professional growth as well as making certain that healthcare personnel have access to the tools, they require to provide excellent care to patients. To create clear workforce regulations, make infrastructure investments in the healthcare industry, and encourage accountability in workforce planning and management, governments and healthcare organizations must work together. Robust governance guarantees that the workforce is sufficiently equipped and supported to confront upcoming health-related obstacles (Van de Pas et al., 2022).

2.3.4 Utilizing technology and innovation

Innovation and technology are viable ways to lessen the workload for healthcare personnel. The use of telemedicine has grown in importance as a means of expanding access to healthcare, especially in rural and underdeveloped areas. Telemedicine lessens the demand on medical facilities by allowing medical professionals to consult with patients online rather than in person. According to studies, telemedicine increases patient access to care, shortens wait times for appointments, and facilitates more effective case management for medical staff (Smith et al., 2020).

The health workforce is also greatly aided by e-health technologies and artificial intelligence (AI). AI can help with data management, patient monitoring, and diagnostic procedures so that medical professionals can concentrate on more difficult jobs. Healthcare professionals can spend less time on paperwork and other non-clinical tasks by using e-health platforms to streamline administrative tasks. Healthcare workers can labor less and spend more time caring for patients by automating repetitive administrative duties including billing, inventory management, and appointment scheduling (Jiang et al., 2021). These technologies must be used in healthcare in a way that enhances rather than eliminates the role of the human element.

2.3.5 International collaboration and support

Addressing the workforce shortages and maintaining the viability of global healthcare systems require international cooperation. Healthcare professionals can expand their networks, share knowledge, and obtain experience in diverse environments through health worker exchange programs, which are facilitated by the World Health Organization (WHO). Through the ability of healthcare professionals from high-resource areas to assist people in low-resource areas, these programs help alleviate disparities in the distribution of healthcare workers. To increase workforce resilience globally, international collaboration also entails exchanging best practices, regulations, and technologies (Cometto et al., 2020).

Another crucial component of international cooperation is addressing the brain drain issue. Migration of healthcare personnel from low-income to high-income nations is beneficial to

high-income countries, but it also frequently makes workforce shortages in the country of origin worse. The effects of brain drain can be lessened by implementing policies that support circular mobility, in which healthcare professionals move back and forth between nations, or that encourage healthcare workers to return home after obtaining experience abroad. Moreover, strengthening local workforce capability might assist mitigate the push factors that promote migration by expanding foreign aid and support for healthcare systems in resource-constrained contexts (Chikanda et al., 2021).

2.4 Case Studies: Successful Approaches in Health Workforce Resilience

Resilient health workforces are essential to building globally sustainable health systems. While exposing serious flaws in health systems, the COVID-19 pandemic also sped up advancements in worker resilience. Many nations have shown how to effectively develop resilient health workforces, particularly by implementing established care models that include flexible organizational structures, community engagement, and effective training programs.

2.4.1 Country-specific success stories

1. Cuba's Robust Primary Healthcare Workforce

Cuba has long been known for having an excellent healthcare system and a workforce that of resilient and adaptable primary care specialists. Cuba's healthcare system is based primarily on preventive care, which guarantees that medical professionals are well-integrated into the communities they serve. Family physicians and nurses are the cornerstone of the nation's healthcare system, acting as the first line of defense in promoting health and preventing illness. Cuba's strong medical education system, which generates qualified medical professionals prepared to handle emergencies, is one of the main factors contributing to its resilience (Keck, 2020). Cuba's primary healthcare personnel proved resilient during the COVID-19 pandemic by quickly mobilizing and utilizing "medical brigades." These teams were dispatched to assist with pandemic response operations not only throughout Cuba but also to neighboring nations (Spiegel & Yassi, 2020). Cuba's capacity to incorporate public health initiatives into the community contributes to the durability of its

health workforce. Working inside neighborhoods enables Cuban medical personnel to promptly identify and address local public health issues. This local integration highlights the nation's achievements in workforce resilience, as does the government's dedication to financing healthcare.

2. Rwanda's Community Health Worker Programs

Rwanda provides another noteworthy illustration of the resilience of the health workforce, primarily due to its community health worker (CHW) initiatives. Initially implemented in the mid-1990s as a component of post-genocide reconstruction endeavors, the CHW program has developed into a resilient and long-lasting model for healthcare delivery in rural regions. Trained members of the local community, CHWs serve as a link between healthcare systems and isolated populations by offering basic healthcare services, health education, and surveillance (Binagwaho et al., 2022). Rwanda's decentralized and community-driven strategy is the key to its health workforce resilience success. By enabling laypeople to actively participate in health promotion and illness prevention, the CHW program tackles the scarcity of workers in the workforce. Rwanda's CHWs were instrumental in helping the nation manage the COVID-19 pandemic with minimal resources by helping with contact tracing, patient monitoring, and health education (Moynihan et al., 2021). Since it enables health systems to continue operating even in the face of widespread health emergencies, this model highlights the importance of funding community-based workforce resilience.

2.4.2 Lessons from the COVID-19 pandemic

The COVID-19 pandemic brought to light the global health workforces' vulnerabilities as well as their capacity for adaptation. Numerous nations' health systems encountered hitherto unseen difficulties, such as a workforce shortage, employee burnout, and insufficient protective measures. But the pandemic also encouraged innovations that increased resilience.

1. Exposure of Workforce Vulnerabilities

Significant flaws in the resilience of the global health workforce were made evident by the pandemic, especially in nations with underfunded or overburdened healthcare systems. Due to a

lack of personal protective equipment (PPE) and inadequate staffing, healthcare professionals in many areas experienced significant levels of stress, burnout, and exposure to infection (Lai et al., 2020). The pandemic highlighted the vulnerability of healthcare systems that depend on contract labour or do not have enough medical experts to manage spikes in patient traffic (Moynihan et al., 2021). The pandemic put strain on seemingly resilient health systems in high income nations like the United States and the United Kingdom, resulting in unprecedented levels of psychological stress and worker exhaustion. According to reports, a significant proportion of healthcare personnel are quitting their jobs due to post-traumatic stress disorder (PTSD) (Greenberg et al., 2020), highlighting the need for sustained investments in health workforce resilience.

2. Innovations in Workforce Resilience

The COVID-19 pandemic revealed weaknesses, but it also spurred important advancements in worker resilience. As a vital tool for preserving healthcare services and lessening the strain on in-person care facilities, telemedicine has emerged. Healthcare professionals can now give care remotely, lowering their risk of contracting COVID-19 and relieving pressure on hospitals thanks to the quick use of telehealth services (Greenberg et al., 2020). This innovation showed how technology may increase worker resilience in future crises while also improving accessibility to healthcare. During the pandemic, several nations also established quick training and upskilling initiatives to increase the number of healthcare workers. In certain nations, for example, medical students were quickly put into duty and retired healthcare personnel were reactivated (Chen et al., 2021). These actions brought to light the significance of adaptable and responsive health workforce strategies that can be promptly modified to address new issues.

The epidemic also sparked initiatives to enhance healthcare professionals' access to mental health resources. The psychological effects of working in high-stress workplaces led to the implementation of mental health support systems in many healthcare institutions, such as peer support networks and counselling programs. The necessity of comprehensive approaches to health workforce resilience that consider both physical and mental well-being has been highlighted by these programs (Chen et al., 2021).

2.5 Implications for Healthcare Delivery

2.5.1 Improving patient outcomes

Improving patient outcomes is directly and significantly impacted by a resilient health workforce. The ability of healthcare workers and institutions to adjust to and recover from stressors, such as public health emergencies, financial limitations, or workforce shortages, is referred to as workforce resilience. A workforce that is resilient can deal with growing workloads, resolve crises, and continue to provide high-quality care even in the face of hardship. Positive patient outcomes and staff resilience are clearly correlated, according to research. For instance, resilient healthcare systems kept maintained patient care standards during the COVID-19 pandemic despite a scarcity of resources and an overwhelming patient volume (Frenk et al., 2010). On the other hand, systems with low resilience saw greater rates of patient mortality, staff burnout, and inadequate care quality. To improve patient care delivery and safety, resilient health systems made sure that healthcare professionals have access to sufficient resources, training, and psychological support (Chen et al., 2021).

Resilient health workforces have also been demonstrated to decrease patient complications and speed up recovery periods by maintaining high standards of service continuity even in times of crisis. For example, areas like Rwanda that have robust community health worker (CHW) programs have demonstrated that even in difficult situations, consistent patient care and improved health outcomes are possible with robust workforce structures (Smith et al., 2020).

2.5.2 Strengthening health systems

Building stronger, more responsive health systems starts with a robust health workforce. Increasing the workforce's resilience helps to increase the capacity of the health system, especially in areas where natural disasters, unstable economies, or disease outbreaks are common.

Robust health systems depend on their workforce's abilities to absorb, adapt, and transform. The system's ability to withstand shocks, such as pandemics or natural disasters, without significantly lowering the quality of medical care is referred to as its absorptive capacity. The ability to modify procedures in the

face of novel difficulties is known as adaptive capacity. For example, telemedicine was used to continue patient care during COVID-19 (Smith et al., 2020). Long-term adjustments made to guarantee that the workforce is better equipped to tackle upcoming difficulties are referred to as transformative capacity. For instance, nations like Rwanda and Cuba have made investments in health workforce models that place a high value on ongoing education, community involvement, and solid primary care networks. This has enabled them to react to public health emergencies with greater vigor (Binagwaho et al., 2022). Reducing mortality and enhancing patient access to critical services are two benefits of having a resilient workforce: it keeps health systems responsive and operational during emergencies. According to Lai et al. (2020), healthcare systems that have made investments in staff training and adaptability demonstrated improved responsiveness to quickly altering needs during the COVID-19 pandemic.

2.5.3 Addressing health inequities

The ability of workforce resilience to mitigate health disparities through addressing differences in healthcare distribution and access is one of its most important features. Access to healthcare is unequally distributed in many low- and middle-income nations, with a serious scarcity of healthcare providers commonly occurring in rural areas. Resilient workforce models, on the other hand, offer an efficient remedy by decentralizing care and reaching underprivileged populations with healthcare services (Binagwaho et al., 2022). Examples of these programs are the community health worker initiatives in Ethiopia and Rwanda.

Reducing disparities in health outcomes is largely dependent on the distribution of the workforce. Inequalities in care are made worse by an unequally distributed staff, which puts marginalized groups at risk. Health systems may guarantee that vulnerable groups receive timely and high-quality healthcare services by emphasizing equitable distribution. By allowing underprivileged groups to receive consultations and care remotely during the COVID-19 pandemic, for instance, the growth of telemedicine helped close some access gaps and lessen disparities in access to healthcare (Chen et al., 2021). Reducing health disparities also involves making sure that the healthcare personnel is diverse and providing care that is

sensitive to cultural differences. Research indicates that patients who receive treatment from healthcare workers who are from similar backgrounds to them likely to have better health outcomes. This emphasizes the significance of fostering diversity in the workforce (Chen et al., 2021).

2.6 Policy Recommendations

Ensuring the resilience and sustainability of health systems worldwide is largely dependent on the health workforce. The COVID-19 pandemic has highlighted the necessity of deliberate policy initiatives to protect, train, and assist healthcare workers. These interventions also aim to improve the overall ability of health systems to handle future emergencies.

2.6.1 National and International Policy Interventions

- **Call for Coordinated Policies to Enhance Workforce Training, Retention, and Fair Compensation**

The global health workforce is confronted with numerous obstacles, such as insufficient training programs, high burnout rates, and unequal distribution, especially in low- and middle-income nations. Coordinated national and international policies that prioritize improving workforce training, retention, and equitable compensation are necessary to overcome these issues. Development of comprehensive training programs that are adapted to local health requirements while adhering to international standards should be given priority in effective policy interventions. For example, funding for capacity-building and continuous education guarantees that healthcare personnel have the most recent information and abilities to handle both routine and emergency circumstances (Smith et al., 2020). International cooperation is crucial for exchanging best practices and giving nations with limited resources technical support, such as through the World Health Organization (WHO) and regional health organizations.

Policy interventions also have retention as a primary objective. Healthcare professionals have high turnover rates that threaten workforce stability. These high rates are caused by things like dangerous working conditions, heavy workloads, and inadequate compensation. To improve retention, policies that give competitive compensation, foster career growth chances,

and offer mental health support are essential (Chen et al., 2021). Retention is another major goal of policy interventions. The high turnover rates among healthcare workers jeopardize the stability of the workforce. Things like hazardous working conditions, excessive workloads, and inadequate compensation are to blame for these high rates. Policies that provide competitive pay, encourage opportunities for career advancement, and provide mental health support are crucial for improving retention (Chen et al., 2021).

2.6.2 Public-private partnerships

- **The Potential of Collaborations Between Governments, Private Sectors, and International Organizations**

Using both sectors' assets, public-private partnerships (PPPs) can significantly address the intricate issues confronting the health workforce. These kinds of partnerships may give the health workforce training, infrastructure, and service delivery the much-needed resources, technology, and experience. Governments frequently lack the funding necessary to increase the capacity of the health staff on their own, especially in low- and middle-income nations. Governments can raise more money and resources for workforce development by collaborating with businesses in the private sector and global organizations. For instance, during the COVID-19 pandemic, relationships with technology businesses allowed the proliferation of telemedicine services, while alliances between governments and pharmaceutical companies supported the quick production and delivery of vaccines (Smith et al., 2020). These alliances showed how teamwork can spur innovation and increase accessibility to healthcare resources.

The training of the healthcare personnel can also be improved by private sector involvement through investments in infrastructure, digital health solutions, and technology. PPPs, for example, can help construct online learning environments for healthcare professionals so they can always have access to opportunities for professional growth, no matter where they are in the world. PPPs that improve health systems in resource-constrained environments, especially in the battle against infectious diseases, have been greatly aided by international organizations like the Global Fund and Gavi (Binagwaho et al., 2022). While PPPs have many benefits, to maintain public health issues at the forefront of collaborative efforts, these partnerships must be

founded on transparency, accountability, and shared goals. To ensure that the private sector's involvement in PPPs is in line with ethical norms and national health objectives, governments should set up regulatory frameworks.

2.6.3 Investment in health workforce infrastructure

- **Need for Governments to Invest in Health Workforce Capacity Building and Infrastructure**

To close the gaps in healthcare delivery that currently exist and get ready for any future medical emergencies, it is imperative that sustainable investments be made in the infrastructure of the health workforce. Governments must set aside enough funding to increase the capacity of the health workforce through focused investments in infrastructure, technology, and training. Institutions that provide health workforce education and training are an important area for investment. To boost the number of healthcare professionals available, particularly in underprivileged areas, it is necessary to expand and improve medical schools, nursing programs, and community health worker training centers. Furthermore, by encouraging them to serve in their communities after graduation, scholarships and other rewards for students from underprivileged or rural backgrounds can assist address problems with workforce distribution (Chen et al., 2021). Investing in digital infrastructure is essential for enhancing workforce efficiency and modernizing health services. Healthcare professionals can provide more timely and effective care when telemedicine, electronic health records (EHRs), and other digital tools are integrated (Smith et al., 2020). This is especially true in distant or resource-constrained situations. For allocating resources and managing the workforce, data collection and analysis can be improved by strengthening the digital health infrastructure. It is also imperative that governments provide top priority to the development and upkeep of secure, well-equipped healthcare facilities that can support healthcare professionals in their capacities. For healthcare personnel to be safe and healthy, especially in times of public health emergency, investments in medical supplies, personal protective equipment (PPE), and other essential infrastructure are essential. To increase access to care and strengthen the resilience of their health staff, nations like Rwanda have made

successful investments in community-based health infrastructure (Chikanda et al., 2021). Maintaining investments in the infrastructure of the health workforce will ultimately strengthen health systems and make them more capable of addressing the difficulties associated with global health in the future, in addition to improving healthcare delivery.

3. CONCLUSION

Burnout, inequality, and shortages are just a few of the major issues facing the global health workforce. Due to resource limitations, low- and middle-income nations are at risk of experiencing a lack of 18 million healthcare personnel by 2030. The maldistribution of healthcare personnel exacerbates disparities in health, especially in metropolitan regions. The COVID-19 pandemic has made burnout a serious problem, making it worsened by unfavorable working circumstances and long hours. Improving governance, leadership, retention, education, and training are just a few of the comprehensive strategies needed to address these issues. Techniques such as telemedicine, technology development, and international cooperation are essential. A resilient workforce in healthcare requires cooperation between governments, international organizations, and players in the business sector.

Addressing the global health workforce crisis requires coordinated efforts from governments, healthcare institutions, and international organizations. By investing in education, retention programs, and equitable workforce distribution, the global community can build a resilient healthcare workforce capable of meeting the growing demands of an evolving healthcare landscape. Only through these concerted efforts can we ensure the sustainability of healthcare systems and the delivery of high-quality patient care worldwide.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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