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Post-COVID health system resilience in Sub-Saharan Africa: Policy priorities for advancing sustainable development goal 3 (good health and well-being)

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Abstract

The COVID-19 pandemic exposed deep-seated vulnerabilities in health systems across Sub-Saharan Africa, highlighting the urgent need for resilient, equitable, and sustainable healthcare infrastructure. This chapter examines how rebuilding health systems in the post-COVID era can serve as a strategic pathway to achieving Sustainable Development Goal 3 (SDG 3) (Good Health and Well-being) in the region. The article explores the multidimensional impact of the pandemic on healthcare delivery, financing, human resources, and access to essential services, particularly for vulnerable populations. Drawing from a regional narrative synthesis country such as South Africa, Kenya, Nigeria and Zimbabwe the article identifies innovative recovery strategies, including investments in primary healthcare, digital health solutions, localized manufacturing of medical supplies, and strengthened health governance. It further discusses the role of international cooperation, regional integration, and community engagement in reinforcing system-wide resilience. The findings suggest that a health system transformation rooted in equity, inclusivity, and adaptive capacity is critical to achieving SDG 3 and protecting the region from future public health crises. The chapter concludes with policy recommendations for building back better and ensuring long-term sustainability in Sub-Saharan Africa's health sector.

Keywords: Health System; Post-COVID Era; Sustainable Development Goal; Sub-Saharan Africa

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1. Introduction

The Coronavirus Disease 2019 (COVID-19) posed significant health policy challenges, particularly for low-income countries, where policymakers faced both direct threats from the virus and social and economic harm owing to lockdown measures. The COVID-19 pandemic acted as a stress test for health systems globally, revealing particularly significant impacts in Sub-Saharan Africa (SSA), where existing structural vulnerabilities were exposed. The crisis highlighted issues such as disrupted service delivery, financial strains, shortages of healthcare personnel, and limited access to essential health services, underscoring the pressing need for transformative change. As the region begins its recovery, the chance to rebuild health systems not only seeks to restore functionality but also to reimagine healthcare as a catalyst for equity, resilience, and sustainability. This article examines how post-pandemic reconstruction efforts can expedite progress towards Sustainable Development Goal (SDG) 3 (Good Health and Well-Being) drawing lessons from various countries in Sub Saharan Africa such as South Africa, Kenya, Nigeria, and Zimbabwe. Additionally, the article analyzes the varied impacts of the pandemic while concentrating on innovative recovery strategies, including the strengthening of primary healthcare, the expansion of digital health initiatives, the enhancement of local medical supply production, and the improvement of governance frameworks. The importance of international cooperation, regional integration, and community engagement is considered crucial for bolstering system-wide resilience. Therefore, this article posits that achieving SDG 3 in Sub-Saharan Africa necessitates a bold reconfiguration of health systems, grounded in inclusivity, adaptability, and long-term sustainability. The way forward is not merely about recovery; it is about building back better.

2. Background to the study

The COVID-19 a worldwide pandemic instigated by Severe Acute Respiratory Syndrome Coronavirus -2 (SARS CoV-2), has led to widespread disruption globally, resulting in millions of infections and nearly five million deaths by late October 2021 (Worldometer, 2021). While the COVID-19 pandemic has impacted all sectors, either directly or indirectly, the crisis has been particularly harsh on the already strained health systems in several countries. A significant level of health service delivery was disrupted, especially during the initial phases, due to the unrelenting transmission of the virus in various settings. This scenario presented challenges in health human resource management, facility utilization, and the management of medical supplies (Kassa and Grace, 2020).

Evidence showed that the COVID-19 pandemic has caused significant disruptions in health service delivery, especially in resource-limited nations (Menendez, Gonzalez, Donnay and Leke, 2020). The disruptions stem not only from the direct consequences of the COVID-19 pandemic rather than from the pressure it placed on health systems, pushing others beyond their limits indirectly. The COVID-19 pandemic has revealed existing deficiencies within the health system (World Health Organization (WHO), 2021a). Further, it has interrupted both preventive and curative services for communicable and noncommunicable diseases (WHO, 2021b). Many essential services have been postponed by healthcare facilities, and patients have been unable to attend follow-ups and acute care appointments because of the fear and anxiety they faced during the waves of the pandemic (Papautsky and Hamlish, 2020; Panagiotidis, 2020; Passos and Prazeres, 2020). This showed that COVID-19 did not only affect the physical part of life, but it also affected the mental and spiritual states of life.

The COVID-19 pandemic posed a significant risk of indirect morbidity and mortality from other preventable and treatable diseases due to the disruption of essential health services (Zindi and Shava, 2022). The primary reasons identified for the substantial reduction in services during the COVID-19 crisis included the reassignment of healthcare personnel to support COVID-19 initiatives, the cancellation of planned treatments, decreased public transportation availability, loss of income impacting service payments, and limited utilization of services (WHO, 2021b; Wilhelm and Helleringer, 2019; Sochas, et al., 2017). Thus, high morbidity and mortality rates among healthcare workers exacerbated staff shortages as a result of the pandemic.

The Sub-Saharan African countries have reported shortages of medications, diagnostics, and other technologies as significant factors disrupting health services (WHO, 2021b). The increase in COVID-19 cases required the reorganization of healthcare workers and the repurposing of healthcare facilities. In contrast, patients with various health conditions became hesitant to seek care at healthcare facilities (Nyavor, 2020). A comparison of service utilisation before and during the COVID-19 pandemic indicated a notable disparity in the provision of health services (Haileamlak, 2021). A significant decrease in patient attendance for routine services was noted. Therefore, the challenges presented by COVID-19 underscored the urgent need for the development of resilient and sustainable health systems.

The COVID-19 pandemic has significantly impacted health systems across Sub Sahara African countries exposing both their strengths as well as the challenges they face. While SSA countries initially reported fewer cases as compared to other regions, the pandemic opened critical issues regarding healthcare resilience and accessibility (Du Plooy, 2024). According to WHO guidelines, government-imposed restrictions intended to prevent the virus, along with public apprehensions, severely affected the use of health services, reflecting the pressing necessity for comprehensive reforms in healthcare delivery (WHO, 2021c; Tannor et al., 2024). In this scenario, vulnerable groups faced increased risks, research showed that individuals from lower socioeconomic backgrounds were prone to negative health outcomes (Sixaba, 2022). Based on this analysis, it can be noted that situation like this underscored the significance of adopting targeted pandemic response strategies, which are critical for better equipping African nations to handle potential future public health emergencies.

The outbreak of COVID-19 pandemic in SSA was an unexpected global health emergency, with the initial cases identified in Nigeria in early 2020. Since the reporting of the first COVID-19 case in Nigeria on 27 February 2020, over 267 188 cases continued to be reported, with 3155 reported deaths as of 11 February 2024 (Kassa and Grace, 2020). The pandemic has significantly strained the health systems and the healthcare workforce, resulting in deficiencies in essential pharmaceuticals, medical equipment and human resources. These gaps have made managing other health disorders more difficult (Sixaba, 2022). The pandemic has also exposed the deficiencies in the health system. The pandemic has negatively impacted treatment and prevention services for infectious and non-communicable diseases.

However, SSA was anticipated to encounter severe consequences because of its vulnerable health systems. In contrast, the region emerged as the least affected region in terms of cases and deaths, reporting fewer occurrences compared to other areas worldwide (Kunyenje et al., 2023). This circumstance availed the pre-existing weaknesses in health infrastructure as well as insufficient resources. With around 1.4 billion inhabitants as well as 54 sovereign states, Africa underwent a different pandemic experience (Panagiotidis, 2020). In addition, the reality of having fewer than one doctor per thousand individuals reflects the urgent vulnerabilities within the region's health systems (Wei et al., 2023). Based on this analysis, it can be noted that,

a situation like this calls for the adoption of targeted pandemic response strategies, which are critical for better equipping African nations to handle potential future public health emergencies.

The COVID-19 pandemic has significantly affected health systems across SSA, exposing existing structural weaknesses like inadequate infrastructure, limited healthcare funding, and a shortage of skilled health professionals. While the region saw relatively lower cases compared to other areas, the pandemic led to a notable decline in the use of health services, with studies indicating a median decrease of over 35% in access to essential services, including maternal as well as child healthcare, HIV treatment, and cardiovascular care (Tannor et al., 2024). This situation further affected already fragile systems, diverting resources from routine care to emergency responses. This jeopardise the progress made towards SDG 3 aiming to guarantee healthy lives at the same time promoting well-being for everyone at every stage of life. The pandemic underscored the urgent need for resilient health systems capable of maintaining essential services during crises. Improving health system governance, financing, and service delivery in Sub-Saharan Africa is crucial not only for recovering from the pandemic but also for accelerating progress towards universal health coverage and achieving SDG 3 (Amu et al., 2022). Therefore, rebuilding resilient health systems in Sub-Saharan Africa in the aftermath of COVID-19 is essential for advancing SDG 3.

3. Research objectives, scope and contribution of the study

The objectives guiding this study include;

- To examine how COVID-19 has exposed significant weaknesses in healthcare delivery, financing, human resources, and access to essential services in SSA.
- To investigate how the rebuilding of health systems can strategically support the attainment of SDG 3.

Focusing on the period from 2021 to August 2025, the study covers the immediate recovery phase following the pandemic, facilitating an analysis of both short-term impacts and medium-term reforms during a crucial time when governments and international partners are actively implementing resilience-focused policies. Countries such as South Africa, Kenya, Nigeria, and Zimbabwe provide contextual insights into various national responses, highlighting innovative strategies such as investments in primary healthcare, digital health initiatives, localized manufacturing, and improved governance. This study contributes to academic discourse by linking recovery efforts to SDG 3, while offering practical guidance for policymakers through evidence-based recommendations that emphasize equity, inclusivity, and sustainability, something not found in existing literature.

The year 2021 is selected as the starting point because it marks the transition from emergency pandemic response to health system recovery and resilience-building in most Sub-Saharan African countries. While COVID-19 cases continued beyond 2020, 2021 represents the period when governments began shifting focus from acute crisis management such as lockdowns and emergency procurement to institutional reforms, including strengthening surveillance systems, rebuilding health workforces, expanding digital health solutions, and re-prioritising universal health coverage aligned with SDG 3 (WHO, 2021a; World Bank, 2023) Additionally, major continental and global policy frameworks, including WHO's post-COVID recovery guidance and Africa health resilience strategies, were largely developed or operationalised from 2021 onwards.

The term "post-COVID" in this study does not imply the complete end of COVID-19 transmission. Instead, it is used analytically to refer to the post-emergency phase, characterised by recurring waves but reduced mortality, increased vaccination coverage, and the normalisation of COVID-19 as an endemic health threat (WHO, 2021c). The study therefore treats COVID-19 as a persistent systemic stressor rather than a singular crisis event, allowing for an examination of how health systems adapted structurally and institutionally over time.

The endpoint 2025 is chosen because it reflects the current policy planning horizon for many national health strategies and global development frameworks, including mid-term SDG implementation reviews. For sources published in 2025, a cut-off date of 30 June 2025 is applied to ensure consistency and manageability of the review process. Documents released after this date were excluded to avoid partial or incomplete policy cycles influencing the analysis.

4. Literature review

Effective health service delivery is crucial for achieving the health-related SDGs, which aim to implement interventions that reduce child mortality, maternal mortality, and the prevalence of HIV/AIDS, tuberculosis, and malaria by the year 2030 (WHO, 2021a). In SSA, healthcare is primarily delivered through five operational levels. These include Community (health posts), sub-district (health centers and clinics), District (District Hospitals/health directorates), Regional (Regional hospitals/health directorates), and national (tertiary/quaternary hospitals) (Chippaux, 2023; Amu et al., 2022). The delivery of health services represents the immediate result of various inputs into the health system, like the health workforce, procurement as well as supplies, financing, and governance (WHO, 2020; Amu et al., 2022). Therefore, based on this analysis, it is noted that, COVID-19 pandemic has reflected the deficiencies in health services that exist in SSA counties.

The lack of adequate laboratories and testing kits in many SSA nations has prevented the ability to conduct mass laboratory testing on samples from suspected COVID-19 cases, resulting in significant delays in collecting test results (Amu et al., 2022). In various cases, it takes longer than the recommended 2–3 days to obtain results, which show deficiencies in the healthcare sector in SSA countries. Furthermore, the insufficient number of hospital beds as well as other facilities, including the absence of isolation centers, has led to early discharge of COVID-19 patients, coercing them to self-isolate at home without a specific follow-up strategy in place (WHO, 2021a). From this analysis, it is evident that COVID-19 has undermined health service delivery in SSA countries.

South African's ability to offer sufficient health services to its citizens is generally contingent upon the skills, competence, knowledge, dedication, motivation, as well as deployment of well-trained health professionals (Warsame et al., 2021). In addition to this, several countries in SSA like Zimbabwe and Kenya are short in the essential human resources necessary for delivering crucial health services.

Following World Health Organization's call to prepare for the containment of COVID-19 in January 2020, the government of Zimbabwe quickly started developing a National Preparedness and Response (NPR) Plan and established an Interagency Coordination on Health and Epidemic Preparedness and Response Task Force (Mhazo and Maponga, 2024). Screening for Severe Acute Respiratory Syndrom Coronavirus 2 (SARS-CoV-2) infections at major entry points was quickly implemented for all incoming individuals. In February and March, the private sector, civil society, academia, professional associations, technical and donor partners, and the

media participated in a series of inter-ministerial meetings on COVID-19 (Uwaezuoke, 2020). Although Zimbabwe's health system was once considered among the best in Africa, it deteriorated due to reductions in public spending, out-migration of health professionals, mismanagement, and industrial action (Kraef, Juma and Kallestrup, 2020). By 2021, the doctor and nurse-person ratios had deteriorated to 1: 12,000 and 0.39: 1,000, respectively, far below the World Health Organization's recommended minimum threshold density of 2.28 doctors, nurses, and midwives per 1,000 people in developing countries (Midzi, Haruzivishe and Gonese, 2025). On March 17th, a state of national emergency was declared prior to any detectable surge in SARS-CoV-2 infection stand. The first case of COVID-19 was only reported on 20th March in an individual who had recently returned from the United Kingdom (Chippaux, 2023). Two additional cases imported from the United States were documented 2 days later. The first recorded fatality occurred on 23rd March, the same day the Civil Protection notice was issued (Uwaezuoke, 2020).

The completeness of human resources in SSA has become more apparent since the sub-district reported its first COVID-19 case (Warsame et al., 2021; Amu et al., 2022). The existing deficit of qualified health professionals to offer significant services to patients during the pandemic has resulted in the neglect of many critical services, like child and maternal health service delivery, Chronic Non-Communicable Diseases and the prevention and treatment of infectious diseases (Amu et al., 2020). Thus, this neglect can be attributed to the fact that the limited number of health professionals has been reassigned to focus on COVID-19 management services, which encompass contact tracing, triaging, laboratory testing, and case management services.

In contrast, there have also been some successful responses. For example, COVID-19 has facilitated the enhancement of health professionals' skills by providing opportunities for training and orientation in various health service competencies, like infection control and prevention protocols, laboratory testing guidelines, and the management of infectious diseases like COVID-19 (Chippaux, 2023). In terms of laboratory testing services, the pandemic has spurred advancements in health technology within SSA. Thus, apart from these successes, a comparable innovative response has been noted in Senegal, which has developed its first-ever 3D-printed ventilators and COVID-19 testing kits.

The COVID-19 pandemic has significantly showed the enduring structural weaknesses within health systems in SSA, exposing crucial deficiencies in workforce capacity, supply chain resilience, as well as service delivery (Amu et al., 2022). Although the region experienced relatively low rates of infection and mortality compared to other regions, the pandemic resulted in a disruption in health service utilisation throughout the continent, with a median reduction of 35.6% (Tannor et al., 2024) in access to essential services like maternal and child health, HIV care, and cardiovascular treatment. These disruptions were further intensified by continuous shortages of skilled health professionals, insufficiently funded infrastructure, as well as fragile supply chains that struggled to provide personal protective equipment, diagnostics, plus, vaccines (Amu et al., 2020). Moreover, the pandemic showed the vulnerability of health systems that are primarily urban-centric, which inadequately addressed the needs of rural and marginalized populations. Such systemic challenges directly prevent progress towards SDG 3, which seeks to ensure healthy lives and promote well-being for all.

Fundamentally, objectives like universal health coverage, access to essential medicines, and the reduction of mortality from both communicable as well as non-communicable diseases remain unattainable because of structural fragility (WHO, 2021b). Without vital investment in strengthening health systems, including workforce development, sustainable financing, as well as resilient supply chains, Sub-Saharan Africa risks lagging further behind in the pursuit of SDG 3. From this analysis, it is evident that COVID-19 acted not only as

a health crisis but also as a diagnostic tool, exposing the deep-seated vulnerabilities within Sub-Saharan Africa's health systems. The pandemic should serve as a catalyst for transformative reforms that align national health strategies with the global vision of SDG 3. Enhancing these systems is not just a technical necessity; it is a moral obligation to ensure equitable health outcomes across the continent.

4.1. Health system resilience framework

The WHO Health System Resilience Framework comprises six fundamental dimensions: governance and leadership, service delivery, health workforce, financing, information systems, and community engagement. These dimensions offer a structured perspective for assessing vulnerabilities and recovery strategies (WHO, 2021b; 2024). In SSA, weaknesses in governance and leadership were apparent through fragmented coordination and policy deficiencies during the COVID-19 pandemic, which informed recommendations for enhanced accountability and inclusive decision-making (WHO, 2021c). Service delivery faced disruptions due to interruptions in maternal, child, and routine health programs, highlighting the necessity for decentralization and investment in primary healthcare to maintain continuity.

The health workforce dimension revealed shortages exacerbated by migration and the strain of the pandemic, emphasizing the need for critical reforms in retention policies, training, and equitable distribution (WHO, 2024). Financing vulnerabilities, characterized by underfunded health budgets and dependence on external aid, were associated with strategies such as localized manufacturing of medical supplies and sustainable insurance schemes. Inadequate information systems, particularly weak surveillance and data integration, highlighted the significance of digital health innovations to enhance detection, preparedness, and response (World Bank, 2023). Lastly, community engagement was linked to disparities in access to care, illustrating how participatory approaches and grassroots involvement can foster inclusivity and trust (WHO, 2024). By systematically aligning findings with these dimensions, the framework facilitated data extraction and analysis, ensuring that recommendations were proactive rather than reactive, and embedded in resilience-building. This mapping illustrates how Sub-Saharan Africa countries can shift from crisis management to proactive system enhancement, thereby accelerating progress towards SDG 3.

5. Methodology

The methodology for this study is based on a qualitative research approach, primarily focusing on desktop analysis as well as document review covering the post-COVID-19 period from 2021 to 2025. This process covers a comparative data analysis of policy briefs, government reports, academic publications, as well as strategic health plans from various SSA nations to identify trends, challenges and innovations in health system recovery (WHO, 2021b). The research adopted comparative data analysis to evaluate how different SSA countries reacted to the pandemic as well as reconstructed their health systems, focusing on governance structures, service delivery models, health financing mechanisms, and community engagement strategies. Through examining documentation across various SSA countries, the study sought to reveal best practices as well as contextual factors that affected resilience outcomes. The findings were analysed through the Health Systems Resilience Framework, which facilitated a detailed understanding of how structural reforms as well as adaptive strategies contributed to advancements toward SDG 3. This methodology is supported by data Table 1.

Table 1. Comparative data analysis of SSA countries

Country	Key Disruption	Recovery Action	Linked SDG 3
South Africa	Overburdened hospitals due to high infection rates and limited ICU capacity	Expansion of primary healthcare and rollout of digital health platforms	Improved access to essential services and strengthened emergency preparedness
Kenya	Disruption in routine services such as maternal and child health programs	Adoption of mobile health solutions and community-based outreach	Enhanced equity in healthcare delivery, especially for rural populations
Nigeria	Weak health financing and shortages of medical supplies	Localized manufacturing of PPE and medicines, plus investment in health insurance schemes	Greater sustainability in healthcare financing and reduced dependency on imports
Zimbabwe	Human resource shortages due to migration and pandemic strain	Strengthening governance and retention policies for health workers	Resilient health workforce ensuring continuity of essential services

Source: WHO (2021; 2024)

5.1. Limitations of desktop research

Using secondary sources to examine post-COVID health system resilience in Sub-Saharan Africa is appropriate for policy-oriented and comparative research, but it presents several important shortcomings that must be acknowledged. First, uneven availability and quality of documents across countries limits the depth and balance of analysis. Health system documentation in Sub-Saharan Africa varies significantly, with countries such as South Africa, Kenya, and Zimbabwe producing relatively comprehensive policy reports, while fragile or conflict-affected states often have limited or outdated documentation (Du Plooy, 2024). This imbalance may lead to an over-representation of better-documented health systems and under-representation of contexts where resilience challenges are most severe.

Second, time lag and rapidly evolving post-COVID reforms pose a major limitation. Many secondary sources were produced during or immediately after the peak of the pandemic and may not fully reflect ongoing reforms, new financing mechanisms, or recent investments in health infrastructure. Given that health system resilience is dynamic, reliance on existing literature may result in conclusions that do not capture the most current policy responses or recovery trajectories.

Third, policy and institutional bias are inherent in secondary sources, particularly government and donor-funded reports. Such documents may emphasize successes while downplaying governance failures, inequities, or implementation gaps. This can affect the objectivity of findings, especially when assessing sensitive issues such as health financing, workforce shortages, and accountability mechanisms related to SDG 3.

Fourth, language and publication bias may restrict the scope of reviewed literature. A large proportion of available studies and policy documents are published in English, leading to the exclusion of relevant reports in French, Portuguese, or local African languages. This may skew findings away from Francophone and Lusophone countries, limiting the continental representativeness of the study. Consequently, while the study

provides valuable policy-level insights into advancing SDG 3, the results should be interpreted as indicative rather than exhaustive.

6. Results and findings

The following were the results emanating from the study. Three major themes were developed which are as follows: Impact of covid-19 on health systems in Sub-Saharan Africa; key gaps and vulnerabilities in health system components and strategies for strengthening health system resilience.

6.1. Impact of covid-19 on health systems in Sub-Saharan Africa

The COVID-19 pandemic had a significant impact on health systems throughout SSA countries, showing structural vulnerabilities as well as interrupting important services. Regardless of having relatively low reported case numbers and deaths in comparison to other regions, the pandemic resulted in a notable reduction in health service utilisation (Inzaule et al., 2021). For example, in Kenya, there was a drop in childhood immunization rates, heightening the risk of outbreaks of preventable diseases. The first case of COVID-19 in Kenya was confirmed in March 2020 and the Kenyan government swiftly introduced measures to curb transmission, some of which negatively impacted maternal health services (Chippaux, 2023). The pandemic also placed additional strain on already fragile health infrastructure. A number of hospitals were inadequately equipped with beds, ventilators, and personal protective equipment complicating the management of surges in COVID-19 cases (Inzaule et al., 2021). More so, in Nigeria, hospitals encountered shortages of oxygen and staffing difficulties, particularly during the Delta variant surge (Inzaule et al., 2021). Vulnerable groups, like those from lower socioeconomic backgrounds, were disproportionately impacted due to limited healthcare access and substandard living conditions. In South Africa's informal settlements, there were reports of higher transmission rates and diminished access to testing and treatment services (Tessema et al., 2021).

The rise of COVID-19 and the measures taken to mitigate its transmission, including lockdowns, travel limitations, and the reallocation of health resources, have profoundly disrupted vital health services throughout Africa (Inzaule et al., 2021). As a result of COVID-19, tuberculosis services encountered interruptions because of diminished access to diagnostics as well as treatment, while malaria strategies experienced challenges in surveillance as well as drug supply, with 21% (WHO, 2024) of facilities in Africa reporting shortages of pediatric antimalarial dosages. Maternal as well as child health services were also gravely affected. Therefore, based on these findings, it can be found that, COVID-19 adds weight on the already crippled health sector of some SSA countries.

Lockdowns and the fear of contracting the virus resulted in a decrease in antenatal care visits and institutional deliveries, thereby revealing the risk of complications and mortality (Inzaule et al., 2021). Modeling studies show that the majority of SSA nations are unlikely to attain the SDGs 2030 targets for decreasing in maternal and child mortality if the current trends continue (Inzaule et al., 2021). These problems show patterns seen during past health emergencies, like the Ebola outbreak from 2014 to 2016, where the

number of indirect deaths because of disrupted services surpassed those directly caused by the virus (Inzaule et al., 2021). From this analysis, it is evident that, despite the introduction of some adaptive strategies, such as community-based care and the home distribution of medical supplies, the overall consequences of COVID-19 have negated many of the advancements attained in disease control as well as the strengthening of health systems across the continent.

The COVID-19 pandemic has worsened existing health issues in SSA, particularly in maternal as well as child health services. Lockdowns, fear of the virus, and resource reallocation led to significant disruptions in essential services. Families experienced challenges like transportation issues, medical supply shortages, and fewer healthcare workers. This resulted in a drop in antenatal visits plus, institutional deliveries, with more home births lacking skilled assistance, adding complication risks (Camara et al., 2024). This tallies with the findings in the research in SSA by Kassa et al. (2024) which showed a notable decline in antenatal care as well as facility-based childbirth because of supply and demand issues. Limited access to sexual and reproductive health services also led to the rising teenage pregnancies, further straining health systems and highlighting the vulnerability of adolescent girls during health crises (Camara et al., 2024). Thus, these findings imply that COVID-19 pandemic has worsened existing health issues in SSA countries and increased significant disruptions in essential services.

Disruptions to routine services such as immunizations and pediatric care threatened child health and jeopardized progress made over the past decade. These challenges have serious implications for attaining SDG 3, which aims to ensure healthy lives for all (WHO, 2021a). Based on these assumptions, it can be noted that, the pandemic has shown the fragility of health systems together with the need for resilient, inclusive strategies that promote continuity of care during crises, focusing on the significance of strengthening main healthcare infrastructure.

6.2. Key gaps and vulnerabilities in health system components

The COVID-19 pandemic exposed considerable deficiencies as well as vulnerabilities within necessary components of health systems worldwide. On service delivery, lockdown measures as well as overwhelmed healthcare facilities led to significant disruptions to important services, like maternal and child health, immunizations, as well as chronic disease management (Inzaule et al., 2021). For example, the WHO (2021c) showed that 90% of nations experienced interruptions in services like HIV, TB, and malaria care during the pandemic (Midzi et al., 2025). Therefore, the health workforce was equally challenged, encountering shortages of trained personnel, uneven distribution, and elevated infection rates among healthcare providers.

The SSA countries experienced severe deficits, with several countries falling short of the WHO's recommended standard of 2:3 health workers per 1,000 populations, adversely impacting care delivery in regions like Nigeria (Donfouet et al., 2024). Financing mechanisms were discovered to be insufficient in low-income nations that rely heavily on donor assistance. The pandemic forced governments to reallocate budgets and increase borrowing, while hospitals faced reduction of revenue because of the postponement of elective procedures (Cheruparambil, 2024). Additionally, supply chains struggled under global strain, resulting in critical shortages of personal protective equipment ventilators, and vaccines. For example, Zimbabwe had to

prioritize vaccine distribution for frontline workers because of limited availability (Midzi et al., 2025). Based on these findings, it can be noted that, these systemic vulnerabilities show the pressing necessity for resilient, equitable, and adequately funded health systems that can endure future crises.

The COVID-19 pandemic underscored the necessity for a sufficient number of adequately trained health professionals who possess the essential skills to tackle emerging diseases. The educational curricula for health workers ought to be aligned with the specific health requirements of the population, thereby ensuring that future health professionals are thoroughly prepared (Midzi et al., 2025). This tallies with the findings from a recent study conducted by the World Bank (2023) which showed considerable discrepancies in diagnostic accuracy among health care providers across various SSA nations. At the same time, the challenges related to human resources are crucial to the broader systemic vulnerabilities that the pandemic has exposed in the health systems of SSA. The COVID-19 crisis highlighted the urgent need for a healthcare infrastructure that is resilient, fair, and sustainable. These findings therefore suggest that reforming the health system based on principles of equity, inclusivity, and adaptability is vital for achieving SDG 3 and protecting the region from future public health crises (Du Plooy, 2024).

The Global Strategy on Human Resources for Health Workforce 2030 underscores the importance of global and regional collaborations in advancing health workforce development in low- and middle-income nations (Donfouet et al., 2024). These collaborations are necessary for providing guidance on workforce planning, conducting labour market analyses, and adopting cost-effective strategies to ensure the availability of health workers (WHO, 2021c). Through collaborating with international organizations, donors, and development partners, the strategy seeks to mobilize the primary technical and financial resources to strengthen health workforce strategies for health security in developing nations (Donfouet et al., 2024). For example, Kenya gained from a strategic alliance with the WHO through the comprehensive Kenya Health Labour Market Analysis in 2023, which assessed current and future workforce requirements, identified trends and challenges, and offered recommendations for effective planning as well as policy formulation (Donfouet et al., 2024; WHO, 2024). More recently, the World Bank emphasized the essentiality of strategic and financial planning, along with the involvement of various stakeholders in the development of health workforce security (World Bank, 2023). Therefore, to achieve the SDG 3 objectives, it is significant to tackle health worker shortages via targeted funding, expertise, and partnerships, as this promotes service delivery within the health sector.

6.3. Strategies for strengthening health system resilience

Policymakers must prioritize investments in faculty development and infrastructure to uphold educational standards. Considering that non-specialist health care workers frequently serve as the initial point of contact for diagnoses in a number of SSA health care environments, governments should concentrate on training strategies aimed at promoting the skills of primary health workers and providing ongoing training opportunities. This strategy guarantees that frontline providers are capable of accurately identifying and managing prevalent health concerns at the community level (Passos and Prazeres, 2020).

Retention of highly skilled health professionals in SSA countries is important and should be a fundamental aspect of national health strategies. These strategies ought to focus of the provision of competitive salaries, opportunities for career advancement, comprehensive benefits packages, and a favorable working

environment. The deployment of health workers to areas with limited access to services, accompanied by incentives, can guarantee that resources are allocated where they are most urgently required (Donfouet et al., 2024). For instance, the World Bank is presently involved in discussions with the Togolese government regarding reforms designed to create a resilient and equitable health workforce in underserved regions. Proposed financial incentives encompass relocation grants, transportation allowances, housing support, communication allowances, life insurance for families, educational assistance for children, and risk premiums for individuals working in conflict-affected areas (World Bank, 2023). These retention strategies are crucial not only for addressing immediate workforce shortages but also act as a key component in the broader transformation of health systems following the COVID pandemic. By ensuring that skilled professionals remain within national health systems and are allocated equitably, SSA countries can enhance service delivery, improve diagnostic accuracy, and build the adaptive capacity necessary to achieve SDG 3 (Chippaux, 2023). Linking workforce reforms with investments in primary healthcare, digital health innovations, and community engagement guarantees that retention policies promote long-term resilience and equity across the region.

Establishing a comprehensive health information system is essential for the enhancement of health systems. Improving human resource as well as payroll data within health sectors through a national system that utilizes biometric identification will facilitate the real-time monitoring of health workers' distribution, qualifications, and performance (Donfouet et al., 2024). For example, in Kenya, the government has effectively merged data on health results with human resources, which has enabled the sharing as well as analysis of health workforce deployment concerning HIV services (WHO, 2023). The challenges related to the workforce and information highlight wider systemic weaknesses that the pandemic has revealed, emphasizing the critical need for resilient and equitable health systems. Following the WHO Health System Resilience Framework, SSA has the opportunity to move from merely responding to crises towards implementing proactive reforms, thereby promoting SDG 3.

Enhancing service delivery is essential for attaining the health-related Millennium Development Goals (MDGs) and SDG 3, which encompass interventions aimed at reducing child mortality, maternal mortality, and the prevalence of HIV/AIDS, tuberculosis, and malaria (Nyavor, 2020). The provision of services is a direct result of the resources allocated to the health system, such as the health workforce, procurement and supplies, and financing. The findings indicate that, an increase in these resources should result in better service delivery and improved access to health services. Therefore, ensuring that health services are available and meet minimum quality standards, as well as securing access to these services, are critical functions of a health system. Thus, effective service delivery is a crucial component of any health system.

To achieve the SDG 3, there is need for substantial investment to promote health systems, such as the development of the healthcare workforce, the establishment of decent working conditions, as well as the provision of training and equipment, particularly concerning Personal Protective Equipment and occupational safety. In addition, social dialogue is significant for building resilient health systems as well as plays a crucial role in both crisis response and in preparing for future health challenges.

In the future, the World Bank is actively tackling health workforce challenges through various significant initiatives designed to create resilient and sustainable health systems. A primary objective is to extend health services to 1.5 billion individuals by the year 2030 (World Bank, 2023). This ambitious aim underscores the vital necessity of establishing robust collaborations with non-governmental organizations, the private sector,

and civil society. To guarantee the success of these investments, it is crucial to link health personnel initiatives to pay-for-performance models and to sustain a strong emphasis on health security (World Bank, 2023).

7. Conclusion

The COVID-19 pandemic acted as a catalyst for rethinking as well as reorganizing health systems throughout SSA. COVID-19 showed systemic vulnerabilities while also revealing opportunities for vital transformation. To achieve SDG 3, which focuses on Good Health and Well-being, a conscious transition towards resilient, inclusive, as well as adaptable health systems that emphasize equity and sustainability is essential. Investments in primary healthcare, digital innovation, and the local production of medical supplies must be complemented by strong governance, strategic financing, and empowered health workforces. Countries such as South Africa, Kenya, Nigeria, and Zimbabwe illustrate those focused reforms, community involvement, as well as international collaboration can lead to substantial advancements. As nations rebuild, it will be crucial to incorporate health security into national planning and promote regional cooperation to endure future challenges. Therefore, the journey towards SDG 3 is rooted in a comprehensive, people-centered strategy that fortifies every aspect of the health system and guarantees that no one is overlooked.

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