


Review

Community resilience and adaptation strategies during the COVID-19 pandemic in sub-Saharan Africa: a comparative analysis of Ghana and South Africa

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Abstract

Background The COVID-19 pandemic posed unprecedented challenges globally, revealing disparities in health preparedness and resilience across regions. Sub-Saharan Africa faced unique hurdles due to its existing socioeconomic and health inequities. Despite these challenges, local communities in countries like Ghana and South Africa demonstrated remarkable resilience by implementing community-led initiatives and adaptation strategies deeply rooted in their local contexts.

Objectives This study compared community resilience and adaptation strategies during the COVID-19 pandemic in Ghana and South Africa. The primary objectives were to understand the effectiveness of local community responses, identify critical strategies employed to mitigate the impacts of the pandemic, and derive policy implications for future public health preparedness and resilience building.

Results The analysis revealed diverse strategies tailored to the socio-political and economic landscapes of Ghana and South Africa. In Ghana, efforts centered around government relief programs, community health education campaigns, and digital communication platforms to disseminate public health information. South Africa focused on mobilising community health volunteers, strengthening local governance structures, and integrating community-led food security and mental health support initiatives. These strategies bolstered community resilience and mitigated the pandemic's economic and health impacts in different settings.

Unique contribution This paper provides a nuanced understanding of community resilience and adaptation strategies in Ghana and South Africa during the COVID-19 pandemic. It underscores the critical role of community-driven initiatives and local knowledge in pandemic response. It offers valuable insights into global health governance and the significance of context-specific strategies in building resilient health systems in resource-constrained settings.

Future research directions Future research should explore the long-term impacts of these strategies, assess the scalability of successful community-led initiatives, and investigate the role of technological innovations in enhancing community resilience. Longitudinal studies tracking community resilience and adaptation over time will further refine these approaches, providing valuable insights for better preparedness and response to future health crises.

Keywords COVID-19 pandemic · Ghana · South Africa · Community resilience · Adaptation strategies · Public health · Local knowledge · Community-driven initiatives

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1 Introduction

The onset of the COVID-19 pandemic in late 2019 marked the beginning of an unprecedented global health crisis, challenging health systems, economies, and communities worldwide. The virus spread rapidly, prompting a cascade of public health responses and revealing stark disparities in global preparedness and resilience [1]. In high-income regions such as North America and Europe, initial responses included large-scale lockdowns, substantial investments in vaccine research, and leveraging advanced healthcare systems [1]. However, challenges emerged in maintaining hospital capacity, supply chain disruptions, and balancing economic stability with public health measures, resulting in varied adherence to restrictions [1].

In contrast, many Asian countries, such as South Korea and Singapore, implemented swift and coordinated strategies, emphasizing extensive testing, contact tracing, and digital surveillance tools. Their experience with prior epidemics like SARS enabled rapid containment measures, which initially helped limit the spread of the virus. Nonetheless, social disparities and economic impacts presented ongoing challenges, mainly as subsequent waves occurred [2].

Meanwhile, the trajectory of the pandemic in sub-Saharan Africa presented a unique set of challenges and noteworthy responses. With its diverse socioeconomic landscape, the region faced the dual burden of combating COVID-19 while grappling with existing health, economic, and infrastructural challenges. Despite predictions of severe outbreaks due to perceived vulnerabilities, such as under-resourced healthcare systems, many countries in the region demonstrated remarkable resilience and adaptability. Community-led initiatives, innovative public health strategies, and local knowledge played critical roles in mitigating the pandemic's impact. This resilience is rooted in a history of managing infectious diseases, leveraging social cohesion, and adapting practices tailored to local contexts [1].

Public Health England's (PHE) community-centered approach provides a relevant framework for understanding these responses. PHE emphasizes the importance of scaling community-based prevention strategies, fostering active community engagement, and sustaining long-term resilience through place-based actions [2–4]. This approach is especially pertinent to the adaptation strategies seen in Ghana and South Africa. Ghana's use of digital communication platforms to disseminate public health information aligns with PHE's focus on leveraging local resources to reach communities effectively. South Africa, on the other hand, emphasized the mobilization of community health volunteers and the integration of regional governance structures to support health services, reflecting the core principles of PHE's emphasis on building local capacities and supporting volunteer networks.

A relevant lens through which to view these community responses is Public Health England's (PHE) community-centered public health approach, which emphasizes scaling up community-based prevention, fostering community engagement, and ensuring sustainable resilience through place-based actions [2–4]. Ghana's use of digital communication platforms for disseminating public health information aligns with PHE's emphasis on leveraging local resources. Meanwhile, South Africa's mobilisation of health volunteers and decentralised governance reflects the core of PHE's model of empowering local capacities.

In addition, the African Union (AU) developed a COVID-19 Recovery Framework, which analysed the pandemic's regional impacts and proposed strategic objectives: protecting health and economic welfare, addressing macroeconomic and human development challenges, and focusing on cross-cutting issues such as gender and social protection [1].

This manuscript draws from the African Union (AU) framework and PHE model to analyse how Ghana and South Africa implemented community resilience and adaptation strategies. The comparative approach highlights lessons for regional and global health governance, offering context-specific insights for building robust health systems in resource-constrained settings.

1.1 Rationale and objectives

Understanding the community resilience and adaptation strategies employed during the COVID-19 pandemic in sub-Saharan Africa is essential for several reasons. First, it offers insights into practical grassroots approaches that can be scaled and adapted in other regions facing similar challenges. Second, it highlights the significance of local knowledge and community engagement in managing public health crises, providing lessons for global health governance. Lastly, examining these strategies contributes to the broader discourse on health equity and underscores the need for context-specific responses during global health emergencies.

The African Union's COVID-19 Recovery Framework sets forth strategic objectives that support the rationale for focusing on Ghana and South Africa. These objectives include [2]:

- **Protecting Health and Economic Welfare:** Accelerating vaccination programs, supporting health sector reforms, and improving access to healthcare services.
- **Tackling Macroeconomic Challenges:** Sustaining monetary and fiscal responses, resolving liquidity and debt issues, and expanding international financing for development.
- **Safeguarding Human Development:** Expanding social protection measures, preventing food insecurity, and reversing deprivations in health and education.
- **Stimulating Economic Recovery:** Facilitating trade and commerce, addressing youth unemployment, and expediting the digitalisation of the economy.
- **Addressing Cross-Cutting Issues:** Promoting social protection, gender equality, disaster risk reduction, and greening the recovery process.

Aligning with these objectives, the primary aim of this research is to explore the community resilience and adaptation strategies employed during the COVID-19 pandemic in Ghana and South Africa. The study documents and analyses community-led initiatives, identifying and evaluating grassroots efforts that emerged in response to the pandemic. This approach provides a comprehensive understanding of how these strategies have been effective in building community resilience and promoting adaptation to the challenges posed by the pandemic.

1.2 Resilience in the context of COVID-19

Resilience is a multifaceted concept that encompasses the ability of individuals and communities to bounce back from adverse situations. In the context of COVID-19, resilience involves absorbing the shock of the pandemic, maintaining essential functions, and recovering quickly [2]. Community resilience refers explicitly to the collective ability of a group to respond to and recover from external stresses such as a pandemic. It includes social networks, local leadership, resource distribution, and cultural practices that support health and well-being during crises [3]. Figure 1 exemplifies some of these public health measures and their effectiveness in supporting community resilience during the COVID-19 pandemic. For instance:

- **Social Networks and Community Support:** Community support networks were established to ensure food security and mental health support. The figure highlights how local groups organised food distribution and set up mental health hotlines to assist those in isolation, thus maintaining social cohesion and mental well-being.
- **Local Leadership and Governance:** Effective local leadership was critical in coordinating responses. The figure shows how local leaders implemented targeted lockdowns and communicated public health information, ensuring compliance and minimising confusion.
- **Resource Distribution:** Fig. 1 depicts efficient resource distribution, including providing personal protective equipment (PPEs) and handwashing stations. This measure was essential in preventing the spread of the virus, especially in crowded urban areas.
- **Cultural Practices:** Leveraging cultural practices, such as using traditional community health workers to disseminate information and conduct contact tracing, is also illustrated. These workers were trusted figures who could reach more remote or skeptical populations, enhancing the overall effectiveness of public health measures.

Norris et al., (2008) define community resilience as a complex concept that includes metaphorical elements, theoretical foundations, various capacities, and strategic approaches to disaster preparedness. As a metaphor, it signifies communities "bouncing back" from adversity. Theoretically, it integrates interdisciplinary models to understand the factors enabling communities to endure and recover from disasters. Community resilience comprises vital capacities such as economic development, social capital, practical information and communication, and community competence. These capacities equip communities to prepare for, respond to, and recover from crises. As a strategy, community resilience enhances these capacities to improve disaster readiness and recovery. The authors emphasise that the practical implementation of community resilience should be comprehensive and inclusive, addressing various capacities to ensure communities are well-prepared and can adapt effectively to disasters [4].

1.3 Adaptation strategies during the COVID-19 pandemic

Adaptation strategies refer to the actions and adjustments made by individuals, communities, and systems to cope with the new realities brought about by the COVID-19 pandemic. In Ghana and South Africa, communities adapted by modifying behaviours, practices, and infrastructures to mitigate the impact of the pandemic. These adaptations included establishing handwashing stations, the widespread use of face masks, and the development of digital platforms for health communication and education [4, 5].

In Ghana, community-based adaptation strategies included using social media platforms to disseminate accurate health information and counter misinformation. Community leaders and local influencers were engaged to promote preventive behaviours such as mask-wearing and social distancing. Additionally, local communities organised support networks to distribute relief supplies and assist vulnerable households, ensuring that basic needs were met despite the economic disruptions caused by lockdown measures.

Due to the country's socio-economic inequalities and diverse population, South Africa's adaptation strategies were more varied. In urban areas, community organisations set up food distribution networks to support households affected by job losses and income instability. In rural areas, communities relied on traditional health practices and local knowledge to support public health measures. Establishing community health worker networks was a key adaptation strategy, allowing for the dissemination of health information and providing support services in areas with limited formal healthcare infrastructure [4, 5].

1.4 Regional contexts: focus on Ghana and South Africa

The focus on Ghana and South Africa provides a comparative analysis of community resilience and adaptation strategies within two distinct regional contexts. Ghana's relatively stable public health infrastructure and proactive government response enabled communities to adapt quickly to the challenges posed by the pandemic. Community-based initiatives complemented national strategies, leading to a cohesive and coordinated response that integrated local knowledge and resources.

Despite having one of the most developed healthcare systems on the continent, South Africa faced significant challenges due to deep-seated socio-economic disparities. These disparities influenced the nature of community responses, with informal settlements and rural areas adopting unique adaptation strategies to cope with the pandemic's impact. The comparative analysis of Ghana and South Africa offers valuable insights into how differing socio-economic and health system contexts shape community resilience and adaptation strategies.

1.5 Rationale for country selection

Ghana and South Africa were selected for this study due to their contrasting socio-economic landscapes and health system capacities. Ghana's relatively stable public health infrastructure provided a foundation for a coordinated response that integrated community resilience strategies. Despite its more advanced healthcare system, South Africa faced significant challenges due to deep socio-economic inequalities that shaped community responses. Analysing these two countries provides a nuanced understanding of how community resilience can be fostered in diverse contexts within sub-Saharan Africa.

Focusing on Ghana and South Africa allows an in-depth examination of how different socio-political and economic contexts influence community resilience and adaptation strategies. The study highlights key lessons that can inform future public health interventions and contribute to the broader knowledge of pandemic response strategies within diverse regional settings [6].

1.6 Theoretical framework

Community Resilience Theory (Norris et al., 2008) provides a comprehensive framework for understanding how communities respond to crises such as pandemics. The theory highlights four critical capacities: economic development, social capital, information and communication, and community competence. These capacities enable communities to effectively prepare for, respond to, and recover from disasters. In the context of Ghana and South Africa, this theory helps

explain how community-driven initiatives, such as mobilising local resources and leveraging social networks, contributed to resilience during the pandemic [4, 5].

Social Capital Theory, primarily developed by Bourdieu and later expanded by Putnam, emphasises the importance of social networks, relationships, and trust in facilitating collective action and community responses. During the COVID-19 pandemic, communities in both Ghana and South Africa leveraged their social capital to disseminate information, provide mutual aid, and support marginalised groups. This theory provides a lens to analyse how community cohesion and trust enabled effective responses, even in the face of limited formal support [6, 7].

Health Belief Model (HBM): The HBM (Rosenstock, 1974) posits that individuals' health-related behaviours are influenced by their perceptions of risk, the severity of the health issue, perceived benefits, and barriers to action. Applying HBM in the context of COVID-19 in sub-Saharan Africa helps understand how communities perceived the pandemic and adopted health behaviours such as mask-wearing, social distancing, and vaccination. This theory elucidates why some communities embraced preventive measures more readily than others [8, 9].

1.7 Methodology

1.7.1 Document analysis approach

This study utilised a qualitative research design, with document analysis as the primary method to examine community-level responses to the COVID-19 pandemic in Ghana and South Africa. Document analysis was selected for its ability to provide a comprehensive overview of existing data while minimising the need for direct fieldwork, which was constrained by the ongoing pandemic [10]. The documents reviewed included government reports, policy briefs, and records from community organisations and NGOs in both countries, offering a holistic understanding of community responses. The analysis involved systematically reviewing, coding, and interpreting data to identify key themes of community resilience and adaptation strategies. A rigorous inclusion and exclusion criterion ensured that only documents offering detailed accounts of community-level responses were considered. Additionally, insights from the African Union's (AU) COVID-19 recovery framework provided a multi-layered understanding of the strategies employed in both countries, allowing for an assessment of how community-level initiatives aligned with continental frameworks for pandemic response and recovery [11]. This approach offered a contextually grounded, rich qualitative dataset that captured the diverse responses to the pandemic.

The document analysis involved systematically reviewing, coding, and interpreting data from selected sources to identify critical community resilience and adaptation themes. A rigorous inclusion and exclusion criterion focused on documents that provided detailed accounts of community-level responses. Insights from the African Union's (AU) framework were incorporated to provide a multi-layered understanding of the community strategies employed in Ghana and South Africa [11]. This approach enabled the study to assess how the strategies implemented at the community level aligned with continental frameworks for pandemic response and recovery.

1.7.2 Comparative analysis

The study leveraged the AU's regional and typology-based analysis to contextualise the findings for Ghana and South Africa [11]. This comparative analysis explored how community responses in both countries aligned with or diverged from the AU's recommended strategies. In examining the intersection of national and regional responses, the study highlights the importance of aligning local initiatives with continental recovery frameworks to enhance resilience and adaptation [11]. This alignment with the AU's COVID-19 Recovery Framework provided a robust foundation for assessing the effectiveness of community-driven strategies in responding to the pandemic.

1.7.3 Selection of materials

The selection of materials for this study was guided by specific inclusion and exclusion criteria to ensure the relevance and quality of the data analysed. Inclusion criteria focused on documents and reports from government health departments, non-governmental organisations (NGOs), and reputable community organisations that detailed responses to the COVID-19 pandemic. These documents provided valuable insights into community-level strategies and interventions. Exclusion criteria were applied to eliminate documents not directly related to community-level responses, such as those focusing solely on national policy without detailing community impacts or responses. This rigorous selection process ensured

that the analysis focused on relevant and substantial data, clearly understanding community resilience and adaptation strategies during the COVID-19 pandemic in sub-Saharan Africa [12, 13].

1.7.4 Issues of saturation

The data saturation principle was followed to ensure the robustness of the qualitative data. Data collection continued until no new information or themes emerged from the documents reviewed. This approach ensured that the analysis captured a comprehensive range of responses and strategies, enhancing the reliability and validity of the findings [12, 13]. During the selection of materials phase, the decision to stop data collection was based on information redundancy, indicating that saturation had been achieved [12, 13].

Ethical Considerations: Given the nature of this research, which relies on secondary data from publicly available sources, ethical considerations focused on ensuring the accurate interpretation and contextualisation of the data. Proper citation and acknowledgement were maintained throughout the study, adhering to academic standards of research ethics. All documents were handled with integrity, respecting the sources and the intended audience [14, 15].

1.7.5 Data analysis

Thematic analysis was used to categorise and interpret information from the selected documents. Themes such as social support networks, health education, resource mobilisation, and the role of social capital were explored in depth, providing insights into the strategies critical to the success of community-driven initiatives [6, 7]. The analysis also identified key differences in the resilience and adaptation strategies employed by Ghana and South Africa, shedding light on the influence of socio-economic contexts on community responses. For example, Ghana's emphasis on social capital and community education initiatives contrasted with South Africa's focus on resource mobilisation and health infrastructure support [6, 7].

2 Results

2.1 Comparative analysis of community resilience and adaptation strategies in Sub-Saharan Africa

The study examined community resilience and adaptation strategies in two sub-Saharan African countries: Ghana and South Africa. The findings reveal diverse responses influenced by each country's unique socio-political and economic context. Table 2 provides a comparative analysis, summarising key differences and similarities in economic development, social networks, communication strategies, and community skills and competence. The strategies are further summarized in Table 1, highlighting the areas where they merge and diverge.

2.2 Comparative analysis of community resilience and adaptation strategies in Sub-Saharan Africa

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2.3 Community resilience and adaptation strategies during the COVID-19 pandemic in Ghana

2.3.1 Community resilience strategies

Throughout the COVID-19 pandemic, Ghana implemented various strategies to enhance community resilience and mitigate the socioeconomic and health impacts of the pandemic. A notable initiative was the Coronavirus Alleviation Programme's Business Support Scheme (CAP-BuSS), which allocated GH¢600.0 million (USD 33,333,333) to assist micro, small, and medium-sized enterprises (MSMEs). This financial assistance was crucial in sustaining small businesses and maintaining economic stability throughout the crisis [19]. Furthermore, the establishment of the COVID-19 National Trust Fund (CNTF) played a crucial role in securing personal protective equipment (PPE) and essential medical supplies

Table 1 Implementing a community-centered public health approach to COVID-19 recovery

Implementing a community-centered public health approach to COVID-19 recovery	
Whole system	Potential actions to build community resilience community-centred public health ¹⁶
Scaling	Adopt a place-based strategy to address health inequalities, focusing on neighborhood-level efforts. Beginning at a 'hyper-local' level will harness local community initiatives and resources. Employ community-centered methods to offer support alongside professional-led services. Local services, such as social prescribing, can provide a flexible, person-centered approach to support individuals during and after the emergency
Involving	Ensure two-way communication and decision-making between communities and services to understand and address needs and priorities. Develop new methods for gathering insights from those most affected by the COVID-19 pandemic. Utilise community development approaches, particularly in marginalised communities, to empower individuals to take control of their health and well-being
Strengthening	Collaborate with local VCS organisations that are assisting those in need. Identify ways to strengthen grassroots organisations by connecting with marginalised and vulnerable groups. Promote volunteering by partnering with organisations that are involved in volunteer-related activities to provide volunteers with the necessary information, support, and training to assist the community safely. Improve the skills of the public health workforce in community engagement and in using asset and strengths-based approaches to address local priorities
Sustaining	Focus on meeting basic needs by addressing employment, housing, food, income, debt, the natural environment, and education as foundational elements for community resilience. Develop a strategic, long-term plan to strengthen communities in the recovery from COVID-19. Enhance measurement using community outcome frameworks with short-, medium-, and long-term indicators reflecting community priorities, such as a sense of belonging and mental well-being

Adapted from Perspectives in Public Health | Month 2020 [2–4]

for frontline workers. As of June 30, 2020, the fund had accumulated GH¢53,911,249.87 (USD 3,461,321.12), significantly enhancing the healthcare sector's capacity to manage the pandemic [19].

The Bank of Ghana implemented various policy measures to support businesses and the economy during the pandemic. These included reducing the monetary policy rate by 150 basis points to 14.5 percent, decreasing the Primary Reserve Requirement from 10 to 8 percent, and establishing a GH¢3.0 billion (USD 192,612,180.00) syndication facility to support the pharmaceutical, hospitality, services, and manufacturing industries. These actions facilitated the disbursement of approximately GH¢7 billion (USD 388,888,888) in support of borrowers from March to June 2020 [20].

In the education sector, the government prioritised the health and safety of students, educators, and staff by distributing face masks, hand sanitizer, liquid soap, and thermometer guns to educational institutions. This initiative ensured that educational activities could continue safely, contributing to community resilience by maintaining educational continuity [21]. The government's focus on easing educational restrictions allowed final-year tertiary students to resume schooling from June 15, 2020. A total of 600,000 face masks, 1,700 Veronica buckets, 200,000 L of hand sanitizer, and 900 thermometer guns were distributed to tertiary institutions to promote hygiene and safety in the educational environment [21].

Further government measures included the fumigation and disinfection of all 1,167 Senior High Schools (SHS) nationwide. The provision of GH¢ 2.4 million reusable face masks, allocated to students, teaching and non-teaching staff, invigilators, and school administrators, demonstrated a steadfast commitment to protecting the health and welfare of individuals in the education sector. Additionally, to ease financial burdens, the government allocated GH¢75.4 million (USD 4,166,667) to cover the 2020 West Africa Senior Secondary School Certificate Examination (WASSCE) fees for the 313,837 SHS-3 students [22]. These initiatives reflected a comprehensive approach aimed at ensuring that education could continue amidst the ongoing challenges of the pandemic.

To mitigate the broader economic impact, the Ghanaian government gradually relaxed restrictions on social gatherings while enforcing mandatory social distancing protocols. This approach facilitated a cautious return to normalcy, supporting community resilience by allowing economic and social activities to resume in a controlled manner [21]. Moreover, the government undertook significant infrastructure development projects to enhance healthcare capacity. These included the construction of infectious disease treatment centers, expanding district hospitals, upgrading regional health facilities, establishing mobile healthcare units in rural areas, and renovating teaching hospitals. The combined cost of these projects exceeded GH¢430 million (USD 27,607,745.80), demonstrating a concerted effort to improve healthcare infrastructure and enhance the nation's ability to respond to future health crises [21].

The Ghanaian government's multifaceted response to the COVID-19 pandemic also included implementing the Imposition of Restrictions Act 2020 (Act 1012), which mandated strict adherence to social and physical distancing rules. This,

Table 2 Comparative analysis of community resilience and adaptation strategies

Country	Economic development	Social networks	Communication Strategies	Community Skills and Competence
Ghana	Government relief programs, local economic initiatives	Strong community networks, digital platforms for support	Effective public health communication via digital media	Leveraging local knowledge for health practices
South Africa	Government aid, local economic initiatives	Community health volunteers, local support networks	Comprehensive public health campaigns	Integration of modern and traditional health practices

Source: Public Health England [16], Creswell [17], British Psychological Society [18]

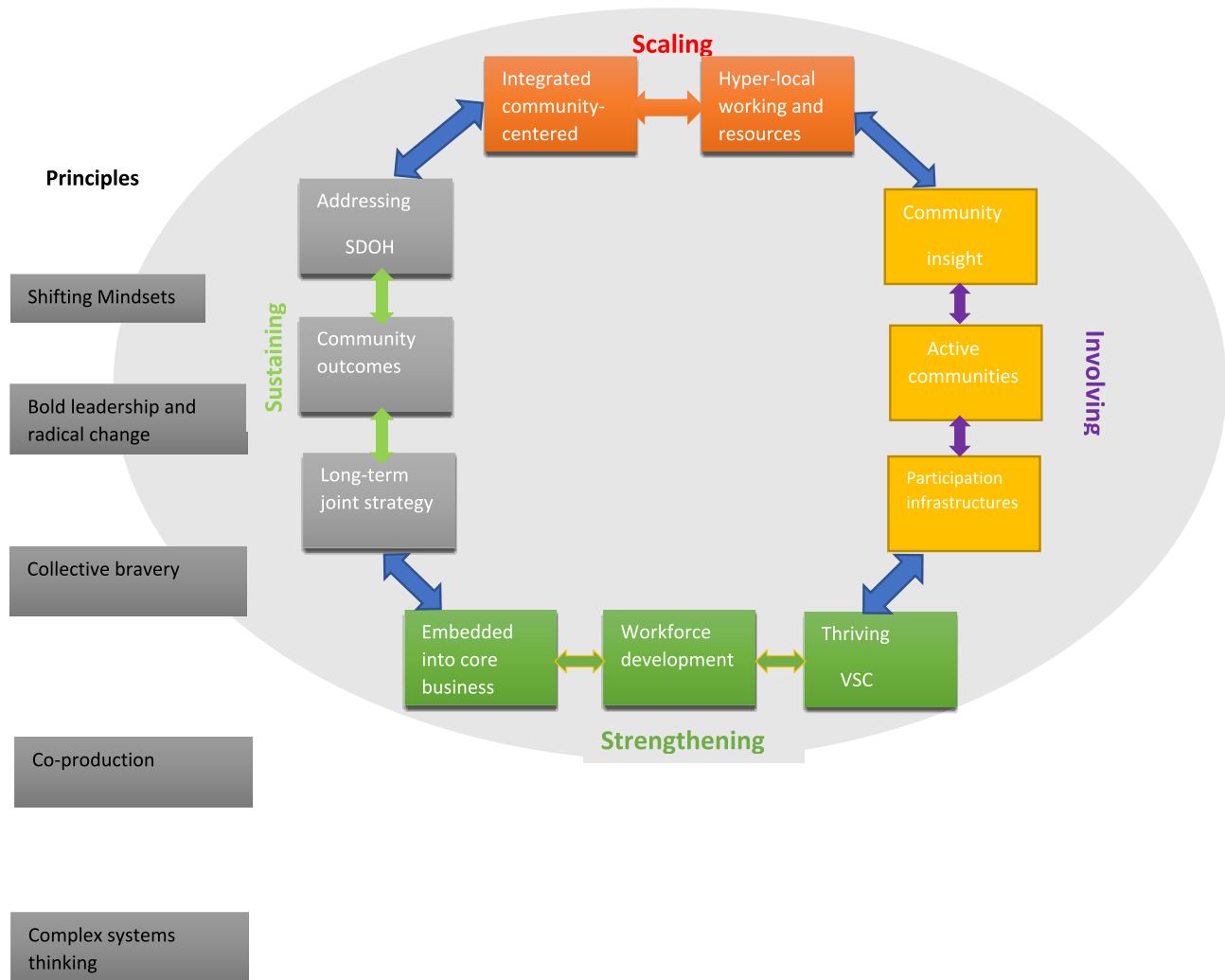


Fig. 1 Example of public health measures and their effectiveness in response to COVID-19 in sub-Saharan Africa. Public Health England. Figure 1 is made available under the Open Government License v3.0. [2–4]

in turn, significantly altered the daily lives of Ghanaians, particularly in the Greater Accra Metropolitan Area (GAMA) and Kumasi Metropolitan Area [22]. The measures aimed to curb the spread of the virus by limiting public gatherings and non-essential movements while ensuring essential activities, such as acquiring food, water, and medication, could continue.

Community-led initiatives, such as the GrEEn Project, also strengthened community resilience. The project provided over USD 90,000 in funding to construct boreholes, sanitation facilities, and water systems across ten Metropolitan, Municipal, and District Assemblies (MMDAs) in the Western and Ashanti regions. These investments benefited over 10,000 people by enhancing access to water and sanitation services, addressing critical needs during the pandemic [19]. Establishing a borehole in the Ejura-Sekyedumase District, for example, improved water accessibility, demonstrating the effectiveness of community resilience strategies in improving public health outcomes [19].

2.3.2 Adaptation strategies

In addition to enhancing community resilience, Ghana implemented several adaptation strategies to mitigate the broader economic and social impacts of the COVID-19 pandemic. One key measure was the introduction of various tax reliefs for households and businesses. These included extending the deadline for filing income tax returns, waiving penalties on principal debts for taxpayers who settled outstanding balances with the Ghana Revenue Authority (GRA) by June 30,

2020, and exempting Value Added Tax (VAT), National Health Insurance Levy (NHIL), and Ghana Educational Trust Fund (GET Fund) Levy on donations of equipment and goods for COVID-19 relief efforts [23].

In its unwavering commitment to economic resilience and recovery, the government also implemented the Ghana COVID-19 Alleviation and Revitalization of Enterprises Support (Ghana CARES) Programme. This GH¢100 billion initiative aims to restore the country to a path of robust growth and mitigate the pandemic's impact on the local economy. The Ghana CARES Programme included various financial support measures for businesses and individuals affected by the pandemic, underscoring the government's dedication to the nation's economic well-being [19].

Furthermore, the pandemic accelerated the adoption of digital solutions, with businesses and educational institutions increasingly utilising platforms like Zoom for consultations and virtual learning. This shift toward digital platforms underscored the community's adaptability and innovation in response to the pandemic's challenges [24]. Equally important was the government's emphasis on implementing hygiene measures, distributing PPE, and enforcing social distancing protocols, which further contributed to the nation's comprehensive adaptation strategy and ensured the public's safety [25].

Significant investments in healthcare infrastructure, such as establishing infectious disease centres, represented strategic adaptations to strengthen the healthcare system's resilience and preparedness for future health emergencies [25]. Moreover, the pandemic emphasised the significance of domestic manufacturing, prompting local pharmaceutical firms to manufacture critical medications such as hydroxychloroquine and azithromycin. Thobinco Pharmaceutical Company, for example, was awarded a \$5 million contract by the World Bank to produce these medications, demonstrating a move toward local production and decreased reliance on imports [19, 26].

The pandemic's impact on community health services was also addressed through projects led by the UNDP in collaboration with the Ghana Health Service and with funding from the Government of Japan. These projects strengthened community health systems, trained community health workers, and established mobile laboratories at key entry points such as the Kotoka International Airport, Aflao, Elubo, and Paga borders. These initiatives were critical in enhancing Ghana's capacity to detect and respond to public health emergencies, contributing to community resilience [19, 27, 28].

2.3.3 Community-led initiatives and stakeholder engagement

Community-led initiatives and multi-stakeholder collaboration formed a vital part of Ghana's COVID-19 response. Working with the UNDP, the National Development Planning Commission (NDPC) and the Ministry of Finance supported five Metropolitan, Municipal, and District Assemblies (MMDAs) to develop COVID-19 Recovery Plans and Integrated Assembly Financing Frameworks. These localised plans aimed to restructure the economy to be more inclusive, sustainable, and resilient [19]. Anchored on four core pillars regional economy, people, infrastructure, and governance the Recovery Plan sought to ensure that no one was left behind in the nation's post-pandemic transformation [19].

Civil society organisations also played a pivotal role. The Ghana Federation of the Urban Poor (GHAFUP) conducted community profiling across 25 localities in the Greater Accra Region to map COVID-19 hotspots. This data-driven approach enabled targeted interventions, fostering proactive community-level responses [19]. In addition, religious institutions, market traders, and transport operators were instrumental in promoting public health awareness and ensuring adherence to safety protocols, highlighting the collective commitment to protecting public health [19, 29, 30].

2.3.4 Lessons from Ghana's COVID-19 response

Ghana's handling of the COVID-19 pandemic offers key lessons in leveraging public-private collaboration, social protection systems, and community mobilisation to build resilience during health emergencies. The country adopted a multifaceted approach that combined economic support measures, health infrastructure investment, and grassroots engagement to navigate the pandemic's challenges.

A notable example of this was the Coronavirus Alleviation Programme Business Support Scheme (CAP-BuSS), which extended financial relief to micro, small, and medium-sized enterprises (MSMEs), preserving livelihoods and economic continuity. Complementing this, the COVID-19 National Trust Fund facilitated resource mobilisation for personal protective equipment (PPE) and essential medical supplies, supporting frontline healthcare delivery and institutional capacity.

In addition, Ghana's central bank introduced monetary easing measures, including interest rate cuts and targeted credit facilities, to sustain key sectors such as hospitality and pharmaceuticals. This was matched by tax reliefs and the

Ghana CARES Programme, a large-scale economic recovery initiative that sought to revitalise the local economy and build resilience in the face of future shocks.

Education-focused interventions also formed a crucial pillar of Ghana's response. The distribution of hygiene materials, fumigation of schools, and coverage of examination fees ensured minimal disruption in learning and signalled the government's commitment to youth and community welfare. These efforts helped maintain educational continuity while protecting health in learning environments.

Ghana's emphasis on public health infrastructure was demonstrated through investments in new infectious disease treatment centers and the upgrading of regional and district health facilities. This bolstered the country's long-term health security while serving immediate needs during the pandemic.

Crucially, community-driven initiatives like the GrEEen Project and the profiling of COVID-19 hotspots by the Ghana Federation of the Urban Poor (GHAFUP) provided tailored, localised responses. Civil society, religious institutions, and market associations collaborated to spread health information and enforce safety measures, reflecting a collective resilience strategy rooted in Ghana's sociocultural context.

Digital adaptation also emerged as a key feature of Ghana's strategy. Schools and businesses increasingly shifted to online platforms, while health communication leveraged digital tools to disseminate information and encourage compliance with health protocols.

Ghana's experience underscores the importance of holistic and inclusive strategies that merge government leadership with community agency and international partnerships. The country's response highlights how local innovations, stakeholder collaboration, and targeted investments can reinforce resilience and prepare systems for future public health emergencies.

2.4 South Africa: community resilience and adaptation strategies

2.4.1 Community resilience strategies

2.4.1.1 Country profile: South Africa and COVID-19 South Africa, one of the most severely impacted countries on the African continent by the COVID-19 pandemic, reported its first confirmed case on March 5, 2020 [31]. The nation navigated through multiple waves of infections, each presenting new challenges. As of June 2023, South Africa has recorded over 4 million confirmed COVID-19 cases, with over 3.8 million recoveries and a death toll surpassing 100,000 [32]. These statistics reflect the pandemic's dual impact, while recovery rates are high, the loss of life remains significant, underscoring the gravity of the crisis.

2.4.1.2 Public health interventions and adaptation measures South Africa's response to the pandemic involved various public health interventions and adaptation measures to mitigate the virus's socioeconomic and health impacts. In the initial stages, stringent lockdown measures were implemented, effectively slowing the virus's spread but imposing severe economic repercussions, particularly on low-income households [33]. The government introduced social relief programs, including increased social grants and food parcel distributions, to cushion vulnerable populations. Community health workers and volunteers were crucial in delivering healthcare services and public health education, particularly in underserved areas. Integrating traditional health practices with modern medicine also facilitated a more comprehensive public health response [34].

2.4.1.3 Vaccination efforts Vaccination has been a pivotal component of South Africa's strategy to combat COVID-19. The vaccination campaign began in early 2021 and prioritised healthcare workers and high-risk populations. Despite initial vaccine supply and distribution challenges, the country made significant progress, administering millions of doses by mid-2023 and achieving considerable coverage [33–35].

2.5 Socio-economic impact and recovery

The pandemic severely affected South Africa's socioeconomic fabric. Lockdowns led to a contraction in economic activity, increased unemployment, and heightened food insecurity. However, the government's swift implementation of economic relief measures, such as adjusting monetary policies through the South African Reserve Bank, provided a buffer against further economic decline [33]. Thus, the combined efforts of governmental actions, community initiatives, and adaptive strategies have been instrumental in navigating the pandemic's complex challenges.

2.6 Community resilience

2.6.1 Social networks, social cohesion, and mutual aid

Community health volunteers and local support networks played a pivotal role in sustaining access to essential services, including food distribution and healthcare, particularly for vulnerable populations. Their efforts were instrumental in maintaining service continuity amidst crisis conditions, as documented in humanitarian settings where community health workers effectively bridged service delivery gaps, engaged local leaders to build trust, supported emergency response, and adapted to supply chain and supervision challenges [36].

This highlights the significance of social cohesion and regional support systems in addressing community needs during the crisis. As Saghin, Lupchian, and Lucheuş demonstrated in the context of northern Romania, communities with strong social ties and active civic participation were more resilient in facing the pandemic's challenges, ensuring rapid collective action and localized support for those in need [37]. Similarly, Jewett et al., emphasized that social cohesion manifested through trust, shared identity, and mutual responsibility was a critical enabler of effective community resilience during COVID-19 [38]. Their scoping review found that high levels of social trust enhanced adherence to public health measures, facilitated information sharing, and reinforced collective coping mechanisms.

Strong community bonds and mutual aid groups, which emerged organically during lockdowns, further exemplified the power of localized resilience. These grassroots networks facilitated the distribution of food, medicine, and other resources among community members, often stepping in where formal systems were overwhelmed or absent. This bottom-up approach not only strengthened collective coping but also enhanced the community's capacity to withstand and recover from the adverse effects of the pandemic. These findings affirm that social cohesion is not only a buffer in times of disruption but also a foundational element that sustains regional support systems, enabling communities to mobilize resources, reinforce solidarity, and mitigate the impact of public health crises.

2.6.2 Community skills, competence, local leadership, and governance

Modern and traditional health practices were integrated, with community health workers spearheading public health education and vaccination campaigns. Local leaders and traditional authorities significantly mobilized community resources, enforced public health measures, and maintained social order, showcasing the community's competence and leadership in managing the pandemic. As Wilkinson et al., [39] observed, the involvement of trusted local leaders and community networks was essential in ensuring compliance and legitimacy in health interventions during the pandemic. Similarly, Mbembe and Meurs [40] underscore that community-based competencies, rooted in local knowledge systems and governance structures, proved vital for adaptive responses in sub-Saharan Africa.

2.6.3 Role of government transfer payments and pre-existing policies

Government transfer payments, such as the Special COVID-19 Social Relief of Distress grant (R350), were critical in insulating low-income households from the economic shocks of the pandemic. These payments and pre-existing social safety nets underscored the community's ability to withstand economic shocks and recover from severe disruptions [39]. The pre-existing transfer policies provided a buffer that enabled communities to leverage existing systems to support those in need during the crisis.

2.6.4 Community health workers and volunteers

Community health workers and volunteers were at the forefront of delivering healthcare services and public health education, particularly in underserved areas. This initiative leveraged existing community networks and local knowledge to enhance the effectiveness of the public health response [41]. Additionally, integrating traditional health practices with modern medicine enabled a more holistic approach, demonstrating the community's ability to utilise diverse knowledge systems to manage crises.

2.7 Adaptation strategies

2.7.1 Economic development and government interventions

The South African government rolled out extensive aid packages and supported local economic initiatives to mitigate the economic impact of lockdowns. For instance, the government increased social grants, distributed food parcels, and supported businesses through various relief programs [40]. These measures were critical in helping communities adjust to the new economic realities and maintain stability during the crisis.

2.7.2 Communication strategies and digital health innovations

Comprehensive public health campaigns utilising multiple media channels, including national and local radio, television, and social media, implemented effective communication strategies. Digital innovations like Health Worker Connect, a WhatsApp-based service, and Health Check South Africa, a USSD-based risk assessment tool, provided real-time COVID-19 guidelines and risk assessments. These tools supported health workers and empowered the general population to make informed decisions during the pandemic [41].

2.7.3 Impact of lockdowns on low-income households

The stringent lockdown measures implemented in the early stages of the pandemic had a significant socio-economic impact, particularly on low-income households. The government, in a display of profound sensitivity to the needs of its citizens, recognised the disparities in economic impact based on educational attainment and implemented targeted interventions and support for low-income labour, exemplifying an adaptive strategy to address vulnerabilities revealed by the pandemic [39].

2.7.4 Health infrastructure adaptation and digital health innovations

A crucial adaptation strategy was the remarkably rapid establishment of temporary health facilities and the repurposing of existing infrastructure to accommodate COVID-19 patients. Additionally, the adoption of telemedicine and mobile health applications provided remote consultations and health monitoring, reducing the burden on physical health facilities and ensuring continuity of care. These innovations highlight South Africa's impressive ability to adapt its health system to meet the unprecedented demands of the pandemic.

2.7.5 Community-based support and resource mobilisation

Community support networks in South Africa, including religious institutions, civil society organisations, and local NGOs, were pivotal in mobilising resources and delivering essential services during the COVID-19 pandemic. Faith-based organisations partnered with government and humanitarian agencies to provide food parcels, hygiene kits, and psychosocial support, especially in informal settlements and underserved communities [42]. Civil society groups also facilitated the distribution of personal protective equipment (PPE), sanitisation materials, and public health information to ensure community preparedness and resilience [43]. For instance, the Solidarity Fund, a government-initiated but independently managed organisation, channelled donations from the public and private sectors to support frontline responses, including community health initiatives and resource distribution [44].

In addition, community radio stations and social media influencers collaborated to dispel misinformation and promote vaccine confidence, especially in rural and peri-urban areas [45]. These collaborative and context-specific efforts enabled communities across provinces, such as Gauteng, KwaZulu-Natal, and the Western Cape, to better cope with the pandemic's socioeconomic fallout, demonstrating South Africa's robust grassroots mobilisation and adaptive capacities [46].

2.7.6 Integration of multisystemic resilience

The COVID-19 pandemic revealed the importance of a multisystemic approach to resilience, particularly among youth in South Africa, where intersecting personal, social, and structural factors played crucial roles in shaping responses to the crisis. Resilience among young South Africans, especially those in socioeconomically disadvantaged communities,

was not only the result of individual agency but also of embeddedness in familial, communal, and policy-driven support structures.

Drawing from Fourie et al., [47], it is evident that youth resilience was significantly mediated by interpersonal relationships, community affiliations, and limited but impactful state interventions. Emotional support from families, encouragement from peers, and community solidarity formed the foundation of a psychosocial buffer that helped young people endure pandemic-induced hardships [47].

Moreover, Anakpo, Nkungwana, and Mishi [48] provide robust empirical evidence of how social grant mechanisms, such as the COVID-19 Social Relief of Distress Grant, contributed to financial resilience among unemployed and marginalised youth. Their study notes that while the structural support was relatively minimal, it played a catalytic role in enabling youth to maintain food security, reduce household tension, and preserve mental well-being.

In a related study, Gittings et al., [48] highlight the gendered and spatial dimensions of youth resilience, underscoring how young women in urban informal settlements navigated lockdown restrictions through household cooperation, localized knowledge sharing, and recalibration of daily routines. Importantly, their research shows that resilience was not innate but cultivated through strategic resource management and strong reliance on kinship systems, aligning with traditional African values emphasizing collective survival and familial responsibility.

Another noteworthy observation from Fourie et al., [47] is the adaptive prioritisation of family ties over peer relationships during lockdowns, with many youths reverting to cultural norms that stress the centrality of family. This shift not only offered emotional stability but also reflected an enduring communal ethos characteristic of African societies.

Overall, the resilience of South Africa's youth during COVID-19 was a product of synergistic systems where personal agency, social capital, and structural support functioned in tandem. While the latter remained constrained, its interplay with community- and family-level support structures facilitated coping strategies that proved vital during prolonged periods of uncertainty and social isolation.

2.8 Lessons from South Africa's COVID-19 response

South Africa's experience with the COVID-19 pandemic underscores the critical importance of integrating community-led initiatives with formal government interventions to build resilience in times of crisis. Despite the challenges and structural limitations faced by the country, a number of strategic adaptations emerged as key lessons for managing future health emergencies.

One of the most notable features of South Africa's response was its strong community-based mobilisation. Faith-based organisations, civil society groups, and local NGOs played a central role in delivering food parcels, hygiene kits, personal protective equipment (PPE), and psychosocial support, particularly within informal settlements and underserved communities. Initiatives like the Solidarity Fund effectively channelled public and private donations to support frontline health responses and grassroots outreach efforts.

Youth resilience, particularly among those in disadvantaged communities, offers another powerful insight. Studies show that young people navigated the pandemic by drawing on personal agency, social network support, and limited yet vital structural assistance, such as social grants. Family and community ties emerged as key protective factors, often reinforced by traditional African values that emphasise communal responsibility and care. These interwoven systems of support highlight the value of a multisystemic approach to resilience, one that connects the personal, social, and institutional levels.

Furthermore, South Africa's adaptation strategies extended to economic support programs, digital health innovations, and the use of community radio and social media to promote public health awareness and vaccine confidence. These context-specific interventions not only filled policy and service delivery gaps but also fostered grassroots ownership and strengthened trust between communities and institutions.

While the pandemic exposed deep vulnerabilities in health systems and social protection mechanisms, it also demonstrated the power of community resilience, local resource mobilisation, and collaborative governance. South Africa's experience serves as a valuable model for how countries can leverage local strengths, foster inclusive partnerships, and sustain adaptive capacities in the face of future health crises.

2.9 Policy implications and recommendations

The study's findings emphasise the critical role of local resources and community networks in enhancing resilience and adaptation during pandemics. The analysis of community-led initiatives and public health measures in

sub-Saharan Africa, as depicted in Fig. 1, reveals several critical policy implications and recommendations. Firstly, it is essential to prioritise the support and development of local economic initiatives. Government aid and financial stability measures are crucial during health crises to ensure that communities can maintain economic resilience. For instance, microfinance programs and small business grants can help sustain local economies and support community resilience. Strengthening these local economies enables communities to withstand the financial shocks associated with pandemics.

Moreover, governments and NGOs must invest in traditional and digital social networks. Strengthening these networks fosters mutual support and enables efficient resource mobilisation. For example, community-based organisations and digital information-sharing and coordination platforms can significantly enhance community resilience. These networks rapidly disseminate information, resources, and support during health crises, ensuring communities respond effectively to emerging challenges.

Effective communication strategies tailored to local contexts are also paramount. Utilising both modern technology and traditional communication channels ensures comprehensive dissemination of crucial information. For example, combining social media campaigns with local radio broadcasts can reach a wider audience and improve public health outcomes. Tailoring these communication strategies to each community's cultural and linguistic context ensures that essential health messages are understood and acted upon.

Building community competence through training programs integrating modern public health practices with traditional methods can further enhance local knowledge and skills. Such programs should focus on preventive measures, treatment protocols, and vaccination campaigns. For instance, community health worker training programs can improve local healthcare delivery and preparedness. In equipping community members with the skills and knowledge needed to respond to health crises, these programs contribute to the community's overall resilience.

Therefore, the study highlights the importance of leveraging local resources and community networks to enhance resilience and adaptation during pandemics. Strengthening local economies, enhancing community networks, tailoring communication strategies to local contexts, and building community competence are essential components of an effective pandemic response. These policy implications and recommendations, informed by the analysis presented in Fig. 1, provide a roadmap for building resilient health systems capable of withstanding future pandemics.

2.10 Strengths and limitations

This paper presents a structured literature review that offers a nuanced comparative analysis of community resilience and adaptation strategies during the COVID-19 pandemic in Ghana and South Africa. These two countries represent distinct yet relatively stable socio-political contexts within sub-Saharan Africa, and their experiences offer meaningful insights into how community-driven initiatives and local knowledge systems complemented formal government responses during the health crisis.

A major strength of this study lies in its emphasis on community-led responses, highlighting how local actors mobilised social capital, traditional values, and adaptive strategies to buffer the impacts of the pandemic. The comparative approach enables an exploration of both converging and context-specific strategies, which strengthens the external validity of the findings. Furthermore, the inclusion of grey literature, policy documents, and peer-reviewed empirical studies adds depth and policy relevance to the analysis.

Notably, Ghana and South Africa benefit from comparatively stronger health infrastructure and a more substantial pool of healthcare personnel than many other countries in sub-Saharan Africa, especially those in conflict-affected regions such as the Sahel, Central African areas, and Sudan. These structural advantages may have contributed to more coordinated responses and effective adaptation at both the community and institutional levels.

As a result, the generalisability of the findings is moderate. While the health system contexts differ across the continent, the cultural and religious fabric of African societies is closely knit, with strong traditions of community solidarity, mutual aid, and reliance on informal social networks. These shared values suggest that lessons drawn from Ghana and South Africa can still inform resilience-building strategies in similarly structured environments, albeit with caution in more fragile or conflict-prone settings.

Overall, this paper contributes to a growing body of knowledge on localized, community-driven public health resilience. It also provides a valuable foundation for future research and policy formulation aimed at strengthening health system preparedness and multisectoral collaboration in the face of global health emergencies.

2.11 Future research directions

Future research should delve deeper into the long-term impacts of the community resilience and adaptation strategies identified in this study, particularly those summarised in Fig. 1. Understanding how these interventions evolve will provide valuable insights into their sustainability and relevance across varying contexts. There is also a critical need to assess the scalability of successful community-led initiatives, especially those that were effective in resource-limited settings. Such analysis will be vital for informing broader policy application and strategic replication in other sub-Saharan African countries and beyond.

In addition, further investigation into the role of technological advancements such as mobile health technologies, telemedicine, and digital health platforms is essential to understanding how innovation can bolster community resilience in future public health emergencies. These tools can facilitate real-time communication, improve access to health services, and enhance information dissemination during crises.

Equally important is the need to explore the interplay between local governance structures and community responses. Understanding how leadership, trust, and participatory decision-making influence the effectiveness of community-level interventions can offer deeper insights into effective pandemic management practices.

To strengthen the evidence base, longitudinal studies are recommended to track the evolution of community resilience and adaptation strategies over time. Such studies will help refine, validate, and optimise the approaches identified in this paper, ensuring they are responsive, inclusive, and capable of supporting resilient health systems in future crises.

3 Conclusion

The COVID-19 pandemic served as both a test and a revelation exposing the vulnerabilities of health systems across sub-Saharan Africa while also illuminating the strength, innovation, and solidarity embedded within communities. This paper has shown that Ghana and South Africa's responses were not merely reactive but deeply rooted in community resilience, stakeholder collaboration, and strategic adaptation. In both countries, the integration of local knowledge, community-led initiatives, and government interventions formed the backbone of effective pandemic management, particularly in navigating the social and economic disruptions that accompanied the health crisis.

Ghana's experience, marked by a blend of national programmes like the Ghana CARES initiative and grassroots projects supported by organisations such as the UNDP and GHAFUP, demonstrated how resource-constrained settings can mobilise internal capacities to safeguard livelihoods and protect public health. Similarly, South Africa's layered response, anchored by institutions like the Solidarity Fund, vibrant civil society networks, and youth-led resilience, highlighted the power of multisystemic collaboration in sustaining communities through prolonged uncertainty.

While Ghana and South Africa may enjoy relatively more developed health infrastructure and a stronger cadre of health professionals compared to many countries in the region, this comparative study remains highly relevant and applicable to broader sub-Saharan Africa. This is due to the shared cultural, religious, and social fabric that closely binds African communities across borders. The deeply communal nature of African societies, characterised by strong kinship ties, religious cohesion, and mutual support, offers fertile ground for replicating the community-driven strategies explored in this paper, even in countries at different stages of development.

Together, these cases provide compelling evidence that community resilience is not a supplementary component of public health preparedness; it is a central pillar. The effectiveness of pandemic responses in both countries reinforces the urgent need for inclusive, localised, and culturally grounded strategies that can be scaled and adapted across diverse African contexts. While challenges remain, especially in conflict-affected and under-resourced regions, the shared ethos of collective care offers a firm foundation upon which to build more resilient health systems.

As the continent looks ahead, the lessons from Ghana and South Africa call for a reimagining of public health governance one that acknowledges the transformative potential of community agency, and one that ensures no community is left behind in the face of future health emergencies.

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Author contributions AKC conceived and led the study, developed the research questions and design, and was responsible for all stages of the work, including conceptualisation, document selection and review, thematic analysis, interpretation of findings, referencing, and manuscript drafting. AKC also financed the study independently and managed all research logistics, data synthesis, and revisions. He provided overall coordination and oversight to ensure the scientific integrity and timely completion of the work. SHO supported the initial phase of document identification and contributed to the visual design of Fig 1. SHO also reviewed the manuscript for basic formatting and layout structure. Both authors reviewed and approved the final version of the manuscript.

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