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The effectiveness of the Sierra Leone health sector's response to COVID-19: a quantitative analysis

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Abstract

Background The COVID-19 pandemic posed significant challenges to health systems globally, particularly in low-resource settings like Sierra Leone. Understanding the effectiveness of leadership, health workforce performance, community engagement, and service delivery during the pandemic is critical for strengthening future pandemic, preparedness and response.

Methods A cross-sectional study was conducted with 303 respondents, including stakeholders from the Ministry of Health, district health management teams, and community health workers. Data were collected using structured questionnaires and analyzed to assess perceptions of leadership, workforce performance, community participation, and disruptions to health services.

Results Leadership and governance were rated as "effective" or "very effective" by 58% of respondents, with key challenges including inadequate communication, delays in resource mobilization, and limited transparency. The health workforce demonstrated strong commitment (62%), but gaps in infection prevention and control training (48%) and shortages of personal protective equipment (39%) were significant barriers. Community engagement was moderately effective, with 54% rating it as "effective" or "very effective." However, low trust in the health sector and misinformation hindered compliance with preventive measures. Maternal and child health services were the most disrupted, but innovative approaches such as telemedicine and mobile health units were adopted to mitigate service interruptions.

Conclusion Sierra Leone's COVID-19 response highlighted both achievements and challenges. While leadership structures, workforce dedication, and community health worker contributions were notable strengths, gaps in communication, resource availability, and community trust limited the overall effectiveness of the response. Strengthening communication channels, investing in workforce training and resources, and enhancing community engagement strategies are critical for improving preparedness and response in future health emergencies.

Keywords COVID-19, Sierra Leone, Health systems, Leadership, Health workforce, Community engagement, Pandemic preparedness, Service delivery

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Introduction

The COVID-19 pandemic has tested the resilience of health systems globally, particularly in low-resource settings such as Sierra Leone, where health systems are already burdened by recurrent health shocks [1, 2]. Sierra Leone, a country with a history of managing health crises such as the Ebola outbreak (2014–2016) and cholera, faced significant challenges during the COVID-19 pandemic due to its fragile health system, which was already strained by the impacts of past outbreaks [3]. To address the crisis, the government implemented several proactive measures, including the declaration of a state of emergency, the establishment of the National Coronavirus Emergency Response Centre (NaCOVERC), and the reactivation of district-level response structures [4]. The government's response was complicated by economic challenges, and widespread distrust in public institutions, which hampered effective communication and community engagement. These factors created a complex environment where efforts to combat the pandemic were often met with scepticisms and logistical hurdles, highlighting the need for stronger governance and community trust in health initiatives [5, 6].

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, has highlighted the critical role of health system resilience in mitigating the impact of health shocks [7]. Health system resilience refers to the capacity of a health system to absorb, adapt, and transform in response to crises while maintaining essential functions [7]. For Sierra Leone, a country prone to health and environmental shocks, building a resilient health system is imperative to ensure continuity of care during crises and to strengthen preparedness for future emergencies [8–12].

Since the Ebola outbreak, Sierra Leone has made efforts to strengthen its health system, including investments in health infrastructure, improvements in disease surveillance systems, capacity building for healthcare workers, and the establishment of emergency preparedness and response mechanisms [13]. These efforts were tested during the COVID-19 pandemic, as the country sought to leverage lessons learned from the Ebola response to address gaps in governance, resource mobilization, and community engagement [1]. However, challenges such as inadequate coordination, weak human resource capacity, limited community ownership, and disruptions to service delivery persisted, affecting the overall effectiveness of the response [14–17].This study aims to examine perceptions of the effectiveness of the Sierra Leone health sector's response to COVID-19, focusing on four key health system building blocks: leadership and governance, the health workforce, community ownership and participation, and service delivery. These building blocks were selected because they represent the areas most directly involved in the operational response to the pandemic and are critical for ensuring an effective and coordinated health system response in emergencies. While the WHO framework includes six health system building blocks, the study focused on these four due to their immediate relevance to the challenges faced during the COVID-19 response in Sierra Leone, such as coordination, resource constraints, community engagement, and service delivery disruptions. By analyzing the perspectives of Ministry of Health and Sanitation (MOHS) employees and stakeholders involved in the COVID-19 response, this research seeks to identify strengths, weaknesses, and lessons learned to inform future health system strengthening efforts.

Methods

Study design and setting

This study employed a cross-sectional quantitative design to assess perceptions of the effectiveness of the Sierra Leone health sector's response to the COVID-19 pandemic. Data were collected through a structured survey administered to Ministry of Health and Sanitation (MOHS) employees and stakeholders involved in the COVID-19 response. The study was conducted at both national and district levels, covering all regions of Sierra Leone. The survey focused on four key health system building blocks: leadership and governance, the health workforce, community ownership and participation, and service delivery.

Study population and sampling

The study population consisted of individuals directly involved in the COVID-19 response. This included (i) MOHS employees working at government hospitals, peripheral health units (PHUs), and administrative offices, and (ii) stakeholders such as members of District Health Management Teams (DHMTs) and representatives of non-governmental organizations (NGOs) collaborating with the MOHS.

A purposive sampling strategy was employed to ensure representation across key groups involved in the response. This approach aimed to capture a diverse range of perspectives by selecting participants based on their roles, expertise, and geographic locations. Specific criteria were established to guide participant selection, including professional roles (e.g., healthcare providers, administrators, and policymakers), organizational affiliation (e.g., MOHS, DHMTs, NGOs), gender, age, and geographic distribution. To ensure geographic representativeness, staff from all 16 districts of Sierra Leone were included in the sample. Special attention was given to the Western Urban district, which had a higher proportion of respondents due to the presence of MOHS headquarters personnel based in Freetown. Participants were selected by a multidisciplinary team of researchers and public

health professionals with extensive experience in health systems research and emergency response in Sierra Leone.

The sample size of 303 was determined based on the need to include a sufficient number of respondents to reflect the diversity of the study population and ensure adequate representation of all stakeholder groups. This figure was arrived at through consultations with key informants and preliminary assessments of the number of individuals actively engaged in the COVID-19 response across the districts. Efforts were made to balance the inclusion of participants from urban and rural settings while also considering logistical feasibility and resource constraints. Recruitment was conducted systematically to ensure that all relevant groups were proportionally represented in the final sample.

By using this purposive sampling strategy, the study was able to achieve a comprehensive and balanced representation of individuals involved in the COVID-19 response across Sierra Leone.

Survey instrument

Data were collected using a structured questionnaire designed to capture quantitative data on respondents' perceptions of the effectiveness of the health sector's response to COVID-19. The survey instrument was developed based on the World Health Organization's (WHO) health system building blocks framework [18], ensuring coverage of key dimensions of health system performance. The questionnaire included Likert-scale questions [19] to measure perceptions of effectiveness and challenges across the four health system building blocks. Demographic information, including age, gender, educational background, and role in the COVID-19 response, was also collected. The survey instrument was pre-tested with a small group of respondents to ensure clarity, validity, and reliability. Based on feedback from the pre-test, minor adjustments were made to improve the wording and structure of some questions. Please see the supplementary file for the questionnaire.

Table 1 Respondent demographics

Variable	Level	Gender		Total
		Male	Female	
Age in years	21–34	50	21	71
	35–49	108	53	161
	50+	45	26	71
Total		**203**	**100**	**303**
Employment status	Permanent	142	85	227
	Temporary	30	3	33
	Non-MOHS	31	12	43
Total		**203**	**100**	**303**
Location	Freetown	69	24	93
	District/DHMT	134	76	210
Total		**203**	**100**	**303**
Duty station	Health facility	63	55	118
	Non-health facility	140	45	185
Total		**203**	**100**	**303**

Data collection

The survey was administered in October 2020 by trained enumerators using electronic data collection tools. Enumerators conducted face-to-face interviews with respondents while adhering to COVID-19 infection prevention and control (IPC) measures, including physical distancing and the use of personal protective equipment (PPE). The electronic data collection tools contributed to accuracy by incorporating features such as automated skip patterns, real-time data validation, and built-in consistency checks, which reduced the likelihood of errors during data entry. Additionally, the use of these tools minimized manual transcription errors by directly capturing responses into a digital format. Participation in the survey was voluntary, and respondents were assured of the confidentiality of their responses.

Data analysis

Quantitative data were analyzed using SAS version 9.4 (SAS Institute, Cary, NC, USA). Descriptive statistics were used to summarize respondent characteristics and key findings across the four-health system building blocks. Frequencies and percentages were calculated for categorical variables, while means and standard deviations were reported for continuous variables. Comparative analyses were conducted to identify differences in perceptions across respondent subgroups, such as gender, professional role, and geographic location. Chi-square tests were used for categorical variables, and t-tests were applied for continuous variables. Statistical significance was set at $p < 0.05$.

Results

Respondent demographics

The table shows that males consistently outnumber females across all demographic variables, with the largest age group being 35–49 years. Most respondents are in permanent employment, predominantly male, while temporary and non-MOHS positions have minimal female representation. Geographically, the majority of respondents are based in the districts (134 males and 76 females), while a smaller proportion is located in Freetown (69 males and 24 females). In terms of duty stations, health facilities exhibit a more balanced gender distribution (63 males and 55 females), whereas non-health facilities are predominantly male (140 males and 45 females) (Table 1).

Perceptions of leadership and governance

In terms of leadership and governance, 58% of respondents rated the effectiveness of leadership during the COVID-19 response as "effective" or "very effective," while 28% rated it as "somewhat effective," and 14% as "ineffective" or "very ineffective." Respondents acknowledged the establishment of the National Coronavirus Emergency Response Centre (NaCOVERC) [4], and district-level response structures as key strengths, which facilitated coordination and decision-making. However, several challenges were identified, including inadequate communication between national and district levels, delays in resource mobilization, and limited transparency in decision-making processes. These challenges were perceived to have hindered the overall effectiveness of leadership and governance during the pandemic (Table 2).

Health workforce performance

The health workforce was perceived to have demonstrated strong commitment and professionalism, with 62% of respondents agreeing or strongly agreeing with this assessment. However, concerns were raised regarding the adequacy of training and resources provided to frontline workers. Nearly half of the respondents (48%) indicated that health workers lacked sufficient training in infection prevention and control (IPC) measures, which was seen as a critical gap in preparedness. In addition, 39% of respondents reported shortages of personal protective equipment (PPE), which posed a significant barrier to the safe and effective performance of health workers. Furthermore, 27% of respondents noted that delays in salary payments and allowances negatively affected health worker motivation during the response (Table 3).

Community ownership and participation

Community ownership and participation were considered moderately effective in the context of the COVID-19 response. Approximately 54% of respondents rated community engagement efforts as "effective" or "very effective." Community health workers (CHWs) were recognized for their critical role in disseminating information and promoting preventive measures, with 68% of respondents acknowledging their contributions. However, challenges were noted, including low levels of trust in the health sector among some communities, which 31% of respondents attributed to misinformation and inadequate engagement with traditional leaders. Additionally, 22% of respondents reported inconsistent compliance with COVID-19 prevention measures, such as mask-wearing and social distancing, particularly in rural areas (Table 4).

Table 2 Perceptions of leadership

	Frequency (n)	Percentage (%)
Rating		
Very Effective (5)	62	20
Effective (4)	113	38
Somewhat Effective (3)	85	28
Ineffective (2)	32	11
Very Ineffective (1)	11	3
Key Challenges Identified		
Inadequate communication	127	42
Delays in resource mobilization	106	35
Limited transparency	64	21

Table 3 Health workforce performance

Aspect	Frequency (*n*)	Percentage (%)
Strong commitment and professionalism	188	62
Lacked sufficient IPC training	145	48
Shortages of PPE	118	39
Delays in salary payments and allowances	82	27

Table 4 Community ownership and participation

	Frequency (n)	Percentage (%)
Rating of Effectiveness		
Very Effective (5)	39	13
Effective (4)	125	41
Somewhat Effective (3)	91	30
Ineffective (2)	33	11
Very Ineffective (1)	15	5
Challenges Identified		
Low levels of trust in the health sector	94	31
Inconsistent compliance with prevention measures	67	22

Disruptions to health service delivery

The COVID-19 pandemic significantly disrupted routine health service delivery. When asked to rate the extent of service disruptions on a five-point Likert scale, 75% of respondents rated disruptions as "moderate" (46%) or "severe" (29%). Maternal and child health services were reported to be the most affected, with 51% of respondents indicating reduced access to these essential services. Despite these challenges, 41% of respondents noted the adoption of innovative approaches, such as telemedicine and mobile health units, to mitigate the impact of service disruptions and ensure continuity of care (Table 5).

Analysis by subgroups

Analysis revealed significant differences in perceptions across respondent subgroups. For leadership and governance, MOHS headquarters staff were more likely to rate

Table 5 Disruptions to health service delivery

	Frequency (n)	Percentage (%)
Extent of Disruption		
Severe	88	29
Moderate	139	46
Minimal	76	25
Most Affected Services		
Maternal and child health services	155	51
Other services	148	49
Innovative Approaches Adopted		
Telemedicine and mobile health units	124	41

Table 6 Analysis by subgroups

Subgroup Comparison	Group 1	Group 2	*p*-value
Leadership effectiveness (rated effective or very effective)	MOHS HQ Staff (65%)	DHMTs (52%)	0.03
Insufficient IPC training reported	PHU staff (56%)	MOHS HQ staff (34%)	0.02
Challenges in community compliance	Rural districts (38%)	Urban districts (19%)	0.04

leadership as "effective" or "very effective" (65%) compared to district health management teams (DHMTs), where only 52% shared this view ($p = 0.03$). Regarding training and resources, healthcare professionals at peripheral health units (PHUs) were more likely to report insufficient IPC training (56%) compared to administrative staff at MOHS headquarters, where only 34% raised this concern ($p = 0.02$). In terms of community engagement, respondents from rural districts were more likely to report challenges in community compliance with preventive measures (38%) compared to those from urban districts (19%, $p = 0.04$) (Table 6).

Discussion

The findings of this study provide critical insights into the performance of leadership, the health workforce, community engagement, and service delivery during Sierra Leone's COVID-19 response. While the results highlight several achievements, they also underscore persistent challenges that limited the effectiveness of the response. These findings are particularly relevant for informing future pandemic preparedness and response strategies in Sierra Leone and similar low-resource settings. The findings of this study align with those of Stone et al. (2024), which also examined Sierra Leone's health system response to COVID-19 [1]. Both studies highlight key achievements, such as the commitment of the health workforce, the role of leadership in mobilizing resources, and efforts to engage communities despite significant resource constraints. However, while the qualitative study emphasized the challenges of coordination between different levels of the health system and the strain on frontline workers [1], our study adds quantitative insights into the demographic distribution of the workforce and the disparities in gender, employment status, and duty stations, which may have influenced the effectiveness of the response. Additionally, our study provides a more structured analysis of service delivery gaps and workforce deployment, offering actionable data to guide future pandemic preparedness in low-resource settings. Together, these studies provide a comprehensive understanding of the successes and limitations of Sierra Leone's COVID-19 response, with our findings complementing the qualitative insights by providing a broader, data-driven perspective.

The majority of respondents (58%) rated leadership and governance as effective, reflecting the establishment of structures such as the National Coronavirus Emergency Response Centre (NaCOVERC) and district-level coordination mechanisms. This aligns with findings from the Afrobarometer Sierra Leone report, which highlighted citizens' high levels of satisfaction with the government's response during the Ebola outbreak. The positive perception of leadership during COVID-19 may reflect a continuation of the trust and confidence built during the Ebola response, underscoring the importance of strong governance structures in managing public health emergencies. These structures likely played a pivotal role in facilitating decision-making and resource allocation during the pandemic [8]. However, the challenges identified such as inadequate communication between national and district levels, delays in resource mobilization, and limited transparency mirror findings from prior studies on the Ebola outbreak in Sierra Leone, which emphasized the importance of clear communication and timely resource distribution in crisis management [20–22]. Addressing these gaps in future responses will require strengthening communication channels and enhancing accountability mechanisms to build trust and improve efficiency.

The health workforce demonstrated strong commitment and professionalism, with 62% of respondents agreeing or strongly agreeing with this assessment. This finding aligns with global observations of health workers' resilience during the pandemic [23–25]. However, the reported gaps in training and resources, particularly the lack of sufficient infection prevention and control (IPC) training and shortages of personal protective equipment (PPE), highlight critical vulnerabilities in the system. These challenges are consistent with previous research on health system weaknesses in low-income countries, where inadequate preparedness often compromises frontline workers' ability to respond effectively [7, 26]. Furthermore, delays in salary payments and allowances were reported to negatively impact health worker

motivation, emphasizing the need for timely financial support to sustain morale during health crises.

Community ownership and participation were perceived as moderately effective, with 54% of respondents rating engagement efforts as effective or very effective. The critical role of community health workers (CHWs) in disseminating information and promoting preventive measures was widely acknowledged, consistent with evidence from other public health campaigns in Sierra Leone [27, 28]. However, low levels of trust in the health sector among some communities, attributed to misinformation and inadequate engagement with traditional leaders, emerged as a significant barrier. Similar challenges have been documented in other health emergencies, where misinformation and mistrust undermined compliance with public health measures [29]. Strengthening community engagement strategies through partnerships with trusted local leaders and tailored communication campaigns could enhance trust and improve compliance with preventive measures in future outbreaks [30].

The COVID-19 pandemic significantly disrupted routine health services, with maternal and child health services being the most affected. These findings echo global reports of the pandemic's impact on essential health services, particularly in low-resource settings where health systems are already fragile [31–33]. Despite these disruptions, the adoption of innovative approaches such as telemedicine and mobile health units demonstrates the health system's adaptability. These innovations offer valuable lessons for maintaining service continuity during future crises. However, scaling up such approaches will require addressing barriers such as limited internet access and digital literacy in rural areas.

The subgroup analysis revealed notable differences in perceptions, which may reflect both the need for tailored interventions and legitimately different perspectives based on stakeholders' positions within the health system. For instance, MOHS headquarters staff were more likely to rate leadership as effective compared to district health management teams (DHMTs), which could partly reflect their proximity to decision-making and leadership structures, as well as a potential tendency to view leadership favorably as a reflection of their own work. Similarly, rural respondents were more likely to report challenges with community compliance, highlighting the unique barriers faced in these settings. Gender differences also emerged, with women who were more likely to be on the front line reporting greater challenges with the availability of infection prevention and control (IPC) measures. These findings underscore the importance of considering both context-specific strategies and the diverse perspectives of stakeholders, including gender and location-based distinctions, to address the varying needs and challenges within the health system.

Implications for policy and practice

The findings of this study have several implications for policy and practice. First, strengthening communication and coordination mechanisms between national and district levels should be prioritized to enhance the effectiveness of leadership during health emergencies. Second, investments in health workforce training and resources, particularly in IPC and PPE, are critical to ensuring frontline workers are adequately prepared for future crises. Third, community engagement strategies must be tailored to address trust deficits and misinformation, leveraging the influence of traditional leaders and CHWs. Finally, innovative approaches to service delivery, such as telemedicine, should be further developed and integrated into routine health systems to improve resilience in the face of future disruptions.

Strengths and limitations

This study provides valuable insights into the COVID-19 response in Sierra Leone, drawing on the perspectives of a diverse range of stakeholders. However, several limitations should be noted. The reliance on self-reported data introduces the potential for response bias, and the cross-sectional design limits the ability to assess changes over time. Additionally, the study focused on perceptions rather than objective measures of performance, which may not fully capture the complexities of the response. Future research could address these limitations by incorporating longitudinal designs and objective performance metrics.

Conclusion

The COVID-19 pandemic exposed both strengths and weaknesses in Sierra Leone's health system, offering critical lessons for future pandemic preparedness and response. While leadership structures, health workforce commitment, and community engagement efforts were notable achievements, challenges related to communication, resource mobilization, training, and trust highlight areas for improvement. By addressing these gaps and building on the innovations and successes observed during the pandemic, Sierra Leone can enhance its capacity to respond to future health emergencies and ensure the resilience of its health system.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-025-12477-3.

Supplementary Material 1.

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Authors' contributions
RMY conceptualise the study. AO developed the initial draft. AO, PSA, FAM, MK, AFK, RMY, KG, and SW critically reviewed the manuscript for its intellectual content. All authors read and amended drafts of the paper and approved the final version. AO had the final responsibility of submitting it for publication.

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Data availability
The data for this study is available upon request.

Declarations

Ethics approval and consent to participate
This study adhered to the ethical principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the Sierra Leone Ethics and Scientific Review Committee at the Ministry of Health and Sanitation in Sierra Leone. Informed consent was obtained from all participants before their involvement. Confidentiality was maintained throughout the study, and all data were anonymised. Participants were assured of their right to withdraw from the study without consequence. No incentives were offered to participants to encourage participation. The study did not involve any invasive procedures or treatments.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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