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Quality of COVID-19 Care in Sierra Leone: Development and Application of a Standardized National Assessment Tool

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Abstract

Enhancing the standard of medical care provided to patients is essential for bettering health outcomes and building public confidence amid outbreaks of infectious diseases. Although Quality Improvement (QI) approaches are widely recognized for advancing routine healthcare and strengthening health systems, documented applications during infectious disease emergencies remain limited. A modified Delphi technique was employed to develop a standardised evaluation instrument for assessing COVID-19 care quality in Sierra Leone. Four evaluation cycles were conducted from July 2020 to July 2021. Changes across these cycles relative to the initial baseline were analysed using a mixed-effects regression model, with reported coefficients and p-values.

In the Delphi procedure, 12 out of 14 experts agreed on the domains for inclusion in the instrument. The resulting tool comprised 50 items: 13 related to outcomes, 17 to processes, and 20 to inputs. Across four cycles, 94 evaluations were performed at 27 sites. Total scores rose by 8.75 ($p < 0.01$) in the second cycle, 10.67 ($p < 0.01$) in the third, and 2.17 ($p = 0.43$) in the fourth compared with baseline. Average overall scores at dedicated COVID-19 Treatment Centres consistently exceeded those at Hospital Isolation Units ($p < 0.02$) across all cycles. Notable progress occurred in domains covering coordination, diagnostics, staffing, infection prevention and control (IPC), nutrition, and support for vulnerable groups, whereas no significant gains were observed in oxygen supply, clinical processes, infrastructure, or medication domains. This study illustrates the practicality of designing a care quality evaluation tool and performing repeated national-level assessments during an active infectious disease outbreak. Substantial rises in quality-of-care metrics were observed in the second and third cycles relative to baseline, though these gains were not maintained. The adoption of QI methodologies alongside standardised assessment instruments is advised to elevate care standards in future outbreak responses.

Keywords: COVID-19, COVID-19 care, Sierra Leone, Quality improvement

Introduction

Raising the level of care delivered to patients during infectious disease outbreaks is critical for optimising clinical outcomes and fostering trust, as well as encouraging healthcare utilisation. Quality improvement (QI) refers to "the combined and continuous actions leading to measurable improvement in health care services and the health status of targeted patient groups" [1]. While QI is firmly embedded in efforts to enhance routine services and health systems, accounts of its application in public health crises are scarce [2], yet "there is no reason why QI principles and tools cannot be effectively utilised in urgent or crisis settings" [3]. In the 2014–2016 Ebola outbreak in West Africa, patient care quality was occasionally compromised [4], and treatment facilities were often substandard [5], probably contributing to higher mortality and prolonged transmission. Here, we outline the application of QI principles and the development of a standardised tool to

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evaluate and upgrade patient care and treatment settings during the COVID-19 pandemic in Sierra Leone.

The majority of published accounts of QI implementation during COVID-19 pertain to its conventional role in sustaining and refining core health services [6], predominantly from high-resource settings [7]. A recent scoping review identified 26 publications on QI in the COVID-19 context, with none originating from Africa and only seven addressing QI techniques for evaluating public health responses to COVID-19 [7]. Curtis and colleagues utilised U.S. Centers for Disease Control and Prevention guidelines to evaluate hospital-based COVID-19 surveillance in Victoria, Australia [8]. A qualitative study examined the Zika virus response in Florida, aligned findings with the WHO Health Systems Framework, and drew implications for COVID-19 management [9]. Additional research evaluated preparedness in multiple nations using the same WHO framework [10]. Another analysis employed annual International Health Regulations reporting data to gauge readiness in 182 countries [11]. Boyce *et al* detailed the development of a Rapid Urban Health Security Assessment Tool for appraising local government preparedness for COVID-19 [12]. No retrieved studies concentrated on facility- or patient-level care quality. Indeed, certain commentators note that care quality was initially deprioritised in the COVID-19 response and advocate its incorporation into emergency planning and execution [13].

In Sierra Leone, drawing lessons from the prior Ebola response [14], a National COVID-19 Emergency Response Centre (NaCOVERC) with a dedicated Case Management (CM) pillar was set up early in the pandemic. The CM Pillar bore primary responsibility for managing suspected and confirmed COVID-19 cases and issued its initial Case Management Strategy and Standard Operating Procedures in April 2020 [15]. These documents were revised periodically in light of emerging evidence [16]. A QI working group was formed under the case management pillar in May 2020, charged with elevating care quality for individuals with suspected or confirmed COVID-19. This paper details the deployment of QI to advance COVID-19 care quality in Sierra Leone, including the design of a standardised assessment instrument for COVID-19 care quality and the findings from successive nationwide evaluations.

Materials and Methods

Study setting: COVID-19 situation in sierra leone

The first laboratory-confirmed COVID-19 infection in Sierra Leone was identified on 30 March 2020. Case counts escalated rapidly, reaching their highest levels in June 2020, after which a sustained downward trend was observed [17]. By 31 October 2021, Sierra Leone had recorded 6,398 confirmed COVID-19 cases and 121 associated deaths. Over the same period, 249,534 COVID-19 reverse transcription polymerase chain reaction (RT-PCR) tests were administered nationwide, corresponding to an overall test positivity rate of 2.56%. The epidemic evolved through three distinct transmission waves: the initial wave occurred between epidemiological weeks 15–46 of 2020, comprising 2,369 cases; the second wave spanned from week 47 of 2020 to week 16 of 2021 and included 1,665 cases; and the third wave was documented between weeks 17–43 of 2021, accounting for 2,364 cases **(Figure 1)** [18].

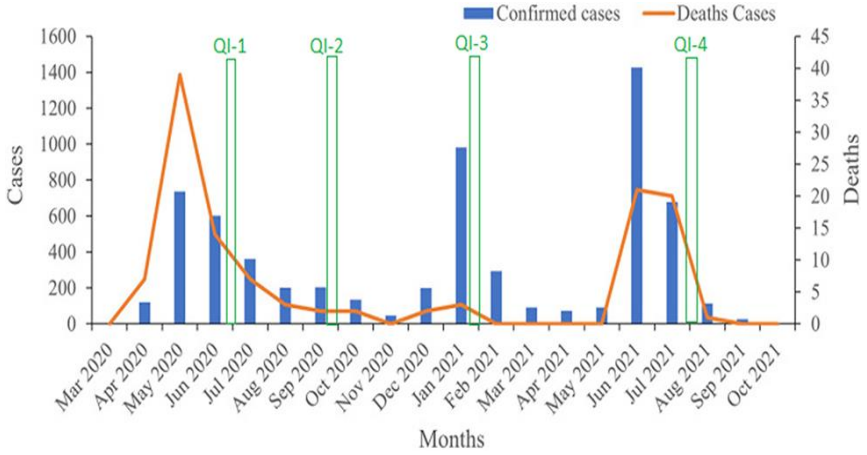

Figure 1. Temporal distribution of COVID-19 cases and deaths in Sierra Leone, with four periods of quality-of-care assessments highlighted in green, adapted from Liu *et al*. [18].

Clinical oversight for individuals with suspected or confirmed COVID-19 was coordinated by the Case Management (CM) pillar. To ensure adequate treatment capacity and mitigate disease transmission, existing health system infrastructure was adapted to establish COVID-19 treatment centres (CTCs), COVID-19 community care centres (CCCs), and hospital isolation units (HIUs). These facilities were designated to manage patients with severe or critical illness, individuals with asymptomatic or mild infection, and those with suspected COVID-19, respectively. A detailed description of the national case management strategy has been published previously [17].

This study reports the application of quality improvement (QI) approaches to evaluate and strengthen patient care during the COVID-19 response in Sierra Leone. The work was implemented in three sequential stages: (1) development of a standardized quality-of-care assessment instrument, (2) nationwide assessment of care quality across COVID-19 facilities, and (3) quantitative analysis of the collected assessment data.

Phase one: design of the quality-of-care assessment instrument

To develop a uniform tool for evaluating quality of care at CTCs, CCCs, and HIUs, the QI technical working group employed a modified Delphi methodology. The working group consisted of 14 members drawn from both governmental and non-governmental institutions, representing diverse professional backgrounds. Eligibility for participation required demonstrated expertise in COVID-19 clinical management or facility leadership, prior involvement in outbreak response activities, or experience in quality improvement initiatives.

Before initiating the Delphi rounds, the QI working group established explicit design criteria for the assessment instrument. These included: a standardized checklist-based format; incorporation of mixed-methods data collection with triangulation [19]; acceptable inter-rater reliability; feasibility for completion within 2–4 hours; inclusion of “tracer items” [20] or “signal functions” [21]; applicability at the health facility level; and production of dashboard-style outputs that could be easily interpreted by healthcare workers and policymakers. Conceptual guidance for tool development was provided by the Donabedian framework, which categorizes healthcare quality indicators into outcomes, processes, and structures (inputs) [22].

To inform tool content, a scoping review of existing quality assessment instruments and operational guidance related to COVID-19 care was conducted [16, 23–26]. The number of Delphi rounds was intentionally left undefined, allowing the process to continue until agreement was reached. Consensus was defined a priori as endorsement by more than 80% of participating members. Feedback collected during each round consisted of quantitative scoring and prioritization of items, complemented by qualitative input shared during meetings and via email. Given the urgent context of the pandemic response, responses were not anonymized.

An initial consultative workshop was convened to orient participants to the aims of the exercise and the predefined criteria for the assessment tool. Participants were then asked to identify domains they considered fundamental to high-quality COVID-19 care. During the first Delphi round, proposed domains were ranked according to importance, and the ten highest-ranked domains were retained. This stage involved multiple iterations, with overlapping or closely related domains merged. Results were redistributed until consensus was achieved.

In the second Delphi round, participants received a Microsoft Excel file listing the ten agreed domains alongside example indicators. Participants were invited to propose additional indicators for each domain and to recommend the most practical and accurate method for obtaining the required information. This process generated an expanded pool of candidate indicators, which was consolidated by the QI working group and circulated to all participants. Members were then asked to select and rank their top five indicators per domain. Each indicator was classified as an outcome, process, or structure/input measure in accordance with the Donabedian framework [22]. Finally, the QI working group organized the proposed data collection methods into three categories: direct on-site observation by assessors [27], retrospective review of patient records or clinical documentation, and structured interviews with health facility personnel.

Phase two: evaluation of quality

Four national cycles of evaluation were carried out from July 2020 to July 2021. The first cycle occurred between 16/07/20 and 20/07/20, the second from 24/09/20 to 28/09/20, the third from 19/01/2021 to 25/01/2021, and the fourth from 14/07/2021 to 22/07/2021 **(Figure 1)**. Evaluations were performed by a group of clinical and public health experts who received training on the instrument and applied it under supervision until they demonstrated competence. These evaluators acted as independent observers without any direct responsibility for or involvement in the care quality at the evaluated sites. Most of them had contributed to the Delphi process that developed the quality evaluation instrument. COVID-19 treatment centres and district medical teams were notified beforehand, and consent was obtained. Four evaluation teams were assigned to cover the following areas: Western Urban and Rural districts, as well as the Southern, Eastern, and Northern provinces. Information was gathered through direct observation (including access to patient zones), review of historical patient records or clinical notes, and discussions with facility personnel. Data were recorded on paper forms and subsequently transferred into a Microsoft Excel database.

To quickly evaluate inter-rater reliability, the instrument was tested at one CTC and one HIU on successive days using different evaluators. Results were consolidated centrally by the Quality Improvement working group and displayed via a dashboard. Upon completion of each evaluation, an oral summary of findings was immediately provided to the facility manager, accompanied by a prioritised list of recommended improvements. Aggregated findings were disseminated through virtual meetings to the evaluated facility, district case management coordinators, regional case management leads, Emergency Operations Centre pillar leaders, and appropriate donors and partners. National-level findings were compiled and shared both in-person and virtually with the Ministry of Health, NaCOVERC, and stakeholders using dashboards.

Phase three: statistical evaluation

Data were transferred to STATA version 17 for processing. Facilities with only a single evaluation were excluded, as changes over time could not be measured; this applied to all CCCs. Aggregate scores were reported by domain along with average overall cumulative scores. Changes in domain scores across time points and differences between CTCs and HIUs were examined using mean score differences and paired t-tests. To address the clustered longitudinal nature of the data at the facility level, multilevel mixed-effects linear regression models were constructed, adjusting for within-facility correlation. Results from mixed-effects models evaluating change from baseline are presented as the constant (baseline value), coefficients (change relative to baseline), and p-values (for significance) for rounds 2, 3, and 4. A sensitivity analysis limited to facilities assessed in the initial round was performed. Missing item-level data were reviewed, and median imputation was applied, given the minimal missingness. Median rather than mean imputation was chosen because response options were restricted to integers.

Ethical considerations

This constituted operational research conducted by the NaCOVERC Case Management Pillar amid the COVID-19 pandemic. No patient-identifiable information or data were gathered or disclosed.

Results and Discussion

In the initial Delphi round to select domains for the evaluation instrument, 12 out of 14 participants responded. The selected domains comprised: coordination; infrastructure; staffing; infection prevention and control; patient care processes; diagnostics and COVID-19 testing; drugs and consumables; oxygen; nutrition; vulnerable populations and safeguarding. The second round, which focused on prioritising items within the ten domains, received responses from 11 out of 14 participants. The resulting 50 items consisted of 13 outcome items, 17 process items, and 20 structure/input items [22]. The completed instrument covered ten domains, with five items per domain, each scored 0–2, yielding a possible total of 100. The Delphi process began on 22/06/20, and the instrument was completed on 06/07/20.

Pilot testing to examine inter-rater reliability produced cumulative scores of 74 versus 72 for the CTC and 66 versus 63 for the HIU. The average duration to administer the instrument was 2 hours and 51 minutes (range: 02:10–03:35).

Quality findings

A total of 94 evaluations across four cycles were analysed: round 1 (n = 19) from 16/07/20 to 20/07/20;

round 2 (n = 25) from 24/09/20 to 28/09/20; round 3 (n = 25) from 19/01/2021 to 25/01/2021; and round 4 (n = 25) from 14/07/2021 to 22/07/2021. These covered 27 facilities, including 10 CTCs and 17 HIUs. Missing item data were minimal at 0.49% (23/4700), and median imputation was applied.

Average domain scores for each cycle across all 27 facilities are displayed in **Table 1**. The overall mean total score rose significantly by 9.3 between round one and round two (P<0.01), increased non-significantly by 1.4 from round two to round three (p<0.64), and then declined significantly by 7.9 from round three to round four (p<0.03). The highest average scores were observed in infrastructure at 8.3 (SD:2.1) and infection prevention and control at 8.3 (SD:1.9), while the lowest was in drugs at 6.2 (SD:2.9).

Table 1. Average scores by domain and evaluation cycle for all facilities; paired t-tests compare each cycle to the preceding one.

Assessment Round	Coordination	Diagnostics	Drugs	Staffing	Infrastructure	Infection Prevention and Control (IPC)	Nutrition	Oxygen Supply	Clinical Care Processes	Care for Vulnerable Populations	Overall Mean Score	P value
Round 1 (N = 19)	7.8 (1.3)	5.3 (1.9)	5.7 (2.2)	6.8 (1.2)	8.5 (1.8)	7.2 (2.5)	5.6 (2.2)	6.6 (2.6)	7.8 (2.1)	6.1 (1.6)	67.5 (12.3)	-
Round 2 (N = 25)	8.8 (1.5)	7.0 (2.5)	6.0 (2.5)	7.4 (1.0)	8.7 (1.7)	8.7 (1.5)	8.1 (1.6)	7.5 (2.3)	7.3 (2.0)	7.3 (1.9)	76.8 (10.9)	0.01
Round 3 (N = 25)	8.4 (1.5)	6.9 (1.4)	6.6 (2.5)	7.6 (1.0)	8.9 (1.8)	8.4 (2.0)	7.3 (2.5)	7.8 (2.3)	8.9 (1.1)	7.4 (2.0)	78.2 (9.4)	0.64
Round 4 (N = 25)	7.4 (1.7)	6.5 (2.0)	6.2 (3.9)	7.2 (1.5)	7.1 (2.5)	8.8 (1.4)	7.0 (2.9)	6.4 (2.3)	8.2 (2.1)	5.6 (2.8)	70.3 (14.3)	0.03
Overall Mean (All Rounds)	8.1 (1.6)	6.5 (2.1)	6.2 (2.9)	7.3 (1.2)	8.3 (2.1)	8.3 (1.9)	7.1 (2.5)	7.1 (2.4)	8.1 (1.9)	6.6 (2.3)	73.6 (12.5)	-

Table 2. Mixed-effects model comparing quality-of-care scores in assessment rounds 2, 3, and 4 against the baseline score across all facilities.

QI Assessment Round	Coordination	Diagnostics	Drugs	Staffing	Infrastructure	IPC	Nutrition	Oxygen	Care Processes	Vulnerable Population	Overall Mean Total
Round 1 Constant N = 19	7.80	5.25	5.68	6.84	8.50	7.30	5.70	6.75	7.80	6.05	67.77
Round 2 Coefficient (p value) n = 25	0.92 (0.04)	1.73 (<0.01)	0.27 (0.34)	0.60 (0.09)	0.20 (0.72)	1.43 (<0.01)	2.37 (<0.01)	0.69 (0.23)	-0.47 (0.40)	1.23 (0.03)	8.75 (<0.01)

Round 3											
Coefficient (p value) n = 25	0.52 (0.25)	1.68 (<0.01)	1.01 (0.19)	0.76 (0.03)	0.40 (0.47)	1.12 (0.02)	1.58 (<0.01)	1.14 (0.05)	1.09 (0.05)	1.41 (0.01)	10.67 (<0.01)
Round 4											
Coefficient (p value) n = 25	-0.49 (0.29)	1.26 (0.02)	0.51 (0.51)	0.32 (0.38)	-1.40 (0.01)	1.45 (<0.01)	1.25 (0.03)	-0.37 (0.53)	0.37 (0.51)	-0.48 (0.40)	2.17 (0.43)

This research outlines the development of a uniform evaluation instrument for assessing the quality of care provided to COVID-19 patients and presents the findings from repeated national-level evaluations. The results illustrate that evaluating care quality amid public health crises is practical and can be conducted promptly. The entire process—from starting the design of the instrument to disseminating country-wide outcomes—required under one month. A trade-off evidently exists between the duration needed for tool development and the urgency to determine an initial benchmark while initiating enhancements in patient management. For subsequent outbreaks, having pre-designed instruments ready and promoting broader sharing of methodologies for tool creation could substantially shorten the period required to obtain a baseline measure of care quality during infectious disease emergencies. The minimal occurrence of incomplete item responses indicates that the combined qualitative and quantitative approaches employed for data collection are viable at individual health facilities. Implementing digital assessment tools via tablets or mobile applications could additionally minimise absent data, limit errors in data transfer, and shorten the time needed for entry. The evaluation framework employed in this study secured comprehensive national reach, with every COVID-19 treatment centre (CTC) and holding/isolation unit (HIU) in Sierra Leone undergoing assessment on at least two occasions.

Existing publications and instruments related to COVID-19 predominantly emphasise readiness over actual care quality [10, 25, 28, 29]. In Sierra Leone, the Pan American Health Organization's Hospital Readiness Checklist for COVID-19 [25] was modified, and researchers conducted a one-time survey across 9 hospitals. That work highlighted major deficiencies in "COVID-19 leadership, coordination, health information, rapid identification, diagnosis, isolation and clinical procedures" [29]. Ogoina *et al*. applied an adjusted WHO readiness instrument [25], comprising 13 domains and 124 indicators, in Nigeria. Only 20 of the 68 CTCs provided responses to the single self-evaluation [30], and just 3 (15%) facilities indicated sufficient preparedness. A comparable self-evaluation in Gondar, Ethiopia, utilising the WHO checklist, revealed that merely 1 of 8 evaluated hospitals met adequate readiness criteria [31]. In Malawi, an established instrument—the Malawi Emergency and Critical Care Survey, created via Nominal Group Technique [32]—was quickly adapted to examine initial readiness in 13 hospitals. That investigation involved interviews with 101 clinicians, cross-verifying answers from various sources to mitigate bias, and identified shortages in oxygen supply, personal protective equipment, and isolation facilities [33].

The present work advances beyond readiness evaluation by conducting successive assessments of care quality. Quality metrics rose markedly from the first to the third cycle, illustrating that quality improvement strategies can elevate standards during an infectious disease crisis. The intervention followed guidelines for quality measurement outlined by the High Quality Health Systems Commission [34]: Emphasis was placed on accountability and follow-through. The Quality working group involved critical responsible parties, such as the facility head, district medical officer, regional COVID-19 case management coordinators, and the national case management pillar. Findings were shared with these key figures, and prioritised recommendations from each evaluation were divided into facility-specific, district-specific, and national-specific tasks, with clear assignments.

The evaluation framework was structured to deliver rapid insights to policymakers, with consolidated results presented at national and district levels within one week of completion. Data were shown through dashboards featuring colour-coded indicators and total scores, facilitating the detection of deficiencies and the acknowledgement of effective practices.

Insights from prior outbreaks [35] and initial pandemic phases indicated that delivering superior care demanded

diverse inputs and procedures. This prompted a comprehensive approach to quality, incorporating staff, space, systems, and supplies [36] essential for excellent outcomes. Such a perspective is especially pertinent in Sierra Leone's health system, where a limited clinical emphasis was deemed inadequate for attaining high-quality care amid a decentralised structure [37] and a limited healthcare workforce [38].

A mixed-effects model examining quality scores relative to baseline is displayed in **Table 2**. Improvements of 8.75 ($p < 0.01$) from baseline occurred in round 2, 10.67 ($p < 0.01$) in round 3 relative to baseline, and 2.17 ($p = 0.43$) in round 4 relative to baseline. Significant gains in round two were observed in the domains of coordination, diagnostics, IPC, nutrition, and vulnerable populations. In round three, notable advances from baseline appeared in diagnostics, staffing, IPC, nutrition, and vulnerable populations. By round four compared to baseline, meaningful progress was noted in diagnostics, IPC, and nutrition, whereas a notable decline emerged in infrastructure.

The decline in quality metrics from the third to the fourth cycle could stem from a reduced allocation of resources to COVID-19 CTCs within the health system [39], linked to lower inpatient numbers and fewer reported COVID-19 deaths in that interval [18]. This shift might represent an appropriate redirection of scarce resources toward core health services [40]; nevertheless, by the last evaluation, overall care quality showed no significant advancement over baseline levels, and the drop in the infrastructure domain raises concerns for future readiness. The deterioration in infrastructure likely arose from multiple factors: limited funding for facility upkeep; reversion of sites to their prior routine service roles as admissions fell; and redirection of funds toward vaccination programmes rather than direct patient treatment.

Average quality ratings remained markedly higher for CTCs compared to HIUs across every assessment point. Drawing from the authors' combined expertise, resources, and focus during outbreak responses tends to concentrate on confirmed cases and dedicated treatment centres, often at the expense of suspected cases and HIUs [35], leaving the latter relatively under-resourced. HIUs manage individuals with possible infection, who present with diverse comorbidities necessitating wider diagnostic, therapeutic, and pharmaceutical options. In Freetown, prolonged delays in test results led to more COVID-19 fatalities occurring in HIUs than in CTCs [41]. Although HIUs recorded lower average ratings throughout, the drop in overall scores during the fourth cycle lacked statistical significance for these units, indicating potential sustained enhancements in hospital-based HIUs across Sierra Leone. This holds particular importance since HIUs typically form the enduring clinical infrastructure, whereas CTCs are often temporarily established and later dismantled as the epidemic subsides. Unlike the Ebola response approach, a key policy in Sierra Leone prohibited NGOs from creating independent treatment units, instead requiring them to assist government efforts in integrating HIUs and CTCs into existing public facilities.

The domains covering drugs and patient care processes proved difficult to enhance, with item-level review revealing specific persistent shortcomings. Although NaCOVERC procured and supplied COVID-19-specific medicines, these generally excluded treatments for frequent comorbidities assessed in the tool, such as hypertension and diabetes. Supplies may not have consistently reached frontline facilities, aligning with ongoing reports of medication shortages [41]. Care processes exhibited minimal progress, particularly in areas like risk assessment and severity-guided triage, which maintained low ratings. Oxygen-related scores improved only modestly, reflecting inconsistent availability of high-flow systems beyond Freetown and suboptimal prescribing practices. Throughout the outbreak, oxygen supply in Sierra Leone remained critically constrained; while NaCOVERC distributed cylinders from a private vendor, these fell short of needs, and expansion of in-hospital oxygen production capacity [42] did not commence until 2022.

This research has both strengths and limitations. The initial evaluation occurred in June 2020, several months following the country's first confirmed COVID-19 case. Consequently, it lacks a true pre-pandemic baseline and misses early system adaptations, including preliminary infrastructure upgrades. The methodology relied on expert consensus, thus constrained by the selected participants. Although Delphi contributors represented varied clinical and non-clinical expertise, involving more specialists or patients could have enriched the process. Given time constraints, responses were not anonymised, potentially influencing contributions. Additionally, thorough testing of inter-rater reliability was limited to two sites due to deployment urgency. Lastly, the design did not examine links between quality ratings and clinical outcomes, which represent the ultimate objective.

Strengths include a robust, framework-based approach to tool development [22], employing triangulated data sources: direct observation, staff interviews, and record reviews. The effort achieved a comprehensive national scope, evaluating every CTC and HIU at least twice, with longitudinal data spanning one year. Future efforts should prioritise extensive piloting of instruments and, where possible, incorporate patient perspectives in Delphi rounds.

From this work, we strongly support routine standardised quality-of-care evaluations and application of improvement techniques in public health crises. Instruments should follow rigorous design protocols, offer clear instructions on implementation and adaptation. Preparedness evaluations need greater emphasis on care quality to support repeated measurements, anchored in explicit change theories or improvement frameworks. Standardised quality monitoring enables consensus on benchmarks; promotes consistent, respectful delivery; upholds patient rights; safeguards staff; facilitates benchmarking across settings or periods [43, 44]; pinpoints urgent gaps; and guides targeted actions and funding [45]. Ultimately, routine quality assessment in emergencies could foster learning health systems [46], promote dissemination of effective approaches, and bolster worldwide health resilience.

Conclusion

The findings illustrate that a care quality evaluation instrument can be swiftly developed via an adapted Delphi method, and that improvement strategies can elevate standards amid a health crisis. We urge integration of standardised quality evaluations and improvement approaches into responses to future emergencies.

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