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Exploring the Contextual Factors Influencing the Implementation and Effectiveness of Community Health Worker–Led Malaria Community Case Management in Kailahun District, Sierra Leone

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Abstract

Background. *CHW-led malaria community case management (CCMm) extends services to rural, hard-to-reach communities in Kailahun District, Sierra Leone, where the malaria burden is heaviest; yet the same standardised intervention produces different outcomes across chiefdoms. This paper asks how contextual conditions enable or block the mechanisms through which CHWs produce outcomes.* ***Methods.*** *A qualitative realist evaluation using the Context–Mechanism–Outcome framework drew on six key informant interviews, three CHW contextual interviews and six focus group discussions (58 caregivers), analysed thematically with realist-informed coding and text-network analysis.* ***Results.*** *Contextual influences spanned nine domains: geographic, health-system, socio-cultural, gender, economic, governance, programmatic, historical and market. Traditional authority engagement and geographic accessibility were decisive across every tier, and the same conditions acted as facilitators when present and barriers when absent.* ***Conclusion.*** *Context is constitutive, not background; policy should stabilise a small set of conditions above all supply continuity and traditional authority engagement that determine whether its mechanisms fire.*

Keywords: Community health workers; Malaria community case management; Realist evaluation; Contextual factors; Context–Mechanism–Outcome; Kailahun; Sierra Leone.

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INTRODUCTION

Malaria remains a major cause of morbidity and mortality in sub-Saharan Africa, and Sierra Leone bears one of the highest burdens in the region. Within Sierra Leone, Kailahun District in the Eastern Province carries the heaviest concentration of disease. District prevalence stands at approximately 45%; malaria parasitaemia among children aged 6–59 months reaches 47.8%, rising to 64.7% in the 5–9 year age group. Only about 50.4% of the population has access to long-lasting insecticide-treated nets, and only 44.9% of pregnant women receive three or more doses of intermittent preventive treatment. The district population of 550,433 is served by an estimated 256 trained health personnel across 87 Peripheral Health Units (PHUs) and two government hospitals, a ratio that places facility-based malaria care beyond the practical reach of many rural communities, particularly during the rainy season when terrain and seasonal inaccessibility compound structural shortages (MoHS, 2021; Statistics Sierra Leone & ICF, 2022; WHO, 2022).

In response to these structural barriers, the Sierra Leone National Community Health Worker Programme deploys formally recognised, trained lay health workers to deliver malaria CCMm at village level. The CHW package, codified in national policy and harmonised with World Health Organization guidance, comprises rapid diagnostic testing (RDT), administration of artemisinin-based combination therapy (ACT) for confirmed uncomplicated cases, recognition of danger signs, referral of severe cases to PHUs, day-three household follow-up and routine community education. The programme is anchored in a dual-track governance arrangement operating through both the formal health system and local government authority (WHO, 2018).

Despite a standardised technical design, the effectiveness of CHW-led CCMm is heterogeneous across chiefdoms within the same district. The same trained CHW, dispensing the same protocol, can produce strikingly different malaria outcomes depending on the chiefdom in which they operate. This heterogeneity poses a problem that effectiveness-only evaluation cannot resolve. Conventional implementation research frequently treats context as a background variable to be statistically adjusted for, or as a list of barriers and facilitators to be enumerated. Such approaches obscure the more important analytical question: how do contextual conditions interact with intervention components to enable or block the mechanisms through which CHWs produce outcomes (Pawson & Tilley, 1997; Phillips et al., 2018; Mazzi et al., 2019)?

The objective of this paper is to identify, describe and theorise these contextual factors at a depth sufficient to support refinement of programme theory and to inform policy attention in comparable resource-constrained, malaria-endemic settings in sub-Saharan Africa. It reports the contextual-factors component of a larger doctoral study; companion papers report community, frontline and stakeholder perceptions of the CHW role and its challenges, and the community-led actions that arise in response.

METHODS

Study Design

A qualitative realist evaluation was employed to move beyond asking whether an intervention is effective to asking how, why, for whom and under what circumstances outcomes are produced. The analytical building block is the Context–Mechanism–Outcome (CMO) configuration: a hypothesis specifying the contextual conditions under which a given mechanism fires to produce an outcome, and the conditions under which it is suppressed or attenuated (Pawson & Tilley, 1997; Pawson, 2013). Within the broader doctoral study, four research questions were operationalised; this paper reports findings against the second contextual factor influencing implementation and effectiveness. The CMO logic of the broader study is preserved so that contextual factors are read not as a standalone list but as the conditions under which intervention mechanisms fire or fail. The pre-analytic initial programme theory, derived from national CHW policy, malaria control guidelines and published evidence, posited that when CHWs are properly trained, formally deployed, consistently incentivised and reliably supplied, their physical and cultural proximity to households activates trust, accelerates fever recognition, supports ACT adherence and improves utilisation of community-level services. This theory was tested and progressively refined against the evidence reported below.

Study Setting

Kailahun District, Eastern Sierra Leone, borders the Republic of Guinea to the north and the Republic of Liberia to the east. Communities are culturally connected across these borders and exhibit considerable population mobility, with implications for cross-border disease transmission and health-seeking behaviour. The district contains 15 chiefdoms varying in malaria endemicity and physical accessibility; selection into the study sampling frame was stratified along these two axes.

Sampling

The sample size for this qualitative evaluation study was determined by information power, diversity of perspectives and anticipated data saturation rather than statistical representativeness. Sampling proceeded in two stages. In stage one, all 15 chiefdoms in Kailahun District were classified using two stratification variables: malaria endemicity and physical accessibility. District routine malaria information and consultation with the District Health Management Team were used to distinguish relatively high- and lower-endemic chiefdoms, while road access, travel time to a PHU and seasonal inaccessibility were used to distinguish accessible and hard-to-reach chiefdoms. Four chiefdoms were then purposively selected to provide maximum variation across the resulting endemicity-accessibility combinations. In stage two, one PHU catchment was selected within each of the four chiefdoms. Six communities were subsequently selected across those catchments to capture configurational diversity in remoteness, riverine or border location, programme performance, commodity continuity, traditional-authority engagement and post-conflict experience. Participant selection within the chosen sites was purposive and role based, as described below. This process yielded four chiefdoms, four PHU catchments and six study communities.

Six key informants were purposively selected to represent the principal tiers of the malaria CCM system: the District CHW Coordinator (district/DHMT level), a PHU in-charge (primary health unit), a chiefdom CHW supervisor (chiefdom level), a low-performing frontline CHW deliberately included as a negative case, a Paramount Chief (traditional authority), and an NGO malaria programme officer (implementing partner). This selection ensured representation of policy, supervisory, frontline, traditional-authority, and implementing-partner perspectives. Six Focus Group Discussions (FGDs) were conducted, one in each study community, yielding 58 community participants, including caregivers, pregnant women, and adult males and females. These discussions were designed to capture shared experiences, health-seeking behaviours, and perceptions of malaria service delivery at the community level. In addition, three community health workers (CHWs) were purposively selected for in-depth interviews, conducted in deliberately varied settings (remote riverine, semi-urban peripheral, and deep interior) to enable within-role contextual comparison. Together, these three tools yielded an overall sample of 67 participants, which is consistent with qualitative research standards and sufficient to achieve thematic saturation, triangulation of data sources, and robust comparative analysis across varying contexts of accessibility and malaria endemicity.

Table 1: Integrated planned sample across study levels and participant categories

Study level/tier	Data-collection tool	Participant category	Planned n
District / DHMT	KII (Tool 1)	District CHW Coordinator	1
Primary Health Unit	KII (Tool 1)	PHU In-Charge	1
Chiefdom	KII (Tool 1)	Chiefdom CHW Supervisor	1
Frontline CHW	KII (Tool 1)	Low-performing CHW (negative case)	1
Traditional authority	KII (Tool 1)	Paramount Chief	1
Implementing partner	KII (Tool 1)	NGO Malaria Programme Officer	1
Frontline CHW	Contextual interview (Tool 2)	CHWs in deliberately varied settings	3
Community	FGD (Tool 3)	Caregivers, pregnant women, adult males and females (6 groups)	58
Total			**67**

Note. Sampling frame: four chiefdoms, four PHU catchments and six study communities selected through two-stage stratified sampling on malaria endemicity and physical accessibility.

Data Collection Tools

Tool 1 — stakeholder key informant interviews

Tool 1 was administered to six respondents spanning the principal implementation tiers of the programme (Table 2). A common structured guide of twenty questions enabled systematic cross-tier comparison, and a low-performing CHW was deliberately included as a negative case to surface mechanism failure modes.

Table 2: Tool 1 — Stakeholder key informant respondents

ID	Role	Tier	Analytical significance
R1	District CHW Coordinator (15 years)	District / DHMT	System architect; full programme view
R2	PHU In-Charge, rural MCHP (9 years)	Primary Health Unit	Operational supervisor; PHU–CHW interface
R3	Chiefdom CHW Supervisor (32 CHWs, 7 years)	Chiefdom	PHU–community bridge
R4	Low-performing CHW, riverine settlement	Frontline CHW	Negative case; mechanism failure modes
R5	Paramount Chief (18 years)	Traditional authority	Governance and legitimacy lens
R6	NGO Malaria Programme Officer (12 years)	Implementing partner	Programme theory and systems lens

Tool 2 — CHW contextual interviews

Tool 2 was administered to three CHWs whose operating contexts were deliberately varied to enable within-role contextual comparison (Table 3). The guide of twenty questions was organised around a barriers cluster (Q1–Q10), an enablers cluster (Q11–Q18) and a synthesis cluster (Q19–Q20).

Table 3: Tool 2 — CHW contextual interview respondents

ID	Setting	Distinctive contextual features
T2-R1	Remote riverine settlement	Canoe access in the rainy season; flooding; supervision absent 2–3 months annually
T2-R2	Semi-urban peripheral village	25–40 minutes from PHU on a passable road; mixed compliance; PHU-bypass observed

ID	Setting	Distinctive contextual features
T2-R3	Deep interior village	Two hours on foot; strong chief endorsement; occasional commodity instability

Tool 3 — Focus group discussions

Tool 3 comprised six focus group discussions with caregivers drawn from configurationally distinct community settings, designed not merely to corroborate but to extend the analysis (Table 4). The site selection was deliberate: FGD-3 represented the success configuration; FGD-4 represented supply failure with weak governance; FGD-6 represented compounded contextual stress with a historical dimension of post-conflict mistrust; and FGD-5 introduced contexts—mobility, informal sector, cross-border health-seeking—that supply-side data had not surfaced. Tool 3 served the critical function of demand-side caregiver corroboration and was the site at which several of the most consequential refinements to the programme theory originated.

Table 4: Tool 3 — Focus group discussion sites

FGD	Setting	n	Distinctive contextual features
FGD-1	Remote riverine village	9	Hard-to-reach; flooding; irregular supervision
FGD-2	Semi-urban peripheral village	10	30 min from PHU; motorbike access; moderate supervision
FGD-3	Interior chiefdom (high-performing)	10	Strong chief involvement; stable supply; community savings group for transport
FGD-4	Low-performing chiefdom	9	Frequent stock-outs; weak chief engagement; unreliable transport; high poverty
FGD-5	Border / migrant-dense community	10	High mobility; cross-border health-seeking; informal drug sellers active
FGD-6	Extremely remote, conflict-affected	10	3–4 hours to PHU; no rainy-season road; conflict legacy of mistrust; no network

Inclusion and Exclusion Criteria

CHWs were eligible if formally enrolled in the National CHW Programme, actively engaged in malaria CCMm for at least six months in their catchment, and willing to consent. Caregivers and community members were eligible if aged 18 or older, resident for at least six months, and having engaged a CHW for malaria services in the preceding six months. Health facility staff were eligible if assigned to Kailahun PHUs with at least six months' service and involved in

supervision, referral or clinical handling of CHW-referred cases. District- and programme-level stakeholders were eligible if they held decision-making, supervisory or implementation roles in CHW or malaria CCMm activities, with at least one year of engagement in the district. Newly recruited or inactive CHWs, transient residents, individuals with administrative-only roles unrelated to CCMm, and those unwilling to consent were excluded.

Research Instruments and Data Collection

All instruments were drafted in English and translated into Mende and Krio, and pretested in non-study communities to confirm validity, reliability, and feasibility. The key informant guide collected stakeholder perspectives on intervention components and implementation strategies; the semi-structured CHW guide explored contextual barriers and facilitators organised by the barriers, enablers, and synthesis clusters; and the FGD guide used open questions and probes to surface observable outcomes- timely diagnosis, treatment adherence, referral practices and community knowledge- while allowing discussion to flow into related contextual dimensions of care-seeking and household decision-making. All interviews and discussions were audio-recorded with consent, translated into English during transcription where conducted in local languages, and checked against the recordings. Transcripts were anonymised with unique identifiers; a master log tracked participant type, location and date; field notes and observation memos were appended to transcripts; and digital files were stored in password-protected folders with encrypted backups.

Data Analysis

Data were analysed thematically with realist-informed coding structured around the study objectives and the CMO framework, supported by text-network analysis (InfraNodus) to surface recurring co-occurring concepts for realist interpretation. The strategy operated at two complementary levels of grain. At the finer level, twelve demi-regularities stable but non-invariant patterns, in Pawson's (2013) terms were identified, each articulated through the Mechanism–Resource (MR) and Mechanism–Reasoning (MRe) distinction of Dalkin et al. (2015): the MR component captures what the intervention provides as a resource, and the MRe component captures how participants reason in response. An outcome is produced when the resource meets favourable reasoning conditions and is blocked or attenuated when they are unfavourable; each pattern was paired with its suppressor variant, drawn from negative-case evidence. At the coarser level, six macro CMO configurations were advanced, each capturing a chiefdom-level operational state in which particular bundles of demi-regularities fired or failed together. Triangulation was achieved across three vantages: cross-stakeholder triangulation at system level (Tool 1), cross-context triangulation within the frontline CHW role (Tool 2) and demand-side caregiver corroboration across configurationally distinct settings (Tool 3).

Ethical Considerations

Ethical approval was secured before fieldwork. Written informed consent or witnessed thumbprint consent for participants with limited literacy was obtained from every participant, with separate consent for audio recording. Participants were informed of their right to withdraw at any stage without consequence. Confidentiality was protected through anonymised identifiers, secure storage and destruction of audio recordings after transcription. Vulnerable

participants received additional safeguards, including simplified consent and extended explanation. No monetary inducement was provided; reasonable transport reimbursement was offered in line with ethical guidelines.

RESULTS

Participant Profile and Evidence Base

The working analysis comprises six stakeholder key informant interviews (Table 2), three CHW contextual interviews (Table 3) and six focus group discussions involving approximately fifty-eight caregiver participants (Table 4). Verbatim quotations are identified throughout by tool and respondent code: T1-R5 denotes Tool 1 Respondent 5; T2-R3 denotes Tool 2 Respondent 3; and FGD-3 (Mother 4) denotes a participant in focus group discussion site 3. Contextual factors influencing the implementation and effectiveness of CHW-led malaria CCMm in Kailahun emerged across nine domains. Six were anticipated from the literature and surfaced in supply-side data: geographic, health-system, socio-cultural, gender and household decision-making, economic, and political/governance. Three further dimensions emerged from caregiver evidence and were not visible in Tools 1 and 2: informal-sector competition, the historical legacy of state neglect in post-conflict settings, and cross-border health-seeking. The findings are presented in turn.

Geographic Factors

Geographic accessibility operated through three established channels—distance from the PHU, terrain and seasonality—and a fourth that emerged from caregiver evidence: time of day. The three Tool 2 settings illustrate how the same broad category manifested in analytically distinct ways (Table 5).

Table 5: Geographic context across study settings

Geographic factor	Riverine (T2-R1, FGD-1)	Semi-urban (T2-R2, FGD-2)	Interior (T2-R3, FGD-3, FGD-6)
Distance to PHU	1 hour plus canoe	25–40 minutes by road	2–4 hours on foot
Rainy-season impact	Areas unreachable; supervision halts 1–3 weeks	Costs rise; rarely fully cut off	Footpaths impassable; night referrals nearly impossible
Network coverage	Weak	Available	Variable; absent in FGD-6
Caregiver-side	Wait until morning if	Some bypass CHW	Heavy reliance; child mortality from night-

Geographic factor	Riverine (T2-R1, FGD-1)	Semi-urban (T2-R2, FGD-2)	Interior (T2-R3, FGD-3, FGD-6)
dynamic	night fever	for PHU directly	referral failure

In the most extreme configuration (FGD-6), a fourth dimension came into focus: fever onset at night intersected with the unavailability of night transport and the absence of male decision-makers from the household, multiplying pre-existing barriers. The narrative from FGD-6 (Mother 4) is among the most analytically valuable in the dataset:

"Last rainy season, a child developed convulsions at night. The CHW referred immediately. But there was no transport. The father tried to carry the child at dawn. The child reached PHU late and required admission. If transport existed at night, the outcome might have been better."

[FGD-6]

Geography here is not a passive distance metric but an active configuration interacting with the temporal pattern of fever onset and the gendered structure of household decision-making.

Health-System Factors

Three health-system factors were consistently named across tiers: supply-chain reliability, supervision regularity and PHU capacity. Of these, supply-chain reliability emerged from caregiver evidence as the single most consequential factor for the operation of trust. In FGD-4, stock-outs produced immediate behavioural withdrawal:

"When we go with a sick child and are told there is no test, it feels like false hope."

[FGD-4]

Bypass behaviour followed:

"Families begin to bypass the CHW entirely. They only go if the child is already very sick."

[FGD-4]

Supervision delivery showed significant slippage between intended and actual frequency. Nominally structured as monthly PHU visits, chiefdom-supervisor coordination and quarterly DHMT visits, supervision in practice lapsed for two to three months during peak rains (T2-R1) and was delivered only twice annually where quarterly was intended (T2-R3); the supervisory schedule thus became itself a contextual condition varying with geography. PHU capacity constrained the referral end of the pathway: severe-case referrals were universally issued, but completion was the bottleneck, conditioned by transport and by perceptions of PHU staffing and stockholding. In the high-performing FGD-3 site, this constraint was partially absorbed by a community-level adaptation: a savings group funding emergency referral transport:

"If an emergency referral is needed, the fund is used to pay the motorbike rider."

[FGD-3]

Concentrated in chiefdoms with strong traditional governance, this adaptation indicates that a health-system constraint can, in some configurations, be partially compensated by a community-level institutional response.

Socio-Cultural Factors

Three socio-cultural sub-domains emerged. The first was beliefs about disease causation. Attributions of fever to teething, spiritual imbalance and related non-biomedical aetiologies were widely reported; crucially, FGD-3 participants and T2-R3 noted that such beliefs are not static but dynamic, with spiritual interpretations re-emerging under treatment failure. Cultural belief was thus not a stable background variable but a framework whose hold changed with the credibility of biomedical alternatives at the point of care. The second sub-domain was traditional medicine as a competing pathway operating both as a first-line preference and as a fallback under stock-outs, as FGD-1 participants described. The third, in-migrant integration, emerged from FGD-5 and revealed a temporal dimension of trust that supply-side accounts had not surfaced:

"For short stays, we may not fully integrate into the CHW system. If you are not settled, you do not build the same relationship with the CHW."

[FGD-5]

Because trust accumulates through repeated interaction over time, short-stay residents are systematically excluded from the embeddedness mechanism even where CHW services are formally available; a sensitisation-at-deployment model does not capture this and is structurally insufficient for mobile communities. FGD-5 further surfaced informal-sector competition from drug sellers constituting a competing pathway with distinct attractions:

"Drug sellers give medicine immediately without questions. With the CHW, there is testing and explanation. Some people prefer speed."

[FGD-5]

The informal sector competed on speed; the RDT-first protocol, the very feature delivering diagnostic legitimacy in remote settings, functioned in this market-adjacent comparison as friction that alternative providers did not impose.

Gender and Household Decision-Making

Gender emerged in Tool 2 and was confirmed and refined in Tool 3, operating with asymmetric force along the care-seeking pathway. At the initial testing step, the free-service feature had reduced the need for male financial permission, and women acted with greater autonomy in bringing a febrile child for testing. At the referral step, however, transport cost reintroduced male gatekeeping. The combined testimony from FGD-6 crystallises the asymmetry:

"In my case, yes, I decide alone, because I am alone. But in married households, fathers decide about transport money. Financial decisions remain male-dominated. If money is insufficient, referral is debated."

[FGD-6]

The gender mechanism therefore migrated along the pathway: at the testing step structural cost barriers had been removed; at the referral step they were re-encountered. The result was a gendered referral-completion gap invisible in testing-uptake data and systematically missed by evaluations observing only the service-utilisation segment.

Economic Factors

Economic factors surfaced through three channels: caregiver transport cost, food security and CHW incentive adequacy. Transport cost was the principal barrier to referral completion and the channel through which the gender mechanism re-asserted itself (Section 3.5). Food security operated through an unexpected channel: the requirement that ACT be taken with food:

"Completion depends on food availability. In the lean season, meals are reduced to once daily. Some mothers delay doses until food is available; others stop when the child improves. Knowledge alone does not override hunger."

[FGD-6]

A related, economically rational behaviour was reported in FGD-4:

"Some families keep leftover tablets for future illness."

[FGD-4]

Tablet-saving is rational under scarcity but epidemiologically consequential, producing sub-therapeutic dosing and supporting later self-medication. Both accounts establish that, in resource-constrained settings, the knowledge–behaviour gap is structural rather than cognitive: caregivers articulated biomedical understanding at high levels but could not translate it into behaviour because the binding constraint was economic. Incentive adequacy emerged in Tool 2 and in the low-performing case (R4): where payments were irregular or inadequate, CHW motivation suffered, and a fragility pattern was visible: performance held under favourable conditions but declined when other contextual conditions deteriorated.

Political and Governance Context

Two governance contexts were prominent. The first, traditional authority engagement, was the factor most consistently named across tiers as differentiating high-performing chiefdoms. R5 distinguished general chief support from "united leadership": internal cohesion among traditional authorities producing consistent endorsement of biomedical norms in community fora. Public endorsement by the chief was described as performatively constitutive of the CHW's legitimacy:

"When we endorse a CHW publicly, it signals that the person carries chiefdom authority. That endorsement prevents resistance and strengthens compliance."

— Paramount Chief [T1-R5]

The second context, intra-community political division, drew on R4's low-performing case: where CHW selection produced a contested rather than consensual outcome, the trust mechanism fired only partially, and the fault line persisted into the CHW's operation. Selection conflict was thus not a transient procedural problem but a structural condition conditioning mechanism activation throughout the CHW's tenure.

Emergent Contextual Factors from Caregiver Evidence

Two further factors emerged exclusively from caregiver evidence and warrant separate treatment, because they reveal contextual dimensions that supply-side accounts cannot generate.

Historical legacy of state neglect in post-conflict communities

In FGD-6, the extremely remote, conflict-affected site, supply instability operated not as a neutral logistical problem but as a re-traumatising signal of state withdrawal:

"Trust here is fragile because of history. During the war, we were abandoned. When health programmes are inconsistent, it reawakens that memory of neglect. It is not just about medicine; it is about feeling included or excluded."

— [FGD-6]

The trust mechanism's reliance on supply stability therefore has different intensities in different historical contexts: in post-conflict settings the threshold at which trust collapses is lower, and the meaning of the collapse is deeper. A monthly stock-out tolerated as an inconvenience in a stable chiefdom can be experienced in a post-conflict chiefdom as confirmation of historical abandonment, making supply continuity a trauma-informed imperative rather than a logistical target.

Informal-sector competition and cross-border health-seeking

Border-dense and market-adjacent communities surfaced a factor that remote-rural communities do not encounter: competitive pluralism in the care landscape. Alongside informal drug sellers (Section 3.4), FGD-5 documented cross-border health-seeking:

"Some families prefer crossing the border because they believe services are faster there."

[FGD-5]

In such communities, the CHW competes not only with the PHU but with informal sellers offering frictionless treatment and with foreign facilities of perceived superior speed or quality. The proximity mechanism, an absolute advantage in remote-rural settings where the CHW has near-monopoly biomedical access, operates here as a comparative judgement weighted by cost, speed and perceived quality. Programme strategies developed in remote-rural settings should not be assumed to transfer to mixed-economy settings, where the CHW's competitive position is structurally different.

Summary of Contextual Factors and Operational Patterns

Table 6 summarises the contextual factors identified, the operational pattern in which each appeared, and the principal evidence sources. The summary preserves the distinction between factors that operated symmetrically (as facilitator and as barrier) and those that operated asymmetrically along specific segments of the care pathway.

Table 6: Contextual factors, operational patterns and evidence sources

Domain	Contextual factor	Operational pattern	Principal evidence
Geographic	Distance, terrain, seasonality, time-of-day	Multiplicative; night onset compounds distance and gender	T2-R1; T2-R3; FGD-1; FGD-6
Health system	Supply-chain reliability	Decisive for trust; stock-outs erode credibility	T1-R6; T2-R1; FGD-3; FGD-4; FGD-6
Health system	Supervision regularity	Slippage between intended and delivered frequency	T1-R1; T2-R1; T2-R3
Health system	PHU capacity (referral end)	Conditions referral completion; absorbable by community adaptation	T1-R2; FGD-3; FGD-6
Socio-cultural	Disease-causation beliefs	Dynamic; re-emerge under biomedical failure	FGD-3; T2-R3
Socio-cultural	Traditional medicine pathway	First-line and fallback under stock-outs	FGD-1; FGD-4
Socio-cultural	In-migrant integration	Temporal accumulation; short stays excluded from trust	FGD-5
Socio-cultural	Informal-sector competition	Competes on speed; RDT becomes friction	FGD-5
Gender	Household decision-making	Asymmetric: free at testing, re-blocked at referral	T2 (all); FGD-6
Economic	Transport cost	Principal barrier to referral completion	T2 (all); FGD-1; FGD-4; FGD-6
Economic	Food security	Adherence constrained by lean-	FGD-6

Domain	Contextual factor	Operational pattern	Principal evidence
	(ACT-with-food)	season meal frequency	
Economic	Tablet-saving behaviour	Rational poverty response; epidemiologically harmful	FGD-4
Economic	CHW incentive adequacy	Motivation–performance fragility under irregular pay	T1-R4; T2 (all)
Governance	Traditional authority engagement	Differentiates high-performing chiefdoms; "united leadership"	T1-R5; T1-R6; FGD-3
Governance	Intra-community political division	Selection conflict suppresses the trust mechanism	T1-R4
Historical	Legacy of state neglect	Supply failure re-traumatises; trust threshold lowered	FGD-6
Cross-border	Cross-border health-seeking	Refines proximity mechanism to a relative concept	FGD-5

DISCUSSION

The contextual analysis generated nine domains of factors influencing the implementation and effectiveness of CHW-led malaria CCMm in Kailahun. Six implications are developed in turn, each carrying consequences for programme theory, for evaluation design and for the policy attention warranted by particular contextual conditions.

The Barrier–Facilitator Distinction is Misleading

The single most consequential observation about context is that the factors named as differentiating high-performing chiefdoms are precisely the inverse of the implementation gaps named everywhere else. Traditional authority engagement, road accessibility, supply stability, supervision regularity and community cooperation appeared as facilitators when present and as barriers when absent. They are not two different sets of factors; they are one set observed in two states. The implication for the standard barriers-and-facilitators framing is substantive. Programmes commonly enumerate facilitators to amplify and barriers to address, treating them as distinct lists with separate action implications. The data suggest this misallocates the analytical task: the policy task is not to add facilitators and remove barriers but to stabilise a small set of contextual conditions whose presence or absence determines performance. This shifts policy attention from action items ("strengthen community engagement") to system properties ("maintain supply continuity at month-end"), and makes

performance diagnosis a question of which contextual conditions are unstable rather than which facilitators are missing.

Two Factors Converge across All Stakeholder Tiers as Decisive

Two factors converged across every stakeholder tier and across the high-performing focus group as the differentiators of high-performing chiefdoms: traditional authority engagement and geographic accessibility. The convergence is unusually strong across district coordinators, paramount chiefs, frontline CHWs and caregivers, despite their different professional incentives, observational vantages and vocabularies. When all name the same two factors as decisive, the convergence is more likely to reflect a structural feature of the system than an artefact of any single viewpoint. Of the two, traditional authority engagement is the higher-leverage policy variable: it is both decisive in stakeholder convergence and more tractable than geographic accessibility, which is largely fixed in the short term. Programmes that treat traditional authority as a matter of community engagement rather than of governance systematically misallocate resources.

Cultural Beliefs about Disease Causation are Dynamic, not Static

The observation by FGD-3 participants and T2-R3 that spiritual or traditional interpretations of fever re-emerge under treatment failure carries a consequential implication. Cultural acceptance of biomedicine is not a one-off achievement secured by initial sensitisation; it is a state that must be sustained by visible biomedical efficacy. When the biomedical alternative fails to deliver through stock-outs, supervision absence, or referral failure, the cultural framework it displaced reasserts itself. Programme theories that treat sensitisation as a discrete activity completed at deployment will systematically misjudge the durability of behaviour change.

What looks like a pre-existing cultural barrier in poorly performing chiefdoms may in some cases be a recent cultural reversion produced by sustained biomedical underperformance: communities described as “resistant to biomedicine” may be communities in which biomedical credibility has been depleted by repeated supply or service failures. Restoration of biomedical performance, on this reading, is not a precondition for sensitisation but its substance.

Gender Operates Differently along the Care Pathway

Free CHW services have unblocked the testing step from male financial gatekeeping; mothers no longer require male financial permission to bring a febrile child for testing. But transport cost re-blocks male gatekeeping at the referral step, producing a gendered referral-completion gap that is invisible in testing-uptake data. The gender mechanism is structurally embedded in the cost structure of the care pathway and migrates to whichever step remains cost-bearing for the household. The implication for evaluation is that gender-impact assessments based on testing-uptake metrics will overstate gender progress, observing the segment where the barrier has been removed and missing the segment where it has been reintroduced. The implication for design is more substantive: programmes addressing only the testing step, for example by scaling community-level diagnostic provision, will not close the referral gap. Gender analysis in CHW programming requires pathway-level rather than service-level attention.

Poverty Operates as a Structural Rather than Cognitive Constraint

Two caregiver formulations anchor this point: "understanding is different from ability" (FGD-4 Grandmother) and "knowledge alone does not override hunger" (FGD-6 Mother 1). Both crystallise a finding recurring across sites: caregivers in poor communities articulate biomedical understanding at high levels but cannot translate it into behaviour because the binding constraint is economic rather than cognitive. This challenges a foundational assumption of much community-health programming, which treats knowledge as the principal modifiable variable. In resource-constrained settings, knowledge is not the binding constraint, and educational interventions yield diminishing returns once a lower threshold of understanding is reached. What changes behaviour is the removal of the economic barrier: transport subsidies, community savings groups, food-security support during ACT administration. The knowledge–behaviour gap in poor communities is most often an economic gap wearing the costume of an information gap, and programmes that respond with more health education will not close it.

Two Factors are Visible only from Caregiver Evidence

Two factors—the historical legacy of state neglect in post-conflict communities, and informal-sector and cross-border competition in border and market-adjacent communities—emerged exclusively from caregiver evidence. In post-conflict communities, supply failure operates with elevated meaning-load: the threshold at which trust collapses is lower, and the meaning of the collapse deeper, so supply continuity becomes a trust-maintenance imperative warranting trauma-informed tolerances. In market-adjacent and border communities, the CHW competes with informal drug sellers offering frictionless treatment and with foreign facilities of perceived superior quality, so the RDT-first protocol functions as friction and the proximity mechanism is more contested than in remote-rural settings.

The methodological implication is significant: both refinements emerged from caregiver evidence that supply-side accounts could not have generated. Evaluations relying on stakeholder informants alone will systematically miss the historical and market-structural dimensions caregivers identify as decisive. Demand-side data is not optional in this tradition but methodologically irreducible—trust, by definition a property of the demand-side actor's reasoning, cannot be evaluated from supply-side accounts, and asking CHWs whether they are trusted yields weaker evidence than asking caregivers whether they trust the CHW.

CONCLUSION

This paper examined the contextual factors influencing the implementation and effectiveness of CHW-led malaria community case management in Kailahun District, Sierra Leone. Drawing on realist evaluation logic and a triangulated qualitative evidence base spanning stakeholder, frontline-CHW and caregiver perspectives, it identified contextual factors operating across nine domains: geographic accessibility, health-system reliability, socio-cultural framings of disease, gender and household decision-making, economic constraint, political and governance arrangements, programmatic stability, the historical legacy of state neglect in post-conflict communities, and competitive pluralism in border and market-adjacent settings.

Three substantive conclusions follow. First, context is not the background of CHW-led CCMm but its constitutive condition: the same intervention produces different outcomes across chiefdoms depending on whether commodity supply is stable, supervision is regular, traditional authority is engaged, in-migrant integration is sustained, and households possess the economic capacity to act on clinical advice. Effectiveness is conditional, and conditional in ways that can be specified with analytic precision rather than left as residual variation. Second, the conventional barrier–facilitator binary misallocates the analytical task; policy attention should shift from adding facilitators and removing barriers toward stabilising the small set of contextual conditions whose presence determines whether the intervention's mechanisms can fire. Third, traditional authority engagement emerges as the highest-leverage policy variable: it is decisive in stakeholder convergence and more tractable than geographic accessibility. Programmes that treat it as community engagement rather than as governance systematically misallocate resources.

Three methodological conclusions follow as well. First, realist evaluation generates findings that variable-level evaluation cannot: the dynamic character of cultural beliefs, the asymmetric operation of gender along the care pathway, and the configurational character of effectiveness would have been hidden in conventional implementation-science framings. Second, demand-side caregiver evidence is methodologically irreducible; two of the most consequential factors identified emerged exclusively from caregiver focus groups. Third, the findings are advanced as a working analysis on a subset of the planned sample, and refinement against the wider evidence base is anticipated.

For policy, the findings suggest that programme attention in Kailahun and comparable settings should focus on (i) stabilising supply continuity, with elevated tolerances in post-conflict chiefdoms; (ii) supporting and formalising community-level adaptations such as savings groups for emergency referral transport; (iii) repositioning traditional authority engagement from an implementation activity to a governance condition; (iv) addressing gender constraints at the referral step rather than the testing step alone; (v) recognising poverty as a structural rather than informational constraint and responding with economic rather than educational interventions; and (vi) adapting programme strategies in border and market-adjacent communities to the competitive landscape in which the CHW operates. The wider implication for sub-Saharan African malaria programming is that effectiveness in resource-constrained, malaria-endemic settings is delivered not by intervention design alone but by the contextual conditions that make a standardised design operative.

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