

District-Level Supervision and Stakeholder Recommendations for Strengthening Routine Health Information System Data Quality in Osun State, Nigeria: A Qualitative Study

Sunday Akingbola Omokanye

asomokanye@oauife.edu.ng

Obafemi Awolowo University

Olayinka Isiaka Baruwa

Obafemi Awolowo University

Olutunde Samuel Michael

Kwara State University

Research Article

Keywords: Routine Health Information System, district supervision, data quality, stakeholder recommendations, qualitative research, key informant interviews, primary health care, Nigeria

Posted Date: October 10th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10910716/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Background

District-level supervision is widely assumed to be a critical safeguard for Routine Health Information System (RHIS) data quality, yet the specific mechanics of how supervision, feedback, and correction actually operate, and what health workers and supervisors themselves believe would most improve the system, are rarely documented in detail. This study explored district-level support and supervision practices and stakeholder-generated recommendations for RHIS strengthening in Osun State, Nigeria, including at the primary health centres that form the frontline of the system examined.

Methods

A qualitative descriptive design was used, comprising 35 key informant interviews: 22 with facility-level health workers and 13 with district-level monitoring and evaluation officers and supervisory staff. Interviews were analysed thematically, with facility- and district-level accounts of supervision practice and recommendations triangulated to assess convergence and divergence.

Results

District-level support operates as a four-stage supervision cycle — facility data compilation, district validation visit, feedback, and correction — functioning well where it occurs (supervisory visits reported by 18/22 facility and 11/13 district respondents; on-the-spot correction by 16/22 and 11/13 respectively) but vulnerable to a shared logistical constraint: irregular supervision due to transport, fuel, or staffing shortages, reported independently by both facility (6/22) and district (5/13) respondents. Recommendations converged strongly across levels on training and capacity building as the top priority (68.2% facility; 65.4% district, aggregated across subthemes) and diverged most on incentives and accountability, the category facility respondents themselves ranked lowest as a stated priority (29.6%) despite the companion analysis of this dataset identifying it as the most consistently reported systemic gap.

Conclusion

District-level supervision in Osun State functions as a coherent, generally effective cycle when it occurs as intended, but its reliability is constrained by logistical resourcing shared across both levels of the system, not by any deficit in either level's commitment to the process. Stakeholders' own improvement priorities are weighted toward training and supervision, areas where they can see and experience direct benefit, over incentive structures, whose absence is more consequential than either group's stated

priorities suggest, indicating a gap between what stakeholders identify as most needed and what the evidence suggests would be most impactful.

Background

Supervision is one of the central mechanisms through which health systems attempt to safeguard the quality of the routine data they depend upon, and Nigeria's Routine Health Information System (RHIS), structured around monthly facility-to-Local Government Area (LGA) reporting cycles feeding into the District Health Information Software 2 (DHIS2) platform, formally assigns this safeguarding function to district-level Monitoring and Evaluation (M&E) teams [1]. This safeguarding function operates most directly at the primary care level: officers-in-charge of primary health centres are both the principal generators of the routine data examined here and the principal recipients of the district-level supervision this study investigates, making the organisation, delivery, and quality of RHIS supervision a primary-care health-services and informatics question in its own right, not only a system-level one. Quantitative RHIS research has established that supervision intensity is statistically associated with data quality outcomes [2], but the specific mechanics of how supervision actually functions — what a supervisory visit consists of, how feedback is delivered and received, what happens when an error is identified — are documented in far less procedural detail than the outcome association itself.

A related, and similarly under-documented, question concerns what the people who operate the RHIS day to day, both facility staff and their district-level supervisors, themselves believe would most improve it. Stakeholder-generated recommendations carry particular value because they reflect first-hand operational knowledge of where the system's friction points actually lie, but they also reflect what is most visible or most immediately felt by each respondent group, which may not always align with what independent evidence suggests would be most consequential. Comparing stakeholder priorities directly against the pattern of gaps identified through the broader qualitative and quantitative analysis of the same system offers a way to test this alignment explicitly.

This study addresses both questions through key informant interviews with facility-level health workers, including primary health centre officers-in-charge, and district-level supervisory staff in Osun State, Nigeria, examining: (i) how district-level support and supervision for RHIS data quality actually operates in practice, including the supervision cycle, feedback mechanisms, and issue-resolution practices; and (ii) the recommendations facility- and district-level stakeholders themselves put forward for strengthening the system, and how these compare with the pattern of gaps identified elsewhere in this research programme.

This second aim reflects a deliberate methodological choice within the broader research programme this study is part of. Stakeholder recommendations are frequently collected in health-services research as a closing exercise, a way of giving participants the final word and generating a list of practical suggestions to append to a study's conclusions, but they are less often placed in direct, systematic dialogue with a study's own analytic findings about where the system's actual weaknesses lie. Where this comparison is

made, it can reveal whether stakeholder priorities and evidenced gaps are aligned, in which case stakeholder consultation offers a trustworthy, efficient guide to intervention design, or whether they diverge, in which case relying on stakeholder-stated priorities alone risks directing resources toward the problems stakeholders find easiest to name rather than the problems that most affect the outcome the intervention is meant to improve. This study undertakes that comparison directly, using the pattern of findings from the companion analyses conducted within the same research programme as the evidentiary benchmark against which stakeholder recommendations are assessed.

Materials and Methods

Study design

A qualitative descriptive design was used, drawing on key informant interviews (KIIs) to explore participants' first-hand accounts of district-level supervision practice and their own recommendations for RHIS strengthening. Reporting follows the Consolidated Criteria for Reporting Qualitative Research (COREQ) framework [6] where applicable.

Setting and participants

The study was conducted in Osun State, south-western Nigeria, across primary, secondary, and tertiary healthcare facilities and their supervising Local Government Areas (LGAs), spanning urban, semi-urban, and rural contexts including Ife Central, Ife North, Ife East, Ife South, Ede North, Ede South, and Egbedore. A total of 35 key informants were purposively sampled: 22 facility-level health workers (officers-in-charge, health records officers, ART coordinators, and facility M&E officers) and 13 district-level respondents (LGA M&E officers, Disease Surveillance and Notification Officers, and RHIS focal persons), with years of experience ranging from 3 to over 20 years across both groups.

Data collection

Semi-structured key informant interviews used a guide developed by the study authors specifically for this study (Additional File 1), and organised around the forms of support received or provided by district/LGA teams, the presence and content of feedback following report submission, the frequency and consistency of supervision or validation visits, how identified data quality issues are addressed, and, separately, participants' own recommendations for improving facility-level data quality and the support they believed was needed from district, state, or other stakeholders.

Data analysis

Interview data were analysed thematically within each of the two focus areas (district-level support and supervision; recommendations), with transcripts coded inductively to identify recurring subthemes,

which were grouped into broader themes. Subtheme frequencies (respondents whose account reflected a given subtheme, out of the total respondents at that level) were tabulated to indicate relative prevalence within this purposive sample. Facility-level (n = 22) and district-level (n = 13) accounts were analysed separately and then triangulated, and, for the recommendations analysis specifically, compared against the pattern of gaps identified in the companion analyses of RHIS tools/data quality and technological/organisational/behavioural determinants conducted within the same research programme. Illustrative verbatim quotations are presented with de-identified facility codes (e.g., F07) to preserve anonymity.

Trustworthiness

Credibility was supported through triangulation of facility- and district-level accounts of the same underlying supervision processes, and through comparison of stakeholder recommendations against the independently derived pattern of findings from the companion analyses in this research programme. Confirmability was supported by grounding all themes in tabulated frequency counts and retained verbatim quotations. Transferability is supported by the detailed description of setting and participant characteristics provided below.

Ethical considerations

The study protocol was reviewed and approved by the Rivers State University Research and Ethics Committee and the Research and Ethics Committee of the Osun State Ministry of Health [approval/reference numbers to be inserted by authors]. Written informed consent was obtained from all participants prior to interview, participation was voluntary, and all interview data were de-identified and stored securely.

Results

Findings are organised into three sections: respondent characteristics, district-level support and supervision, and stakeholder recommendations for RHIS strengthening. Within the latter two, facility-level and district-level findings are reported and then triangulated.

Respondent characteristics

Table 1 summarises the roles, geographic distribution, and experience profile of the 35 key informants. At the facility level, respondents included officers-in-charge of primary health centres, health records/information officers, ART coordinators, and facility M&E officers, drawn from primary, secondary, and tertiary facilities. At the district level, respondents comprised LGA monitoring and evaluation officers, Disease Surveillance and Notification Officers, and RHIS focal persons. Both groups spanned

urban, semi-urban, and rural Local Government Areas, and years of service ranged from 3 to over 20 years at both levels.

Table 1
Characteristics of key informants (N = 35)

Characteristic	Facility-level (n = 22)	District-level (n = 13)
Roles represented	Officers-in-charge (PHCs), health records/information officers, ART coordinators, facility M&E officers	LGA M&E officers, Disease Surveillance and Notification Officers (DSNOs), RHIS focal persons
Facility/administrative levels	Primary, secondary, and tertiary healthcare facilities	Local Government Area (LGA) health offices
Local Government Areas represented	Ife Central, Ife North, Ife East, Ife South, Ede North	Ife Central, Ife North, Ife East, Ife South, Ede North, Ede South, Egbedore
Geographic context	Urban and semi-urban facilities	Urban, semi-urban, and rural LGAs
Years of experience	3 to over 20 years	Range including over a decade of M&E/RHIS experience to 2–3 years newly posted

District-level support and supervision

Five themes described how district-level support and supervision function from the facility perspective: the forms of district support received, feedback mechanisms, the topics feedback addresses, the frequency of supervision, and how identified issues are addressed. Figure 1 presents subtheme frequencies across all five themes.

Theme 1: District support for facility-level data quality

Validation and supervisory visits from LGA teams were the most widely reported form of district support (18/22, 81.8%), followed by provision of data tools, registers, and reporting templates (13/22, 59.1%) and technical clarification of indicator definitions or reporting procedures (11/22, 50.0%).

"They come to check the data and tell us what to correct, and they give us forms when we run out." - F12

Theme 2: Feedback from the district

Fourteen of 22 respondents (63.6%) reported receiving verbal or written feedback from district officers following report submission, though 10 of 22 (45.5%) indicated this feedback was confined mainly to validation visits or monthly review sessions rather than occurring routinely. Seven of 22 respondents (31.8%), predominantly from remote or underserved areas, reported infrequent or absent feedback unless errors were substantial enough to prompt a specific query.

"They call us if there's a problem in the report, or they tell us during the LGA meeting." - F07

Theme 3: Topics covered during feedback

Feedback content centred overwhelmingly on accuracy and completeness (17/22, 77.3%), followed by timeliness (13/22, 59.1%) and format compliance or indicator misinterpretation (9/22, 40.9%), a pattern that closely mirrors the same four data quality dimensions examined in the companion qualitative analysis of this dataset.

"They show us what we missed or filled wrongly, especially in the summary form." - F04

Theme 4: Frequency of supervision and validation visits

Monthly or quarterly LGA visits were the modal pattern (15/22, 68.2%), supplemented in some facilities by ad-hoc, anomaly-triggered visits (8/22, 36.4%). Notably, 6 of 22 respondents (27.3%) explicitly attributed irregular supervision to transport difficulties, staffing shortages, or fuel constraints at the LGA level, a logistical rather than motivational explanation for supervisory gaps.

"They come every month, but sometimes they miss it if they don't have fuel or staff." - F02

Theme 5: Addressing data quality issues identified during supervision

On-the-spot correction, accompanied by verbal demonstration and retraining, was the dominant response to identified issues (16/22, 72.7%). Thirteen of 22 respondents (59.1%) described receiving immediate feedback with step-by-step guidance, and 10 of 22 (45.5%) confirmed that issues were also documented for follow-up in subsequent visits, indicating that correction in this system combines immediate remediation with a degree of longitudinal tracking.

"If there's a mistake, they correct it there and then. They even show us how to do it next time." - F17

District-level perspective on support and supervision

District-level accounts closely corroborated the facility-level picture while adding operational detail. Monthly validation and supervisory visits were confirmed by 11 of 13 respondents (84.6%), during which registers and summaries were reviewed, tools supplied, and informal capacity-building conducted through on-the-job guidance (8/13, 61.5%). Technical clarification and tool provision were confirmed by 9 of 13 respondents (69.2%). Feedback was described as delivered primarily through phone calls, WhatsApp messages, or verbal comment during visits (10/13, 76.9%), largely reactive to errors or inconsistencies rather than delivered as a matter of routine; 5 of 13 respondents (38.5%) acknowledged limited documentation or structured follow-up in their own LGA, a gap consistent with the facility-level reports of infrequent feedback in under-resourced areas.

On feedback content, 12 of 13 district respondents (92.3%) identified completeness and accuracy as their primary focus, followed by timeliness (9/13, 69.2%) and indicator definition clarification (7/13,

53.8%), closely mirroring the facility-level pattern. On supervision frequency, 10 of 13 respondents (76.9%) confirmed monthly visits as standard practice, with additional visits reserved for persistently underperforming facilities (6/13, 46.2%); 5 of 13 (38.5%) explicitly cited logistical barriers, principally lack of vehicles or fuel, as a cause of delayed or cancelled visits, corroborating the facility-level account of this constraint from the opposite side of the same relationship. On issue resolution, 11 of 13 respondents (84.6%) confirmed addressing errors immediately, either by phone or during visits, 7 of 13 (53.8%) described demonstrating correct documentation methods as part of this process, and 4 of 13 (30.8%) indicated that recurrent offenders were escalated to LGA health management for higher-level intervention.

"If there's a mistake, they correct it there and then. They even show us how to do it next time." - reflecting a pattern independently confirmed at district level

The district-level supervision cycle

Read together, these five themes describe a coherent, four-stage supervision cycle: facility data compilation, district validation visit, feedback to the facility, and correction, after which the cycle returns to strengthened facility-level practice. Figure 2 depicts this cycle, annotated with the frequency evidence supporting each stage from both facility and district respondents.

Table 2 summarises the triangulated pattern across all five supervision themes.

Table 2
Triangulation of facility- and district-level findings: district-level support and supervision

Theme	Facility-level (n = 22)	District-level (n = 13)
District support received/provided	Validation visits dominant form (18/22, 81.8%)	Monthly visits confirmed (11/13, 84.6%)
Feedback mechanism	Verbal/written after submission (14/22, 63.6%); gaps in remote areas (7/22, 31.8%)	Phone/WhatsApp/verbal, largely reactive (10/13, 76.9%); documentation gaps acknowledged (5/13, 38.5%)
Feedback content	Accuracy/completeness dominant focus (17/22, 77.3%)	Accuracy/completeness dominant focus (12/13, 92.3%) – closest convergence of the five themes
Supervision frequency	Monthly/quarterly modal pattern (15/22, 68.2%)	Monthly standard practice (10/13, 76.9%)
Logistical constraint	Irregular supervision from transport/staffing/fuel (6/22, 27.3%)	Logistical barriers independently confirmed (5/13, 38.5%)
Issue resolution	On-the-spot correction dominant (16/22, 72.7%)	Immediate correction confirmed (11/13, 84.6%)

The most striking feature of this triangulation is not divergence but convergence: across all five supervision themes, facility- and district-level accounts of the same underlying process align closely, including on the specific logistical constraint — transport, fuel, and staffing shortages — that interrupts the cycle. This is a materially different pattern from the technological and organisational domains examined in the companion analysis of this dataset, where facility- and district-level experience diverged substantially in favour of district-level advantage. Supervision, unlike infrastructure or training access, appears to be a domain where both levels of the system share a largely accurate, mutually corroborating understanding of how it currently functions and where it currently breaks down.

Stakeholder recommendations for RHIS strengthening

Participants at both levels were asked directly what steps would most improve facility-level data quality, and what support they believed was needed from district, state, or other stakeholders. Facility-level responses grouped into two themes; district-level responses, drawn from the triangulated recommendations analysis, addressed comparable priorities.

Theme 1 (facility): key steps to improve data quality

Regular training and retraining was the most frequently proposed step (15/22, 68.2%), followed by routine internal data validation meetings and supervision (13/22, 59.1%) and provision of adequate, updated data collection tools (12/22, 54.5%). Fewer respondents proposed recruiting or designating dedicated data personnel (7/22, 31.8%) or introducing motivation and incentives for data staff specifically (5/22, 22.7%), the latter notably the least-cited recommendation despite incentive absence being the most consistently reported gap in the companion behavioural-factors analysis of this dataset.

"They should train us more often, provide enough registers and forms, and give us something to encourage those of us handling data." - F14

Theme 2 (facility): support needed from district, state, or other stakeholders

Regular supportive supervision and data quality assessment visits were the most frequently requested form of external support (16/22, 72.7%), followed by provision of data management logistics, computers, internet connectivity, forms (14/22, 63.6%), and timely, constructive feedback after submission (12/22, 54.5%). Incentives or allowances for RHIS staff were requested by 8 of 22 respondents (36.4%), and periodic joint review meetings at LGA or state level by 9 of 22 (40.9%).

"Let them come regularly for supervision, correct us immediately, and bring computers, forms, and internet for reporting." - F06

District-level recommendations

District-level respondents echoed the facility-level emphasis on training, with 11 of 13 respondents (84.6%) advocating routine refresher sessions for all cadres, not only senior officers, and 6 of 13 (46.2%)

specifically recommending that training incorporate updates on new reporting tools and procedural changes. On logistics, 9 of 13 respondents (69.2%) stressed consistent RHIS tool supply, 7 of 13 (53.8%) the provision of computers and data-entry devices, and 5 of 13 (38.5%) explicitly recommended addressing unreliable internet and power supply. On supervision, 10 of 13 respondents (76.9%) recommended increased frequency and standardised coverage of validation visits using supervision checklists, and, distinctively, 6 of 13 (46.2%) recommended that verbal feedback be supplemented with written feedback to enable facilities to reference and track corrections over time, a gap not raised as prominently in facility-level accounts. On incentives and accountability, district-level respondents were, if anything, more explicit than facility respondents: 5 of 13 (38.5%) proposed formal reward systems for consistently accurate and timely facilities or staff, 6 of 13 (46.2%) recommended incorporating data quality metrics into staff performance reviews, and 5 of 13 (38.5%) proposed penalties for facilities that repeatedly submit poor-quality data.

Comparing recommendation priorities across levels

Figure 3 aggregates all recommendation subthemes into four broad categories – training and capacity building, tools and logistics, supervision and feedback, and incentives and accountability – and compares the proportion of facility- and district-level respondents citing each.

Table 3
Triangulation of recommendation priorities across levels

Priority category	Facility-level (n = 22)	District-level (n = 13)
Training & capacity building	Highest-ranked priority (68.2%)	Highest-ranked priority (65.4%)
Tools & logistics	Second priority (59.1%)	Third priority (53.8%)
Supervision & feedback	Third priority (63.6%)	Second priority (61.5%)
Incentives & accountability	Lowest-ranked priority (29.6%)	Fourth, but more specific and structural (41.1%)

Table 3 presented the triangulation of recommendation priorities across levels. As shown in the table, training and capacity building was the top-ranked priority at both levels, and supervision/feedback and tools/logistics were closely ranked second and third at both levels, indicating strong cross-level consensus on three of the four priority categories. The clearest divergence is in incentives and accountability: this was the lowest-ranked category at facility level (29.6%) and, while still ranked fourth at district level, district respondents proposed markedly more specific and structural interventions – formal reward systems, performance-review metrics, penalties – than the comparatively general 'incentives or allowances' framing offered by facility respondents. This pattern is discussed further below, in relation to the companion behavioural-factors analysis of this dataset, which identified incentive and accountability absence as the single most consistently reported systemic gap across the entire research programme.

Discussion

This study explored how district-level support and supervision for RHIS data quality actually function in Osun State, Nigeria, and what facility- and district-level stakeholders themselves believe would most improve the system. Three findings merit particular discussion: the unusual degree of facility-district convergence in this domain compared with others examined in this research programme; the shared, logistical, rather than motivational, character of the supervision cycle's principal weakness; and the gap between stakeholders' stated priorities and the pattern of gaps identified through independent analysis.

Supervision as a domain of genuine cross-level agreement

Unlike the technological and organisational domains examined in the companion determinants analysis of this dataset, where facility- and district-level accounts diverged substantially, with district respondents consistently reporting better infrastructure, training, and formalisation, the supervision domain examined here shows close alignment between facility and district accounts on every theme, including the specific logistical barriers that interrupt it. This is a meaningful methodological finding in its own right: it suggests that supervision, as a relational process actively co-produced by both facility and district actors in real time, generates a more consistent shared understanding between the two levels than domains like technology or training access, which are experienced asymmetrically and resourced from outside the relationship itself. Where a determinant is something one level does to or for another, facility-district accounts diverge; where it is something both levels do together, accounts converge. This distinction may be a useful heuristic for anticipating where future RHIS qualitative research is likely to find cross-level agreement versus disagreement.

A shared logistical constraint, not a shared motivational deficit

Both facility (27.3%) and district (38.5%) respondents independently identified the same specific mechanism — transport, fuel, and staffing shortages — as the cause of irregular supervision, rather than attributing gaps to district-level disengagement or facility-level resistance to oversight. This is an important distinction for intervention design: a supervisory gap attributed to motivation would call for a different response, incentives, performance management, than a supervisory gap attributed to logistics, which calls for resourcing, vehicle access, fuel budgets, staffing levels at the LGA level. The consistency of this attribution across both respondent groups, each with a plausible incentive to blame the other for supervisory gaps, strengthens confidence that the logistical explanation reflects the actual underlying constraint rather than a self-serving account offered by either side.

A gap between stated priorities and evidenced impact

The clearest tension in this study's findings is that facility respondents ranked incentives and accountability as their lowest recommendation priority (29.6%), even though the companion behavioural-factors analysis of this same dataset identified the absence of incentive and accountability structures as

the single most consistently reported systemic gap in the entire research programme, converging almost completely between facility (81.8%) and district (92.3%) respondents when asked about it directly. This is not a contradiction in the data; rather, it reflects a well-documented pattern in stakeholder-generated recommendations more broadly — respondents tend to prioritise recommendations addressing problems that are most visible or most immediately experienced (a missing register, an untrained colleague, a missed supervisory visit) over structural gaps whose absence is normalised precisely because it is so pervasive and longstanding that its absence no longer registers as a distinct, nameable problem worth recommending a fix for. District-level respondents, who proposed markedly more specific and structural incentive interventions than facility respondents despite ranking the category similarly low overall, may reflect a supervisory vantage point from which the consequences of absent accountability structures, inconsistent facility performance, absorbed largely as further district-level correction workload, are somewhat more visible.

This finding has a direct implication for how stakeholder consultation should be used in RHIS policy design: stated priorities from facility and district stakeholders are a valuable and largely trustworthy guide to three of the four priority areas identified in this study, but should not be treated as a complete or self-sufficient guide to intervention design on their own. Systemic gaps that are pervasive enough to have become normalised within a respondent group's own frame of reference are, by that same logic, unlikely to be volunteered as a top recommendation by that group, even when independent evidence indicates the gap is highly consequential. Effective RHIS strengthening strategy therefore benefits from combining stakeholder consultation with independent, triangulated analysis of the kind offered by this research programme as a whole, rather than relying on either source alone.

Comparison with the wider literature

The supervision cycle identified here, compilation, validation, feedback, correction, corresponds closely to supportive supervision models documented in Ethiopia and Kenya, where structured feedback loops and on-the-spot correction were similarly found to be central mechanisms through which district-level oversight improves RHIS data quality [2, 3]. The logistical, rather than motivational, character of the supervision gap identified in this study is also consistent with evidence from Chad, where transport and fuel constraints, rather than staff disengagement, were identified as the primary barrier to consistent supervisory coverage in rural and semi-rural health systems [4]. The gap between stated stakeholder priorities and independently evidenced systemic weakness identified here appears less thoroughly documented in the existing RHIS literature and may represent a specific contribution of this study's triangulated, multi-manuscript research design.

Methodological reflections on comparing stated priorities against triangulated evidence

The comparison at the centre of the preceding subsection — stakeholder recommendation priorities set against the independently derived pattern of findings from the companion determinants analysis of this same dataset — was only possible because this research programme collected recommendations and

determinants data as analytically separate lines of inquiry within a coordinated design, rather than treating stakeholder recommendations as a self-contained output to be reported on their own terms. Had recommendations been the sole qualitative output of this research programme, the finding that facility respondents deprioritise incentive structures would most plausibly have been reported at face value, as evidence that incentives are simply a lower true priority in this setting, rather than as evidence of a specific, identifiable gap between stated priority and evidenced consequence. This suggests a broader methodological lesson for RHIS stakeholder-consultation research: recommendation data collected in isolation risks being taken as a complete account of intervention priority, when it may more accurately represent a partial account shaped by which problems are most visible to the respondent group being consulted, a limitation that only becomes visible when recommendation data is deliberately checked against independent, differently sourced evidence of the same system's actual weaknesses, as this study's position within a coordinated, multi-manuscript research programme allowed.

Conclusions

This qualitative study found that district-level supervision in Osun State operates as a coherent, four-stage cycle — facility compilation, district validation, feedback, and correction — that functions effectively where it occurs, with close agreement between facility- and district-level accounts on how the cycle works and where it breaks down. Its principal vulnerability is a shared logistical constraint, transport, fuel, and staffing shortages at the LGA level, rather than any deficit in either level's engagement with the process. Stakeholder recommendations converged strongly across levels on training, tools, and supervision as priorities, but facility respondents notably deprioritised incentives and accountability structures relative to the prominence of this gap in independent analysis of the same research programme, suggesting that pervasive, longstanding systemic weaknesses may be under-recognised by the stakeholders who experience them precisely because of how normalised their absence has become. RHIS strengthening strategy in this setting should therefore combine direct stakeholder consultation with independent, triangulated evidence, rather than treating stakeholder priorities alone as a sufficient guide to intervention design.

Taken together with the two companion qualitative manuscripts from this research programme, one examining RHIS tools, methods, and data quality directly, the other examining technological, organisational, and behavioural determinants, this study completes a three-part qualitative account of the same underlying RHIS. Read as a set, the three manuscripts point toward a consistent overall picture: a system with sound foundational tools and a generally disciplined reporting and supervisory structure, whose remaining weaknesses are concentrated in a small number of specific, identifiable mechanisms — informal facility-level verification, cross-domain training gaps, facility-district technological dependency, logistically constrained supervision, and the near-total absence of incentive and accountability structures — each amenable to a targeted, rather than wholesale, intervention response.

Recommendations

Based on the findings, the following five recommendations are proposed, each specifying the responsible party and the corresponding action required.

1. The Osun State Ministry of Health and Local Government Health Departments should ring-fence dedicated transport and fuel budgets for RHIS supervisory visits, given that both facility (27.3%) and district (38.5%) respondents independently identified logistical constraints, not motivational gaps, as the specific cause of irregular supervision; LGA Health Departments should be responsible for monitoring monthly visit completion rates against this dedicated budget.
2. District M&E teams should extend written feedback to all facilities as standard practice, rather than the current predominantly verbal/phone-based approach, given that district-level respondents specifically recommended this (46.2%) as a way to help facilities reference and track corrections over time, addressing a gap facility respondents did not raise as prominently themselves.
3. The Osun State Ministry of Health's policy and planning leadership should treat incentive and accountability structures as a standing policy priority regardless of their comparatively low ranking in direct stakeholder recommendations, given the evidence from this research programme's companion analysis that pervasive systemic gaps are structurally likely to be under-recommended by the stakeholders who experience them; policy prioritisation exercises should draw on triangulated, independently evidenced findings alongside, not instead of, stakeholder consultation.
4. The Osun State Ministry of Health should design and pilot a formal, structured incentive and accountability framework incorporating the specific mechanisms district-level respondents themselves proposed – performance-review metrics (46.2%), formal reward systems (38.5%), and defined consequences for repeated poor-quality submissions (38.5%) – since these more concrete district-level proposals are readily actionable despite the category's lower overall priority ranking.
5. Health Information Management training institutions and LGA Health Departments should jointly design a single, integrated training curriculum addressing the top-ranked shared priority across both respondent groups, training and capacity building (68.2% facility; 65.4% district), incorporating supervision checklists and standardised validation procedures to support the second-ranked priority of consistent, structured supervision.

Implications of the study

The findings carry implications for RHIS supervisory resourcing, feedback practice, and the design of stakeholder consultation processes more broadly. For supervisory resourcing, the shared, logistical attribution of supervision gaps implies that transport and fuel budgeting, rather than supervisory training or motivation programmes, is the most directly targeted intervention available for improving supervision consistency. For feedback practice, the specific district-level recommendation for written feedback, not echoed as prominently by facility respondents, illustrates the value of eliciting recommendations from

both sides of a supervisory relationship rather than one alone. For stakeholder consultation design more broadly, the gap identified here between facility respondents' stated priorities and the independently evidenced significance of incentive and accountability gaps implies that health system planners should treat stakeholder-generated recommendations as one input among several, rather than as a complete guide to intervention prioritisation, particularly for systemic, longstanding gaps that stakeholders may have become accustomed to working around rather than naming as a priority for change.

There is also a resourcing-sequencing implication worth drawing out explicitly. Because training, tools, and supervision were the three priorities on which facility and district respondents most strongly agreed, and because these are also the categories most directly actionable through existing budget lines and existing supervisory relationships, they represent the more immediately implementable tier of this study's findings. The incentive and accountability gap, by contrast, requires new policy architecture, a reward or accountability framework that does not yet exist at any level of the system examined, and is therefore inherently a longer lead-time intervention. A pragmatic implication is that RHIS strengthening programmes in this setting need not choose between these two tiers of finding: near-term investment in the three converged priorities can proceed immediately using this study's evidence base, while the incentive and accountability framework recommended above is developed as a parallel, longer-horizon policy workstream, rather than treating the two as competing claims on the same limited implementation capacity.

Contributions to knowledge

This study contributes to the RHIS literature in three specific ways. First, it provides a detailed, stage-by-stage account of a functioning district-level supervision cycle, triangulated across both parties to the same supervisory relationship, offering a level of procedural detail rarely available in quantitative supervision-intensity studies. Second, it identifies supervision as a domain of unusually strong facility-district convergence relative to other RHIS determinant domains, proposing a relational-versus-resourced distinction as an explanatory heuristic that may generalise to other health-system supervisory contexts, including primary care contexts beyond RHIS specifically. Third, and most distinctively, it provides empirical documentation of a gap between stakeholder-stated recommendation priorities and independently evidenced systemic weakness, specifically regarding incentive and accountability structures, contributing methodological grounds for triangulating stakeholder consultation against independent multi-method evidence in RHIS strengthening research and policy design, rather than relying on stakeholder consultation as a self-sufficient prioritisation tool.

Limitations of the study

This study has several limitations. As in the companion qualitative manuscripts from this research programme, subtheme frequencies describe prevalence within this purposive sample of 35 key informants and should not be interpreted as population-representative estimates, and a discrepancy exists in the source documentation between a stated facility-level sample of 20 and a consistently applied frequency denominator of 22, which this manuscript follows and which should be reconciled

against the original interview log before publication. The recommendations analysis compares stakeholder priorities against findings from companion analyses conducted within the same broader research programme rather than against fully independent external benchmarks, which somewhat limits the independence of the comparison offered above, though the recommendations and determinants analyses were conducted as analytically distinct exercises. Participants' accounts of supervision practice and their own recommendations may be subject to social desirability bias, a risk partially mitigated by triangulating facility-level accounts against independent district-level accounts of the same relationship. Finally, this study did not include the perspective of state-level or national RHIS policy actors, whose views on the incentive and accountability gap identified here would usefully extend this analysis in future research.

A reflexivity note is also warranted, consistent with COREQ reporting expectations for qualitative research of this kind. The interview guide, coding framework, and thematic structure applied to this dataset were developed and applied by researchers affiliated with the same institutions responsible for aspects of the broader health information management training and research infrastructure this study examines. This positioning brought valuable contextual and technical familiarity with RHIS operations in Osun State to the analysis, but also carries a plausible risk of interpretive bias toward findings that affirm the functional value of existing training, supervisory, and reporting structures. This risk was partially mitigated by grounding every thematic claim in tabulated frequency counts and retained verbatim quotations, allowing readers to independently assess the correspondence between the data presented and the interpretive claims built upon it, and by the deliberately critical framing adopted above, which treats a convergence between stakeholder priorities and researcher-favoured interpretations as a finding to be interrogated rather than assumed.

Declarations

Ethics approval and consent to participate

The study protocol was reviewed and approved by the Rivers State University Research and Ethics Committee and the Research and Ethics Committee of the Osun State Ministry of Health. All participants provided written informed consent prior to interview. The study was conducted in accordance with the Declaration of Helsinki.

Consent for publication

Not applicable. This manuscript reports de-identified, aggregated qualitative findings and does not contain any individually identifying participant information, images, or videos.

Availability of data and materials

Given the sensitive and potentially identifying nature of qualitative interview transcripts, the full dataset is not publicly available. De-identified excerpts supporting the themes reported in this manuscript are

available from the corresponding author on reasonable request, subject to participant consent restrictions.

Competing interests

The authors declare that they have no competing interests.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Authors' contributions

SAO: conceptualisation, methodology, investigation, formal analysis, data curation, writing original draft, writing review and editing, visualisation, project administration. OIB: methodology, writing review and editing. OSM: validation, writing review and editing. All authors read and approved the final manuscript.

Acknowledgements

The authors thank the 35 key informants, facility-level health workers and district-level supervisory staff across Osun State, who generously shared their time and experience for this study, and the Osun State Ministry of Health for facilitating access to participants.

References

1. Federal Ministry of Health. NHMIS annual reports [Internet]. 2023. Available from: <https://fmohconnect.gov.ng/nhmis-annual-reports/>
2. Shiferaw AM, Zegeye DT, Assefa S, Yenit MK. Routine health information system utilization and factors associated thereof among health workers at government health institutions in East Gojjam Zone, Northwest Ethiopia. *BMC Med Inf Decis Mak*. 2017;17(1):116.
3. Cheburet SK, Odhiambo-Otieno GW. Organizational factors affecting data quality of routine health management information system quality: case of Uasin Gishu County Referral Hospital, Kenya. *Int Res J Public Environ Health*. 2016;3(9):201–8.
4. Moukéné A, de Cola MA, Ward C, Beakgoubé H, Baker K, Donovan L, Laoukolé J, Richardson S. Health management information system (HMIS) data quality and associated factors in Massaguet district, Chad. *BMC Med Inf Decis Mak*. 2021;21(1):326. 10.1186/s12911-021-01684-7. . PMID: 34809622; PMCID: PMC8609810.
5. World Health Organization. Strategy for optimizing national routine health information systems: strengthening routine health information systems to deliver primary health care and universal health coverage. Geneva: World Health Organization; 2024.

6. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care*. 2007;19(6):349–57.

Figures

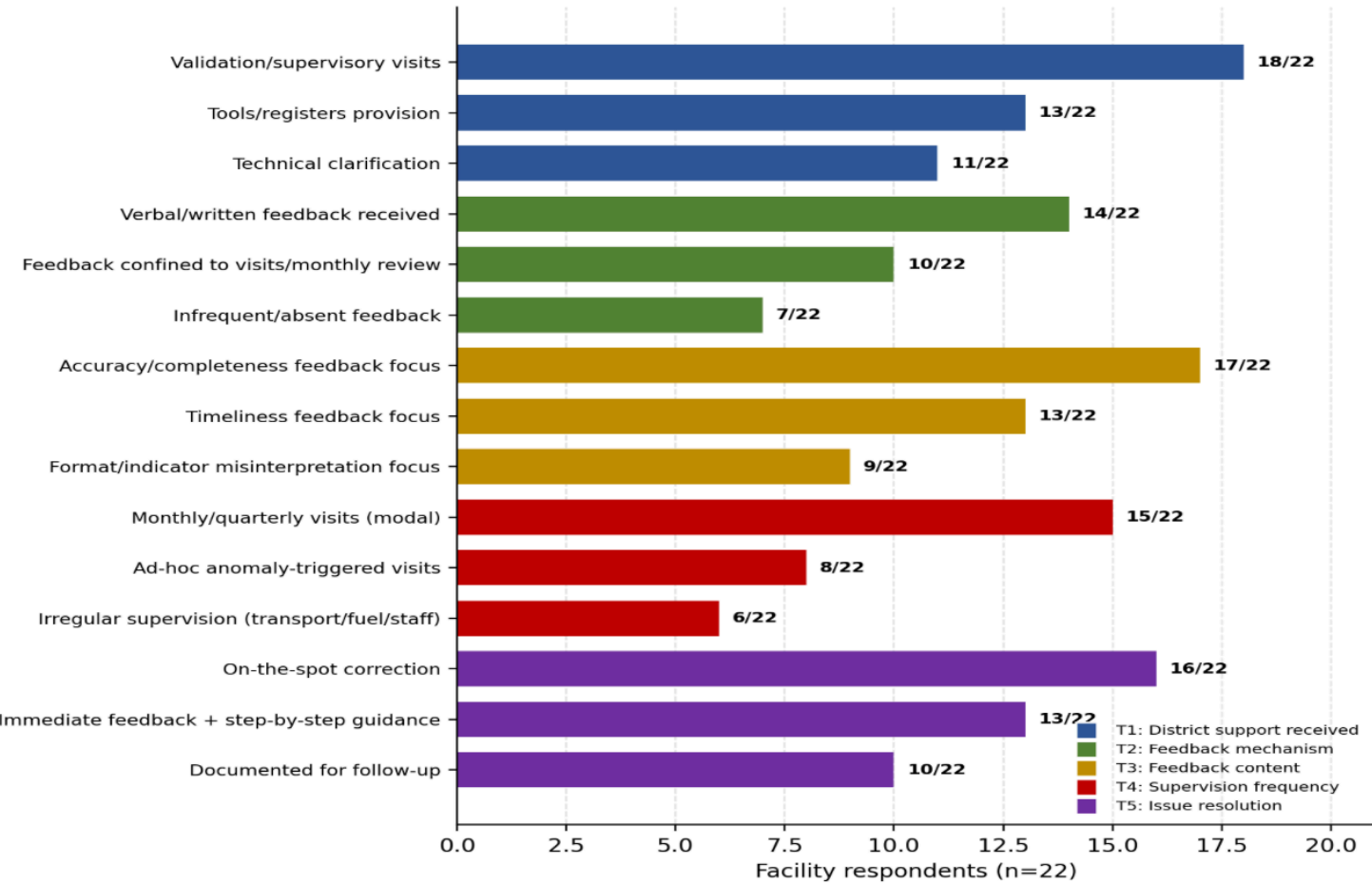


Figure 1
Frequency of district-level support and supervision subthemes, facility-level KIIs (n=22)

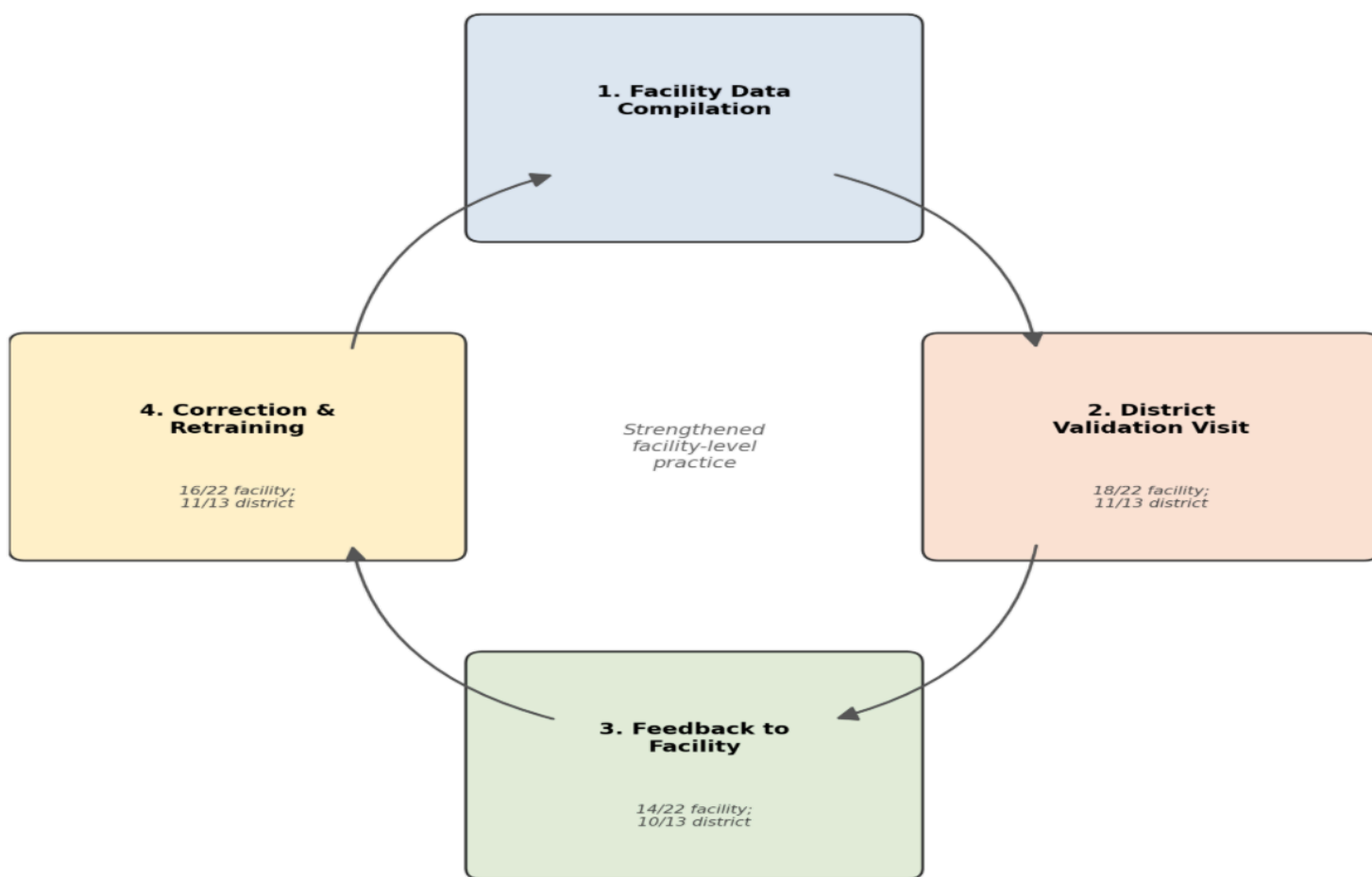


Figure 2

The district-level supervision cycle for RHIS data quality

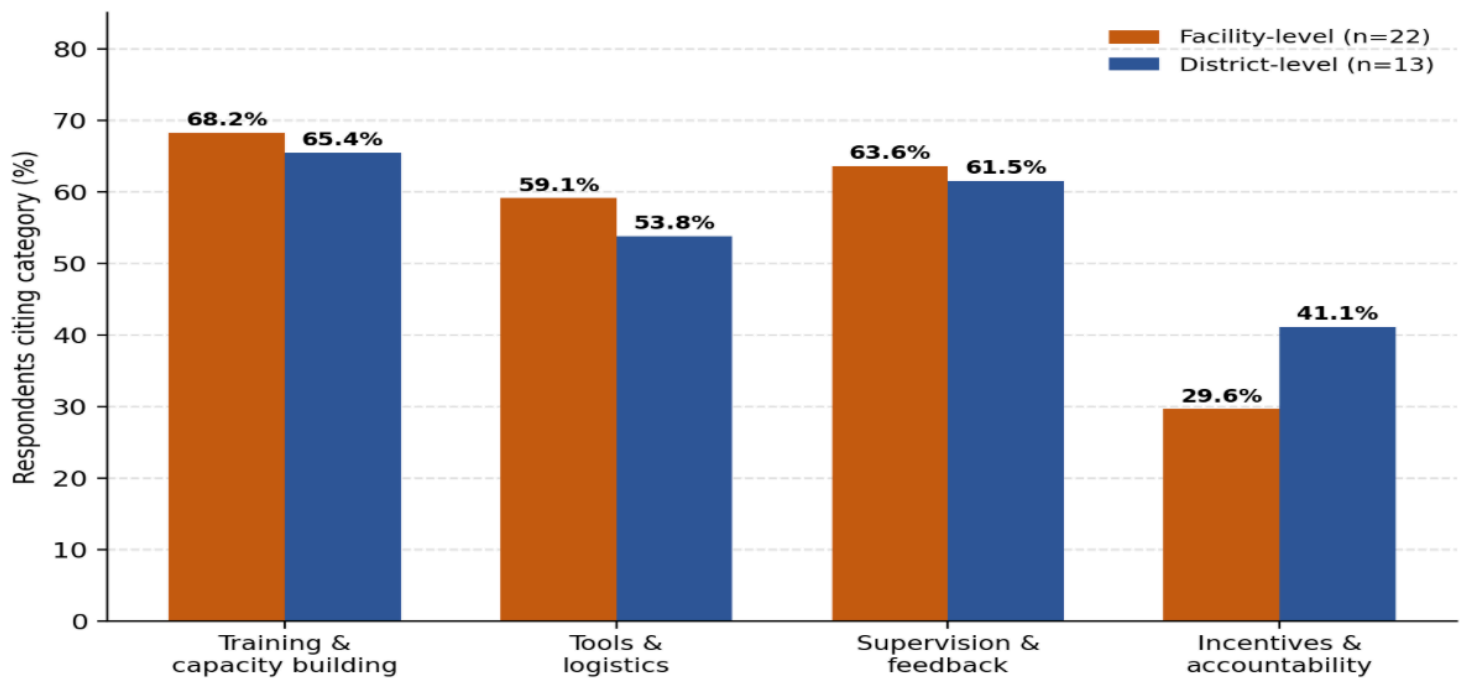


Figure 3

Recommendation priorities: facility-level vs. district-level respondents

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [AdditionalFile1KIIGuideforDistrictLevelRHISManuscript.docx](#)