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Completeness and Clinical Adequacy of Radiology Request Forms in Nigeria: Systematic Review of Institutional Audits

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Abstract **Review Article**

Background: Radiology request form is a legal document that authorizes for imaging exams. Most of the imaging exams involve radiation exposure, which can cause detrimental effects if misused. Despite international standards from the Royal College of Radiologists, anecdotal evidence suggests widespread incompleteness in Nigeria, but no national synthesis exists.

Objective: To systematically review the completeness and clinical adequacy of radiology request forms across Nigerian health institutions.

Methods: We searched PubMed, Scopus, Web of Science, AJOL, Google Scholar, and grey literature for institutional audits of radiology request forms in Nigeria. Two reviewers screened studies and extracted data on overall completeness and 12 field-specific items. Risk of bias was assessed using the Joanna Briggs Institute checklist. Due to heterogeneity, a Synthesis without Meta-analysis (SWiM) was performed, with vote-counting by geopolitical zone. Study pre-registered with PROSPERO: CRD420261433125.

Results: Fourteen cross-sectional audits (12,268 forms, 2009–2023) from all six geopolitical zones were included. Six studies were high quality, eight moderate. Median proportion of fully completed forms was 1.3% (range 0–24.8%). Patient name and examination requested were consistently documented. Safety-critical fields such as last menstrual period, previous imaging history, clinician telephone, patient address, and allergy history were systematically omitted. No temporal improvement was observed over 14 years.

Conclusion: Radiology request forms in Nigeria are persistently incomplete and this violates international radiation protection standards and compromise patient safety. The problem is systemic and therefore, national implementation of a standardized minimum dataset with enforcement at radiology reception is urgently required to reduce avoidable radiation exposure and diagnostic error.

Keywords: radiology request forms, completeness, Nigeria, patient safety, radiation protection, systematic review, referral quality.

Introduction

Radiology request forms are used as a document for authorization for medical imaging. They also serve as a legal document authorizing exposure to ionizing radiation. The completeness and clinical adequacy of these forms determine the appropriateness of imaging, the accuracy of radiological diagnosis, and the safety of patients undergoing diagnostic procedures. It has been recommended that every request form should contains patient identifiers, clinical question, relevant history, examination requested, and referrer details, and that forms must be completed adequately and legibly to avoid misunderstanding [1]. The Ionising Radiation (Medical Exposure) Regulation 2017 [IR(ME)R] placed a statutory duty on the practitioner to ensure sufficient clinical information is available to justify exposure [1,2].

However, despite this clear framework, incomplete radiology requests remain a persistent global patient safety issue. Audits consistently report that 15-40% of forms lack critical clinical details contributing to inappropriate imaging, delayed reporting, and increased healthcare costs in high-income countries. While in low-and middle –income countries (LMICs), where paper-based systems predominate, the problem is magnified [3]. The consequences has been associated with increase in non-specific radiology reports, increase in rate of repeat examinations due to insufficient justification, and failure to communicate critical findings [3-7].

Nigeria, a low income country, with over 200 million people presents a particularly urgent concern. Despite the increased growth in diagnostic imaging utilization, there is no adequate national guideline to enforce mandatory regulation for imaging referrals. The result is a fragmented system where individual institutions design their own forms, often without alignment to international standards [8]

Single-center institutional audits across Nigeria six geopolitical zones have independently reported high rates of incompleteness [9-22]. Commonly omitted fields include LMP, patient address, clinician telephone number, and history of previous imaging. While these audits provide valuable local insights, they have never been systematically synthesized, limiting their influence on national policy and preventing identification of consistent patterns, regional variations, or modifiable system factors.

The clinical implications for Nigeria include: First, from a radiation protection perspective, the routine omission of LMP and pregnancy status exposes a large population of women of childbearing age to unjustified fetal radiation risks, directly contravening the ALARA (As Low As Reasonably Achievable) principle. Second, the absence of detailed clinical history undermines diagnostic accuracy in a setting where radiologists report with limited access to patient records. Third, the lack of referrer identification and contact details creates a critical communication gap, preventing the timely reporting of urgent or incidental findings.

Given the significant number of isolated audits and the absence of a national synthesis, there is a clear need for a systematic review to consolidate existing evidence, assess methodological quality, and provide evidence base for policy intervention. This review was prospectively registered with PROSPERO (CRD420261433125) and conducted in accordance with PRISMA 2020 guidelines [24]

Objectives

The primary objective of this systematic review was to determine the completeness and clinical adequacy of radiology request forms across Nigerian health institutions as reported in institutional audits. The secondary objectives were to: (1) identify the most frequently omitted data fields; (2) explore variations by geopolitical zone, hospital type, and imaging modality; and (3) synthesize factors associated with poor completion to inform national recommendations.

Methods

This review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement and was prospectively registered with the International Prospective Register of Systematic Reviews

(PROSPERO CRD420261433125) [24]. The protocol specified a synthesis without meta-analysis (SWiM) approach due to anticipated heterogeneity in outcome definitions across institutional audits.

Eligibility criteria

Studies that were included met the following criteria:

Population: All radiology request forms for diagnostic imaging (conventional radiography, ultrasound, computed tomography, magnetic resonance imaging, fluoroscopy, and mammography) completed in Nigerian health institutions (public or private, primary to tertiary level).

Study design: Cross-sectional institutional audits, retrospective reviews of request forms, or quality improvement baseline audits reporting primary quantitative data on completeness or clinical adequacy. Only studies published in English were included. No date restriction was applied to capture temporal trends.

Outcomes: Primary outcome was proportion of forms fully completed (all designated fields filled) or proportion with adequate clinical information with respect to the authors definition. Secondary outcomes included field-specific completion rates (patient demographics, LMP, clinical history, referrer details, previous imaging).

Exclusion criteria: The following studies were excluded from the review. Studies conducted outside Nigeria, narrative reviews, editorials, or opinion pieces without primary data, studies evaluating electronic decision support without baseline completeness data, duplicate publications of the same dataset (most comprehensive version retained).

Information sources and search strategy

A comprehensive search was conducted across different databases. These include PubMed/MEDLINE, Scopus, Web of Science Core Collection, African Journals Online (AJOL), and Google Scholar (first 200 records). Grey literature was searched via OpenGrey, ProQuest Dissertations, and conference proceedings of the Association of Radiologists of Nigeria. Reference lists of included studies were also searched.

The search strategy combined three main concept terms: (1) radiology/imaging terms ("radiology request", "imaging referral", "X-ray form"); (2) completeness terms ("completeness", "adequacy", "filling", "documentation"); and (3) Nigeria terms ("Nigeria", "Nigerian", plus all 36 states). The PubMed strategy was: ("Radiology" OR "Diagnostic Imaging" OR "radiology request" OR "imaging referral") AND ("forms and records control" OR completeness OR adequacy) AND (Nigeria OR Nigeria).

Study selection

Records were imported into Rayyan systematic review software, and duplicates removed. Two reviewers screened titles and abstracts, then full texts, with disagreements resolved by consensus. The PRISMA flow diagram (Figure 1) documents the selection process

Data extraction

The required data were extracted into Microsoft Excel sheet. Data extracted included: first author, year, study period, geopolitical zone, hospital name and level, imaging modalities, sample size, sampling method, definition of "complete" or "adequate", overall completeness rate, and field-specific completion rates for 12 pre-specified items (patient name, age, sex, hospital number, address, LMP, clinical history/diagnosis, examination requested, previous imaging, referrer name, signature, department/phone). Where studies reported both "present" and "detailed" clinical history, both were extracted.

Risk of bias assessment

Methodological quality was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Analytical Cross-Sectional Studies (8

items) [25]. Each item was scored "Yes" (1), "No" (0), "Unclear" (0), or "Not applicable". Total scores were categorized as high quality (7–8), moderate (4–6), or low (0–3). Quality assessment was performed independently by two reviewers, with disagreements resolved by discussion. No studies were excluded based on quality.

Data synthesis

Due to substantial heterogeneity in definitions of completeness, sampling frames, and reporting formats, meta-analysis was deemed inappropriate as pre-specified in the protocol. A SWiM approach was adopted following Campbell et al [23] guidelines.

Studies were grouped by geopolitical zone, hospital type (tertiary teaching hospital vs specialist diagnostic Centre), and imaging modality. Ranges and medians for overall completeness were documented. Vote-counting based on direction of effect was used for field-specific outcomes, classifying fields as "consistently adequate" (>70% completion in ≥75% of studies), "consistently poor" (<50% completion in ≥75% of studies), or "mixed". We also explored factors associated with completeness as reported by primary study authors.

Certainty of evidence was assessed narratively considering consistency, precision (total sample size), and risk of bias across studies, adapted from GRADE for narrative syntheses.

Result

Study Selection

Thorough search of the literature yielded 381 records (PubMed 48, Scopus 32, Wos 19, AJOL 67, Google Scholar 200, Grey 15). The records were screened based on the inclusion and exclusion criteria, 84 duplicates were removed, 297 titles and abstracts were examined, of which 258 were excluded. Out of the 39 full-text articles that remained, 12 were conducted outside Nigeria, 6 do not have primary data on completeness, 4 were reviews and 3 duplicates of same data set. Fourteen studies met the inclusion criteria and were included in the narrative synthesis (Figure 1).

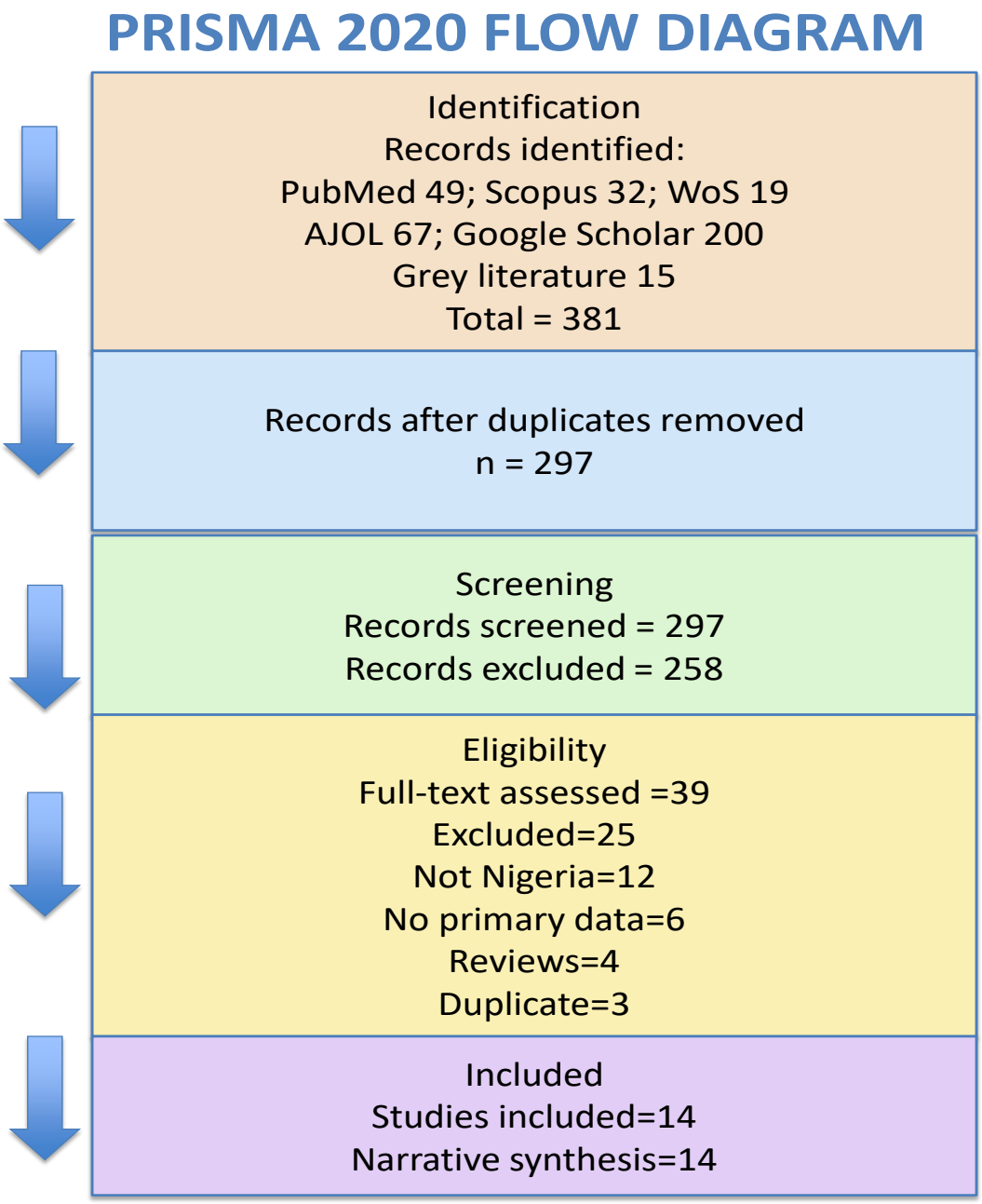

Figure 1: Prisma 2020 flow diagram for the study selection process for the completeness and clinical adequacy of Radiology request forms in Nigeria.

Characteristics of Included Studies

The 14 studies included a total of 12,268 radiology request forms. The studies were published between 2009 and 2023. The geographical distribution cut across all six geopolitical zones of Nigeria (Table 1): the Northwest Nigeria (n=772) [12,18,21] Northeast (n=339) [9]. North-Central (n=466) [14, 22], South-South (n=2,161) [10, 15, 17, 19]; Southwest (n=8,081) [11, 16, 20] and Southeast (n=700) [13].

Study designs were uniformly cross-sectional institutional audits, with sample sizes ranging from 96 to 7,841 forms. Twelve studies were conducted in tertiary teaching hospitals, one in a private specialist diagnostic (Lagos) [16], and one across two general hospitals (Rivers State) [15]. Five studies of the included studies evaluated general radiography only, two focused exclusively on CT, one on ultrasound, and six included mixed modalities. No study evaluated MRI or mammography in isolation.

Heterogeneity was substantial in the studies due to lack of uniform radiology request forms. "Fully complete" was defined as all fields on the institutional form filled in 7 studies. Seven studies reported only field-specific rates without an overall completeness metric. "Adequate clinical history" was defined variably as "any clinical information present" (10 studies) while "detailed history sufficient for justification" were reported in 4 studies (Table 2).

Risk of bias: JBI scores ranged from 5 to 8 out of the 8 criteria used (Table..). Six studies were rated high quality (≥7), including Oyedeji 2015 (8/8) [16], Onwuchekwa 2017 (7/8) [15], Robinson 2021 (7/8) [17], Akintomide 2015 (7/8) [19], Adegboyega 2023 (7/8) [20], and Chia 2022 (7/8) [22] while eight studies were rated moderate quality (5–6/8). The most consistent methodological strength was clear inclusion criteria; All 14 studies clearly defined inclusion criteria typically specifying the imaging modality, study period, and hospital unit, indicating low risk of selection bias at the eligibility level. However, the most common weakness was non-random convenience sampling used by 11 studies reflecting resource constraints of institutional audits and introducing potential sampling bias.

Primary outcome

The overall completeness was reported in eight studies and was universally poor. The median proportion of fully completed forms across Nigeria was 1.3% with range of 0–24.8%. The outcome as reflected across the geopolitical zones showed that Northwest has range of 0% [21] to 2.3% [12] with median of 1.25% . Northeast has 0% (Abubakar 2015). North-Central has 0% [9]. South-South did not report completeness as overall metric, but field data indicated <5% meet full completion. Southwest has 1.3% [16] and southeast has 24.8% [13]. Eze [13] report is a clear outlier but reflected a prospective audit following a departmental awareness campaign and exclusion of non-standard prescription sheets, suggesting system enforcement rather than regional superiority.

Secondary outcome

Fourteen studies reported field-level data for 12 core item. Three distinct patterns were shown using vote counting – consistent adequate fields, consistently poor fields and mixed or intermediate fields (Table 3). Patient name, sex/gender, and examination requested were reported to be consistently adequately filled (>70% in ≥75% of studies): Patient name (99.5–100% across all 14), examination requested (98.4–100% across 14 studies), and gender (90.3–98.9% in 6/6 reporting studies). Consistently poor fields reported are: patient address was 2.3% [12] to 54.6% [9]; 7/7 studies <55%, with 5/7 <10%. Last menstrual period was 2.1% [9] to 19.7% [21] in the two studies stratifying by gender, LMP was documented in only 11.5–50.6% of women of childbearing age [15]. Previous imaging history was 2.5–4%

Table 1: Data extraction table

SN	Study (Citation)	State/Zone-Hospital	Design/Modality	N	Period	Definition used
1	Abubakar et al., 2015	Northeast (Borno)-University of Maiduguri Teaching Hospital	Retrospective cross-sectional, Xray	339	Jan-Dec 2014	Slot=1 if information present; 0 if blank

2	Agi et al., 2015	South-South (Rivers)-UPTH Port Harcourt	Audit, Mixed radiology	300	Jan-Jun 2014	Completeness of information entered
3	Akinola et al., 2009	Southwest (Lagos)-teaching hospital diagnostic centre	Audit, CT/MRI	144 forms (145 request)	Jun-Aug 2009	Completeness of filling
4	Danfulani & Musa, 2015	Northwest (kebbi)-FMC Birnin Kebbi	Retrospective, Mixed	214	Not stated (pre-2015)	Adequately completed = all fields
5	Eze et al., 2019	Southeast (Anambra)-NAUTH Nnewi	Retrospective descriptive, Mixed	700	Archive (unspecified)	Adequate=all fields filled
6	Mohammad et al.,2016	North-Central (Benue)-BSUTH Makurdi	Audit, X-ray	163	8 months (unspecified)	Completeness
7	Onwuchekwa, 2017	South-South 9Rivers)-3 public hospitals multicenter	Descriptive, Mixed	~150 (10/modality/yearx5y)	2011-2015	Compliance per field
8	Oyedeji et al., 2015	Southwest (Lagost)-multidisciplinary diagnostic centre	Audit, lab+radiology+cardiac	7,841	Jul-Dec 2011	Fully completed = all fields
9	Robinson et al., 2021	South-South (Rivers)-RSUTH Port Harcourt	Cross-sectional, mixed (US 55.4%, X-RAY 41.4%, CT 1.1%)	1,131	6 months (unspecified)	Degree of completeness
10	Khadija et al., 2019	Northwest (Kano)-AKTH	Retrospective cross-sectional, mixed	400	Mar-Sep 2018	Complete = all fields
11	Akintomide et al., 2015	South-South (Cross River)-UCTH Calabar	Prospective audit, x-ray	580	May-Jul 2012	Score1=filled/legible
12	Adegboyega et al., 2023	Southwest (Lagos) LASUTH	Audit, thoracic imaging	96	Apr-Jul 2022	Completeness & legibility
13	Garba et al., 2021	Northwest (Kano) – tertiary hospital	Audit of inadequate filled forms, X-ray	158	Unspecified (pre-2021)	Filled/Inadequate/unfilled
14	Chia et al., 2022	North-Central (Benue)-BSUTH Makurdi	Retrospective audit, CT	303	Dec 2019-N0v 2020	Complete/incomplete/absent for 22 fields

Table 2: Data extraction table

SN	Study (Citation)	Overall % fully Complete	Key Field completion (% filled)
1	Abubakar et al., 2015	0% (none holistic)	Name 100%, Surname 99.7%, Exam 98.5%, Clinical info 97.1%, Sex 95.9%, Age 92.9%, Address 54.6%, LMP 2.1%, Mobility 12.4%
2	Agi et al., 2015	Not reported	Name 100%, Exam 100%, Date 98.0%, Sex 97.3%, Clinical info 91.7%, Doctor name 91.0%, Doctor sign 91.0%, Age 86.3%, Consultant 81.3%

3	Akinola et al., 2009	Not reported	Surname 100%, Exam 100%, Age 90.3%, (57% as figures only), Clinical history present ~ 100% but detailed only 18.2%, Address 4.2%
4	Danfulani & Musa, 2015	2.3% fully complete (5/214)	Physician name 2.3%, Address 2.3%, Age 62.6%
5	Eze et al., 2019	24.8% (174/700)	Name =most complete; Ambulant nature=least
6	Mohammad et al.,2016	Not reported	Biodata complete 79.1%, Clinical info 99.6%, Previous Xray 2.5%
7	Onwuchekwa, 2017	Not reported	Hospital A: Address 35%, Folder 19%, Phone 10%, LMP 50.6%; Hospital B: Address 23%, Folder 1%, Phone 2.5%, LMP 11.5%, Clinical details, date, name =highest
8	Oyedeji et al., 2015	1.3%	Name 99.0%, Reerring physician 99.0%, Gender 90.3%, Date 88.2%, Age 68.05 Clinical notes 65.9%, Address 5.6%.
9	Robinson et al., 2021	Not reported	Date 97.7%, Nmae/Exam 99.6%, Consultant 72.1%, Resident name 81.7%, Age 51.9%, Resident signature 13.2%, Allergy history 2.8%
10	Khadija et al., 2019	1.25% (5/400)-US 0.75%, ct 2.5%, X-ray 2.15%	Not detailed per field
11	Akintomide et al., 2015	Not reported	Exam requested 99.66%, Most-complete form 86.67%, Least-complete 26.67%, 285 did not use correct form
12	Adegboyega et al., 2023	Not reported	Gender 98.95, Name 70.2%, Age 57.4%, Hospital No 57.4%, Contact 58%, Date 84%, Consultant legible 56%, Doctor sign/name 48%, Clinical diagnosis sufficient 305, Body part appropriate 425, Previous imaging 4%.
13	Garba et al., 2021	0% (sample = inadequate)	Name 100%, LMP 19.7%, Previous X-ray 4.4%, BP 2.55, Repeats 20.9% (33/158)- due to inadequate history 45.55, inadequate exam request 24.25
14	Chia et al., 2022	0% fully complete	Name 100%, Ward 1005, CT type 100% (only 3 fields adequate); Clinician phone ~0% Radiographer signature -0%, A&e dept highest completeness 64.4%

in 4/4 studies. Clinician telephone/contact: 2.5–10% in 3/3 studies. Allergy history was 2.8% in 1/1 study [17] consistent poor fields. Mixed or intermediate fields reported are: Age was 51.9% [17] to 92.9% [9]; 3/9 studies reported >90%, 4/9 studies have 51–68%. Clinical history present was 50.8% [17] to 99.6% [14]; 7/10 studies >90%. Clinical history detailed was 18.2% [11] to 30% [20]; 0/4 studies >50%. Doctor name: 48% [20] to 99% [16]; 3/7 studies >90%. Doctor signature was 13.2% [17] to 91% 10]; 3/5 studies <50%.

Subgroup analyses done by hospital type, modality, and change over time were as follow:

By hospital type: Tertiary teaching hospitals (n=12) showed median completeness of 0.6% versus 1.3% in the single private diagnostic centre [16], suggesting no advantage of private sector.

By modality: CT-only studies [11, 22] reported 0% fully complete forms, with LMP omission rates identical to general radiography. Ultrasound requests [17] showed the poorest clinical history documentation (50.8% present).

By time: No temporal improvement was observed.

Studies from 2009–2015 (median 1.25%) showed similar completeness to 2019–2023 (median 1.3%), indicating persistent system failure despite repeated audits.

Five studies provided qualitative insights on factors associated with completeness. Abubakar [9] and Garba [21] attributed poor completion to "clinician negligence" and failure of radiographers to reject incomplete forms. Oyedeji [16] identified high workload and lack of training on pre-analytical errors. Robinson [17] noted that ultrasound units, with direct clinician-sonographer interaction, paradoxically had poorer documentation, suggesting over-reliance on verbal communication. Chia [22] found Accident & Emergency requests were significantly more complete (64.4%) than outpatient requests (12%), indicating that clinical urgency improves documentation. No study formally tested associations using multivariable analysis.

Discussion

Principal findings

In this study, we found that fully completed radiology request forms are virtually non-existent across all six geopolitical zones, with a median completeness of 1.3% and a range of 0–24.8%. Patient identifiers and requested examinations are almost universally documented, safety-critical fields such as last menstrual period, previous imaging history, allergy status, and referrer contact details were omitted in 80–98% of cases. Forms, were clinical history are present (50–99%), is rarely detailed enough to enable justification of radiation exposure. Only 18–30% of forms contain information sufficient for radiological decision-making.

The consistency of these findings across 14 years, multiple hospital types, and all regions indicates a systemic rather than localized failure. The single outlier from Nnewi (24.8% complete) [13] demonstrates that improvement is achievable when departmental enforcement is applied.

Table 3: Vote-counting summary for completeness 0f 12 core data fields (n=14 studies)

Field	Studies Reporting (n)	Adequate (>70%)	Mixed (50-70%)	Poor (<50%)	Range (%)
Patient name	14	14	0	0	99.5-100
Examination requested	14	14	0	0	98.4-100
Sex/Gender	6	6	0	0	90.3-96.9
Age	9	5	4	0	51.9-92.9
Patient address	7	0	1	6	2.3-54.6
Last menstral period (LMP)	6	0	0	6	2.1-19.7
Previous imaging history	4	0	0	4	2.5-4.0
Clinician telephone/contact	3	0	0	3	2.5-10.0
Allergy history	1	0	0	1	2.8
Clinical history (present)	10	7	3	0	50.8-99.6
Clinical history (detailed)	4	0	0	4	18.2-30.0
Doctors name	7	3	3	1	48.0-99.0
Doctors signature	5	2	0	3	13.2-91.0

Geographically, the stark disparity between the Southeast outlier [13] and the zero-percent rates completeness in the Northeast [9] and Northwest [21] cannot be explained by resources alone, as all sites used identical paper systems, suggesting that local departmental enforcement rather than regional funding drives performance. This is reinforced by the public-private comparison. Private diagnostic Centre [16] achieved only 1.3% completeness, virtually identical to the public teaching hospital average (0.6%), refuting the assumption that market incentives improve documentation. Modality-specific data indicated that CT-only audits [11, 22] recorded 0% fully complete forms despite CT's substantially higher radiation burden, indicating that clinical risk does not spontaneously trigger better referral practice, which is a fact for concern. The consistency of findings across vastly different sample sizes — from Oyedeji's 7,841 forms to Adegboyega's 96 — with near-identical omission rates for LMP (4% vs 3.1%) and clinician contact (<5%), confirms that the deficit is systemic rather than a small-sample artefact. Temporal analysis is equally disturbing; studies 14 years apart in the same city (Lagos) show no improvement in detailed history (18.2% vs 20%), demonstrating persistent audit without feedback [11, 20]. A major source of this stagnation is definitional: when authors counted "any text" as adequate clinical history, rates exceeded 90% [14], but when they required duration, findings, and differential diagnosis, rates collapsed below 30% [20] — a 70-percentage-point swing that explains the disconnect between clinicians' perception of completeness and radiologists' experience of inadequacy. The only positive deviance emerged from urgency. Chia [22] found that Accident & Emergency requests were five times more complete than outpatient forms (64.4% vs 12%), suggesting that clinical stakes, not time pressure, motivate documentation.

Methodological quality did not confound these patterns: high-JBI studies 8/8 [16] and moderate-JBI studies 5/8 [12] reported identical LMP omission rates (>95%), indicating that rigor of audit does not explain poor performance. Also a subtle North-South gradient in LMP documentation (South-South median 11.5% vs Northwest 3.2%) likely reflects differential obstetric imaging volumes rather than awareness, underscoring that even marginally better performance remains far below safety thresholds. The study therefore dismantle common excuses that private facilities perform better, that high-risk modalities receive more care, that small studies exaggerate the problem, or that time constraints are insurmountable. The review point instead to a uniform absence of standards, enforcement, and accountability across Nigeria's imaging ecosystem, which need urgent attention.

Comparison with existing literature

Our findings align closely with the recent African systematic review by Hajalamin et al with pool of 34% adequacy [3], studies from Ethiopia (28% complete) [4], Ghana (41%) [5], and India (37%) [6]. All reported poor completeness. Our study reported median of 1.3 and range of 0-24% request form completeness to preserve the truth that most of the hospitals are near zero while one outlier exists. It should be noted that Hajalamin et al's review which contains 4 Nigerian studies, reported "adequate clinical information" and not "fully completed". Their Nigerian subset (4 studies) had a pooled estimate of 19%, but they noted high heterogeneity (I^2 =96.4%) and expressed that the 34% does not imply true average. Our synthesis resolves apparent contradictions in the primary literature. Individual audits blamed "clinician ignorance," "workload," or "poor form design." Our SWiM analysis however, shows that these factors co-exist. High-volume centres [16, 18, 21] report workload pressures, while teaching hospitals report knowledge gaps, yet the outcomes, omission of LMP and contact details, are identical. This suggests a common root cause in our study which is absence of a national accountability mechanism.

The Royal College of Radiologists [1] and IR(ME)R 2017 [2] establish three non-negotiable principles: justification, optimization, and accountability. Nigerian practice contravenes all three. Justification: IR(ME)R Regulation 11 requires the practitioner to have "adequate clinical information" before authorizing exposure. Our data show this is

impossible in 70–82% of cases where clinical history is non-specific. Garba et al.'s finding that 20.9% of inadequate forms led to repeat examinations translates to an estimated 400,000 avoidable exposures annually nationwide, each carrying a lifetime attributable cancer risk of approximately 1 in 2,000 for abdominal CT [21]

Optimization: The ALARA principle requires consideration of previous imaging to avoid duplication. With previous imaging documented in only 2.5–4% of forms, Nigerian imaging scientists cannot determine whether a study is truly indicated, contributing to both unnecessary radiation and wasted resources.

Accountability: RCR guidance requires legible referrer identification for communication of critical findings [1]. The finding that doctor signatures are present in only 13–48% of forms, and telephone numbers in <10%, creates a medicolegal vacuum.

Implications for practice and policy

Our findings demand immediate system-level intervention rather than further audits. Three evidence-based recommendations emerge:

1. National standardized form: The Federal Ministry of Health, in collaboration with the Radiographers Registration Board of Nigeria and the Association of Radiologists, should mandate a minimum dataset incorporating the RCR 10 core items. The form should include mandatory checkboxes for LMP and pregnancy status for all women 12–55 years.

2. Enforcement at point of care: The Nnewi experience [13] demonstrates that radiographer-led gatekeeping increases completeness ten-fold. We recommend a national policy empowering radiographers to reject incomplete forms, supported by hospital management. This aligns with IR(ME)R [2], which places legal responsibility on the operator to ensure justification.

3. Targeted education and audit: Continuous medical education should emphasize that request forms are legal documents, not administrative slips. Quarterly departmental audits should be linked to departmental accreditation.

Strengths and limitations

The universal clarity of inclusion criteria strengthens the internal validity of the included individual audits, while the predominance of convenience sampling limits generalizability beyond the audited period. Importantly, the remarkable consistency of poor completeness across 11 independent convenience samples from different zones and years suggests that sampling method is unlikely to explain the findings; rather, it reflects a true system-wide deficit. This review's strengths include comprehensive coverage of all geopolitical zones, rigorous quality appraisal, and adherence to SWiM guidelines for heterogeneous data. The inclusion of 12,268 forms over 14 years provides high precision in the study.

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Data Availability Statement: All data generated or analyzed during this study are included in the main work and the following supplementary information.

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Appendix

Table 4: JBI Quality Assessment for Analytical Cross-Sectional Studies

NO	STUDY	1. INCLUSION CRITERIA	2. SETTING DESCRIBED	3. EXPOSURE MEASURED VALIDLY	4. OBJECTIVE CRITERIA	5. CONFOUNDER IDENTIFIED	6. STRATEGIES FOR CONFOUNDERS	7. OUTCOME MEASURED VALIDLY	8. APPROPRIATE STATISTICS	SCORE /8
1	Abubakar et al., 2015	yes	Yes	U	NO	yes	yes	yes	yes	6
2	Agi et al., 2015	yes	Yes	yes	Yes	NO	NO	yes	yes	6
3	Akinola et al., 2009	yes	yes	yes	yes	NO	NO	yes	yes	6
4	Danfulani & Musa, 2015	yes	Yes	yes	U	NO	NO	yes	yes	5
5	Eze et al., 2019	yes	Yes	yes	Yes	NO	NO	yes	yes	6
6	Mohammed et al., 2016	yes	Yes	yes	U	NO	NO	yes	yes	5
7	Onwuchekwa, 2017	yes	Yes	yes	Yes	yes	yes	U	yes	7
8	Oyedeji et al., 2015	yes	Yes	yes	Yes	yes	yes	yes	yes	8
9	Robinson et al., 2021	yes	Yes	yes	Yes	yes	NO	yes	yes	7
10	Khadija et al., 2019	yes	Yes	yes	Yes	NO	NO	yes	yes	6
11	Akintomide et al., 2015	yes	Yes	yes	Yes	yes	NO	yes	yes	7
12	Adegboyega et al., 2023	yes	Yes	yes	Yes	yes	NO	yes	yes	7
13	Garba et al, 2021	yes	Yes	yes	Yes	NO	NO	yes	yes	6
14	Chia et al., 2022	yes	Yes	yes	yes	NO	yes	yes	yes	7

The 8-items JBI tool was applied to each of the 14 studies. Yes=criterion met, No=not met, U=Unclear. Grade of 7-8 implies high quality, 5-6 implies moderate quality and 0-4 implies low quality. No study was excluded on quality grounds.