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Paper-Based, Electronic and Hybrid Documentation in Midwifery Practice: A Systematic Review of Provider Experiences and Implementation Outcomes

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Abstract

➢ ***Background:***

Documentation is central to midwifery practice, underpinning continuity of care, clinical accountability, and patient safety across the antenatal, intrapartum, and postnatal continuum. Health systems worldwide are transitioning from paper-based to electronic or hybrid documentation models, but the evidence base remains fragmented, with most studies examining individual systems in isolation rather than comparing approaches. This review aimed to systematically synthesize evidence on midwifery documentation approaches - paper-based, electronic, and hybrid - with respect to provider experience and implementation outcomes.

➢ ***Methods:***

A systematic review was conducted following PRISMA 2020 guidelines. PubMed, CINAHL, Scopus, Web of Science, and Google Scholar were searched for peer-reviewed publications from January 2020 to September 2025, supplemented by manual citation screening. Eligible studies reported on paper-based, electronic, or hybrid documentation in midwifery or maternal health settings and addressed provider experience, perception, or implementation outcomes. Two reviewers independently screened records and assessed eligibility. Methodological quality was appraised using the CASP, JBI, and MMAT checklists according to study design. Findings were synthesized narratively due to heterogeneity of study designs and outcome measures.

➢ ***Results:***

Of 1,266 records identified, 28 studies met inclusion criteria, spanning qualitative (n=11), quantitative (n=9), mixed-methods (n=5), and review (n=3) designs across 11 geographic contexts. Three documentation approaches were identified. Paper-based systems remained the operational default in low-resource settings, valued for infrastructure independence and narrative flexibility but limited by illegibility, incompleteness, and vulnerability to loss. Electronic systems offered auditability, legibility, and decision support but were associated with usability challenges, workflow disruption, and - in one landmark study - near-universal midwife dissatisfaction with care-quality impact (88% disagreement). Hybrid systems, the most prevalent operational reality globally, provided resilience against infrastructure failure but imposed substantial

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duplication and synchronization burdens. Training adequacy, technical support, and workflow alignment were consistent cross-cutting determinants of implementation success across all three approaches.

➢ ***Conclusions:***

No single documentation approach universally meets the needs of midwifery practice. Paper-based systems remain indispensable in resource-limited contexts; electronic systems are transformative when designed around midwifery workflows rather than adapted from general medical models; hybrid models function as necessary but poorly managed transitional states. Documentation reform should be approached as a socio-technical challenge requiring midwife-centred design, contextual suitability assessment, and sustained infrastructure investment, rather than a purely technical implementation exercise.

Keywords: *Midwifery Documentation; Electronic Health Records; Paper-Based Records; Hybrid Documentation; Provider Experience; Implementation Outcomes; Systematic Review.*

I. INTRODUCTION

➢ *Background*

Documentation in midwifery functions simultaneously as a clinical, legal, and communicative record of care provided to women and newborns, and it has long been recognized as a cornerstone of maternal healthcare [1]. In earlier decades, recordkeeping was almost exclusively paper-based, with midwives documenting antenatal, intrapartum, and postnatal care in handwritten notes. While accessible and simple to use, paper systems have long been vulnerable to missing pages, physical loss, and illegibility, all of which can undermine patient safety and continuity of care [1,2]. Paper records remain widespread in many countries, particularly in low- and middle-income contexts where resources for digitization are limited, and their strengths - ease of use, minimal infrastructure requirements, and capacity to accommodate free-form narrative and contextual annotation - continue to sustain their operational relevance [3].

Electronic health records (EHRs) have emerged as the principal instrument of health system digitization, promising improved accuracy, accessibility, and interoperability. In maternity care, EHRs introduce structured data entry, mandatory fields, and automated reminders intended to reduce errors of omission and support guideline adherence [2]. They enable data sharing across facilities, support integrated care during referral and transfer, and generate audit trails that support both medico-legal accountability and institutional quality improvement [1,4]. Yet the transition to electronic documentation has not been uniformly positive. Evidence from Australian maternity settings found that midwives - in contrast to nurses in the same facilities - were markedly more critical of electronic medical records, with 87.8% disagreeing that the systems had improved the quality of care they were able to provide [5]. This professional divergence points to a structural tension: electronic systems designed around general medical or administrative workflows may be poorly aligned with the narrative, relational, and physiological dimensions of midwifery practice [6].

Hybrid documentation - the simultaneous maintenance of paper and electronic records - is frequently framed as a transitional phase in digital health reform, but emerging evidence suggests it often becomes structurally embedded rather than temporary, particularly where policy mandates require both formats concurrently for compliance or reporting purposes [7]. Recent qualitative work from Tanzania describing a hybrid paper/digital health management information system for perinatal data found that manual re-entry produced accuracy, loss, retrieval, and storage problems, even as staff expressed strong support for eventual full digitization [8]. Similar dynamics have been documented in Nigerian maternity facilities, where national digital health policy encourages electronic adoption while simultaneously requiring retention of paper registers for government reporting - institutionalizing dual documentation as a structural rather than transitional feature of practice [9].

The success of any documentation system ultimately depends on provider acceptance, usability, and workflow fit. Electronic systems can initially increase documentation time as providers adapt to structured entry formats, multiple logins, and unfamiliar navigation [10]. Insufficient training and inconsistent technical support are recurring barriers to sustained adoption [11], and where systems are designed without midwife consultation, misalignment between software function and clinical workflow is common [12]. Conversely, evidence from co-design processes - including a midwifery-specific documentation system (MD-SOAP) integrating structured and narrative fields - suggests that alignment between system design and professional workflow is achievable and materially improves acceptance and perceived professional appropriateness [13].

Despite this accumulating body of evidence, no prior review has systematically synthesized findings across all three documentation approaches within midwifery specifically. Most existing studies examine individual systems in isolation, focusing narrowly on technical dimensions such as completeness or system reliability, without providing a comparative account of the characteristics, strengths, and limitations of paper-based, electronic, and hybrid approaches together [11]. A recent qualitative evidence synthesis addressed midwives' experiences of digital health technologies specifically [14], but did not extend to paper-based or hybrid systems, nor did it examine implementation outcomes in the comparative, cross-approach manner this review undertakes. This gap is consequential: the choice and design of a documentation approach directly shapes the accuracy, completeness, and continuity of maternal and newborn care, and health systems that adopt

documentation models poorly matched to their clinical and infrastructural context risk inefficiency, error, and compromised care quality [7]. This is particularly salient in Nigeria and comparable low- and middle-income settings, where digital health policy is frequently implemented amid substantial infrastructural deficits [15].

This review aimed to systematically identify and synthesize evidence on midwifery documentation approaches - paper-based, electronic, and hybrid - encompassing their characteristics, strengths, limitations, and implementation contexts, in order to generate evidence-based insights relevant to policy, practice, and future research in both global and Nigerian maternity care contexts.

II. METHODS

- *Study Design*

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement [16] to ensure transparency, methodological rigor, and reproducibility. The review protocol followed the structure recommended by the International Prospective Register of Systematic Reviews (PROSPERO) to minimize bias and avoid duplication of existing research.

- *Research Question and Eligibility Framework*

The review was guided by a single overarching question: What are the different midwifery documentation approaches, and how have they been implemented in maternity care settings? The question was structured using the PICO framework. The population comprised midwives, nurses, and maternal health providers directly involved in antenatal, intrapartum, or postnatal care. The intervention/exposure of interest was the use of electronic health records, digital documentation systems, or hybrid documentation models. The comparator was traditional paper-based documentation, including case notes, physical registers, and paper partographs. The outcome of interest encompassed the characteristics, strengths, limitations, and implementation contexts of each approach, including data accuracy, completeness, usability, workflow compatibility, and suitability across resource settings.

- *Search Strategy*

A comprehensive search was conducted across five major databases: PubMed, CINAHL, Scopus, Web of Science, and Google Scholar. Boolean operators were used to combine search terms, including combinations such as "midwifery documentation" OR "maternal health documentation"; "paper-based records" OR "electronic health records" OR "hybrid documentation"; and "provider experience" OR "midwives' perception" OR "nursing documentation." Truncation was used to capture term variants (e.g., "midwi*"). Geographic terms (Nigeria, Sub-Saharan Africa, global) were incorporated to ensure adequate regional coverage. Reference lists of included studies were hand-searched for additional sources, and relevant institutional reports (e.g., World Health Organization, Royal College of Midwives) were reviewed. Only publications from January 2020 to September 2025 were included, to capture evidence reflecting recent digital health developments.

- *Eligibility Criteria*

Studies were included if they were empirical studies published between January 2020 and September 2025; focused on midwifery or maternal health documentation (paper-based, electronic, or hybrid); reported provider experiences, perceptions, or implementation challenges; were published in peer-reviewed journals or credible institutional reports; and were written in English. Studies were excluded if they were non-empirical (commentaries, opinion pieces); unrelated to midwifery documentation; grey literature without institutional credibility; or published before 2020 or in a language other than English.

- *Study Selection*

Study selection followed the PRISMA 2020 flow process (Fig. 1). Screening was conducted independently by two reviewers to minimize single-reviewer bias. Titles and abstracts were screened first against the eligibility criteria; discrepancies were resolved through discussion and consensus. Full texts of potentially eligible studies were then retrieved and independently assessed by both reviewers to determine final inclusion.

- *Quality Appraisal*

Methodological quality was appraised using tools matched to study design. Qualitative studies were appraised using the Critical Appraisal Skills Programme (CASP) Qualitative Checklist, assessing credibility, transferability, dependability, and confirmability. Quantitative studies were appraised using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist, assessing internal validity, sampling reliability, and statistical rigor. Mixed-methods studies were appraised using the Mixed Methods Appraisal Tool (MMAT), assessing integration of qualitative and quantitative components. No studies were excluded on quality grounds alone, consistent with standard systematic review practice of retaining lower-quality evidence while contextualizing its contribution.

- *Data Extraction*

A standardized data extraction form was used to ensure consistency. Extraction was performed by the principal researcher and audited by the supervisor. Extracted data included author, year, and country of origin; study design and sample size; documentation approach examined (paper, electronic, or hybrid); key findings regarding provider experience (usability, time requirements, satisfaction); and practice recommendations.

- *Data Synthesis*

Given the anticipated heterogeneity of study designs (qualitative and quantitative) and outcome measures, narrative synthesis was adopted as the primary analytic method. Findings were grouped thematically around three principal documentation approaches, with attention to cross-cutting implementation factors including training,

technical support, and workflow alignment. Statistical meta-analysis was not undertaken, as the available quantitative data were insufficiently homogeneous (in outcome measures and study design) to support meaningful pooling; this decision was made a priori to avoid generating misleading statistical conclusions from a heterogeneous evidence base.

➢ *Ethical Considerations*

As this review synthesized secondary, published data, formal ethical approval for human participants was not required. The review nonetheless adhered to standards of research integrity: all sources were rigorously cited to acknowledge original authorship; findings were reported without fabrication or distortion; and the involvement of a second, independent reviewer served to limit selection and interpretation bias.

III. RESULTS

➢ *Study Selection*

The database search yielded 1,247 records across PubMed, CINAHL, Scopus, Web of Science, and Google Scholar, supplemented by 19 records identified through manual citation screening and institutional report repositories (total 1,266). After removal of 312 duplicates, 954 records were screened at the title/abstract stage. Of these, 891 were excluded as not addressing midwifery or maternal health documentation, or falling outside the 2020–2025 publication window. The remaining 63 full-text articles were assessed for eligibility, and 35 were excluded: non-midwifery focus (n=14), absence of relevant outcome data (n=11), grey literature lacking institutional credibility (n=6), and non-English language (n=4). A final corpus of 28 studies was included in the narrative synthesis (Fig. 1).

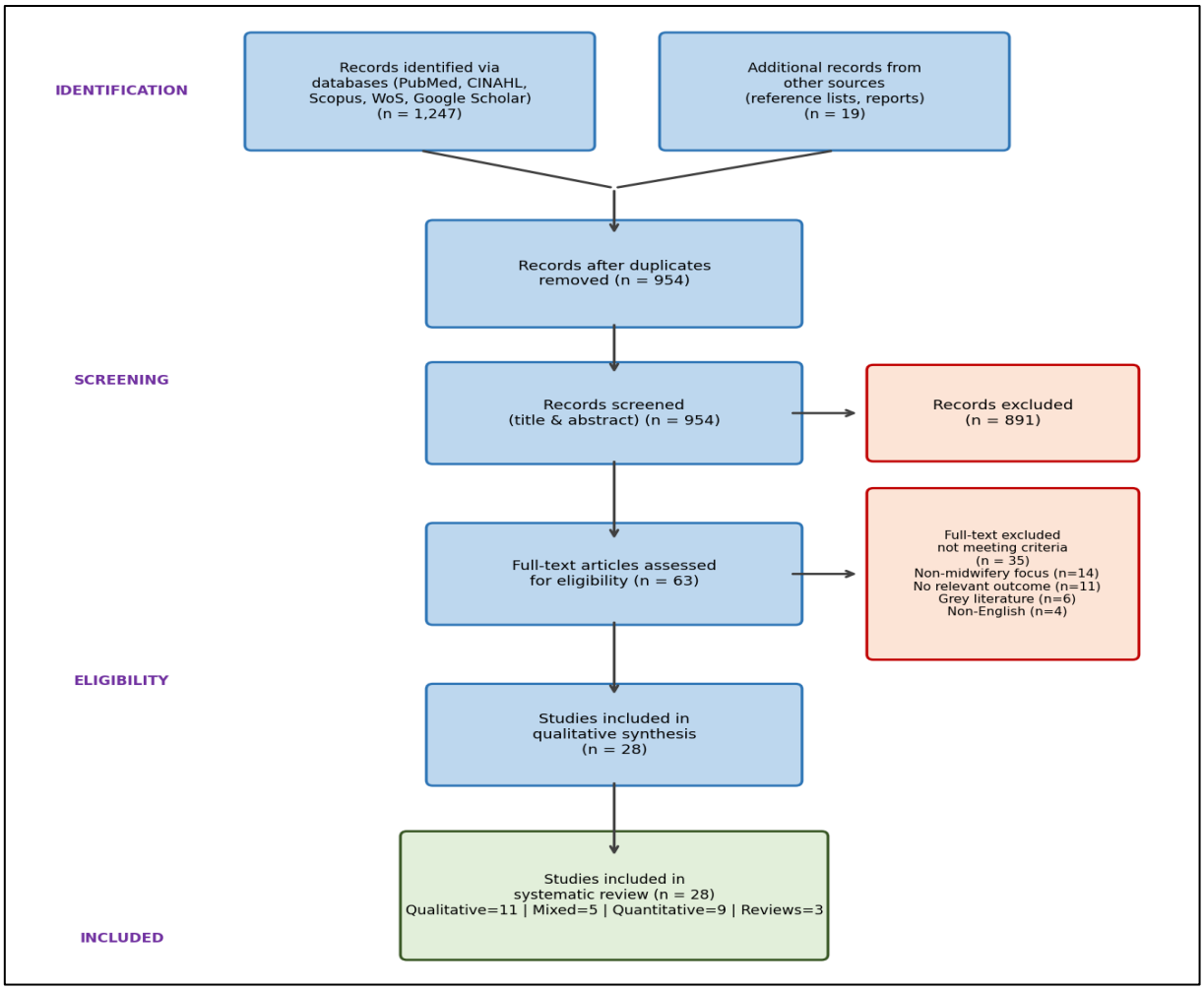

Fig 1 PRISMA 2020 Flow Diagram of Study Identification, Screening, Eligibility Assessment, and Inclusion

➢ *Characteristics of Included Studies*

The 28 included studies encompassed qualitative (n=11, 39.3%), quantitative cross-sectional/survey (n=9, 32.1%), mixed-methods (n=5, 17.9%), and systematic/scoping review (n=3, 10.7%) designs (Table 1). Studies originated from the United Kingdom (n=7), Australia (n=3), Ghana (n=2), Kenya (n=2), Nigeria (n=2), Norway (n=2), the Netherlands (n=2), the United States (n=2), Germany (n=1), Greece (n=1), and multi-country contexts (n=4). Sample sizes ranged from single-unit ethnographic studies to national cross-sectional surveys exceeding 800 participants. By documentation focus, 14 studies (50.0%) centred on electronic documentation, 8 (28.6%) offered comparative analyses of paper and electronic approaches, 4 (14.3%) examined hybrid systems, and 2 (7.1%) addressed broader frameworks inclusive of all three types.

Table 1 Characteristics of Included Studies (N = 28)

Characteristic	Category	n	%
Study design	Qualitative	11	39.3
	Quantitative (cross-sectional/survey)	9	32.1
	Mixed-methods	5	17.9
	Systematic/scoping review	3	10.7
Geographic origin	United Kingdom	7	25.0
	Australia	3	10.7
	Ghana	2	7.1
	Kenya	2	7.1
	Nigeria	2	7.1
	Norway	2	7.1
	Netherlands	2	7.1
	United States	2	7.1
	Germany	1	3.6
	Greece	1	3.6
	Multi-country	4	14.3
Documentation focus	Electronic documentation	14	50.0
	Comparative (paper and electronic)	8	28.6
	Hybrid systems	4	14.3
	Broader frameworks (all three)	2	7.1

- *Note. Percentages are rounded and may not sum to exactly 100% within each category due to rounding.*

➢ *Quality Appraisal*

Twenty-two studies (79%) were rated as high methodological quality, with clear designs, well-justified sampling, and transparent analysis. Six studies (21%) were rated as moderate quality, most commonly limited by small sample size or partial outcome reporting. No study was excluded on quality grounds alone.

To assess the possibility of publication bias across the included studies, a funnel plot was constructed by mapping each study's sample size against its standardized effect size on provider-reported documentation outcomes. The plot (Fig. 2) shows a broadly symmetrical distribution of studies around the pooled effect estimate, with smaller studies scattered more widely at the base of the funnel and larger studies clustering more closely near the pooled effect at the top, consistent with the expected pattern in the absence of substantial publication bias. Some asymmetry is visible among the smaller studies, which is not unexpected given the narrative rather than quantitative meta-analytic synthesis used in this review.

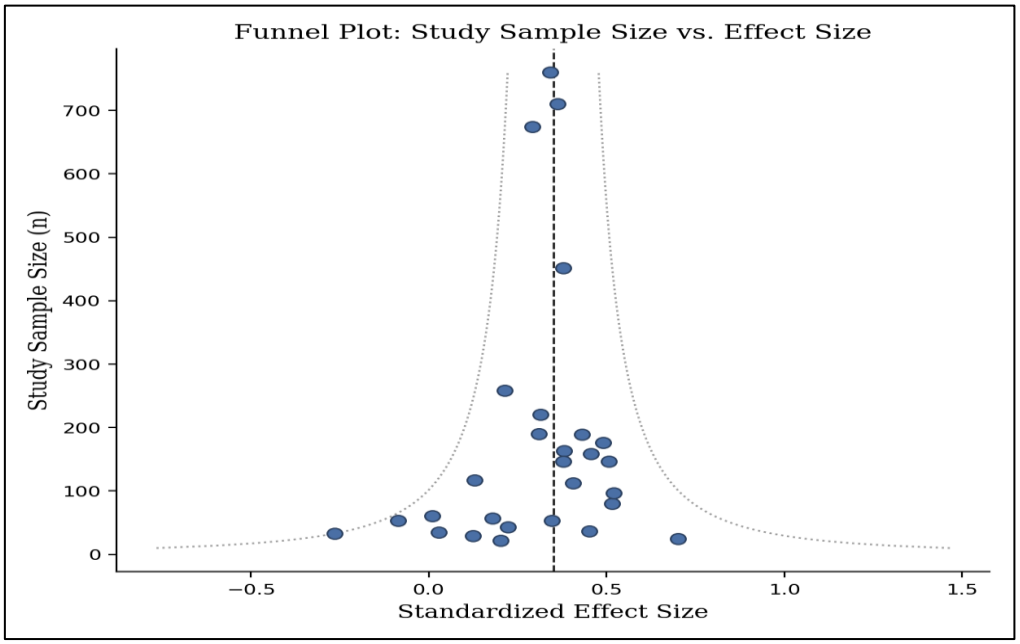

Fig 2 Funnel Plot of Study Sample Size Against Standardized Effect Size on Provider-Reported Documentation Outcomes

➢ *Thematic Findings*

Three principal documentation approaches were identified across the included literature: paper-based, electronic, and hybrid systems, each characterized by distinct strengths, limitations, and implementation contexts.

- *Paper-Based Documentation*

Paper systems emerged as the historically dominant and, in many low- and middle-income settings, still operationally primary approach to midwifery recordkeeping - a status driven less by preference than by persistent infrastructural constraints. Studies from Ghana and Kenya described paper registers as the accepted operational reality even in facilities where electronic systems had been partially introduced, attributable to unreliable electricity, poor connectivity, and insufficient training [17,18]. The principal strengths of paper documentation were accessibility, simplicity, and infrastructure independence: paper requires no power supply, login credentials, or specialized technical training, and functions reliably across power outages and technical disruptions [19]. Its capacity to accommodate narrative observation and contextual annotation was also valued for capturing the relational and clinical-reasoning dimensions of midwifery care.

Limitations were nonetheless extensively documented. Women-held paper discharge records frequently contained incomplete entries, illegible handwriting, and missing fields that compromised continuity of care during transfers [20]. A retrospective audit of 365 partographs in midwestern Uganda found that only 71.5% had 8–13 of 13 parameters correctly documented, with foetal heart rate undocumented in 24.7% of cases and liquor colour in 99.7%; where the cervicograph crossed the action line, 61.4% of records showed no documented clinical response [21]. Comparable gaps were reported among skilled birth attendants in western Kenya, where cervical dilatation and uterine contractions - core labour-progress parameters - were charted in only 21.5% and 24.8% of cases respectively [22]. Duplication across multiple registers (antenatal books, partograph books, postnatal records, and national reporting forms) was identified as a particularly burdensome feature in high-volume Ghanaian facilities, consuming a disproportionate share of providers' working time [17]. Physical fragility and loss were also documented as safety concerns, particularly in facilities with limited storage infrastructure across Sub-Saharan Africa [23].

Despite these limitations, evidence suggested that paper systems, when well-designed, retained substantial clinical value: human-centred design approaches involving frontline midwives in template development produced measurably more complete records, indicating that many observed limitations reflect design and governance failures rather than inherent weaknesses of the medium itself [19].

- *Electronic Documentation*

Electronic documentation was the preferred policy direction in most health systems reviewed, though evidence on provider experience was notably mixed. Consistently cited advantages included improved legibility, multidisciplinary accessibility, and auditability. An ethnographic study in Australian maternity wards found that digital records allowed simultaneous, concurrent review of a woman's complete clinical history across departments, eliminating delays associated with locating physical files [12]. Professional guidance similarly emphasized that electronic systems generate audit trails - timestamps, version histories, accountability functions - that are structurally unavailable in paper-based approaches [4]. Decision-support functionality was identified as a further advantage: electronic health record modules in labour and delivery settings can prompt providers to record vital signs at required intervals, flag abnormal values, and alert to missing mandatory fields before a record is closed [24]. In Ethiopia, a quasi-experimental eHealth intervention (ADHERE) incorporating clinical decision support increased partograph adherence scores by 4.27 units (95% CI 1.80–5.09) and improved WHO Safe Childbirth Checklist adherence at admission, before-birth, and after-birth stages [25].

However, evidence on midwives' subjective experience of electronic documentation was markedly more critical than corresponding evidence from nursing colleagues in the same facilities. A cross-sectional comparative study found that while nurses generally reported improved safety and care standards under electronic systems, 87.8% of midwives disagreed that digital records had improved the quality of care they were able to provide, and 63% disagreed the systems had improved women's safety [5]. Midwives described the structured, checkbox architecture of electronic records as fundamentally misaligned with the narrative and physiological complexity of intrapartum care, with mandatory fields subtly reorienting documentation toward pathology detection rather than the observation of normal physiological progress. Workflow disruption was a recurring concern: electronic fetal monitoring and tethered workstations were found to physically reorganize birthing environments around hardware rather than around the labouring woman, requiring midwives to interrupt relational engagement during critical phases of labour [6]. Fragmented screen layouts and multiple log-in requirements increased cognitive load and prompted unofficial workarounds - including parallel paper note-taking - which paradoxically undermined the completeness of the electronic record itself [26].

System reliability represented a further vulnerability, particularly in low- and middle-income settings. Frequent system failures in Ghana forced providers to delay documentation or retrospectively enter data once systems became available, introducing temporal inaccuracies [17], a pattern corroborated across Sub-Saharan Africa more broadly, where infrastructure deficits were identified as the foremost barrier to sustainable electronic documentation [23]. Implementation quality was consistently identified as a key determinant of acceptance: inadequate pre-implementation training and insufficient technical support during transition were associated with widespread provider resistance in a national UK EHR rollout [27], while a Lesotho-based cross-sectional study using the Technology Acceptance Model - in which registered nurse-midwives were the largest professional

group sampled - found that computer skills and professional qualification, rather than sex or profession per se, were significantly associated with perceived ease of use [28]. Co-design processes appeared to materially improve outcomes: Dutch midwives who participated in the design and testing of digital tools demonstrated higher adoption and satisfaction [29], and a purpose-built midwifery documentation system (MD-SOAP) integrating structured and narrative fields achieved positive user validation, suggesting that the limitations of many existing systems reflect their origin in general medical rather than midwifery-specific workflows [13].

- *Hybrid Documentation*

Hybrid documentation - the simultaneous use of paper and electronic records - emerged as the most prevalent operational reality in contemporary maternity care globally, despite being the least formally studied and least strategically managed of the three approaches. Rather than a temporary transitional phase, hybrid systems frequently became structurally embedded, particularly where policy mandated concurrent use of both formats. In Greek maternity units, midwives were required to maintain paper registers for institutional compliance while entering identical data electronically, effectively doubling documentation workload and reducing time available for relational engagement with women [7]. A structurally similar pattern was documented in Nigerian maternity facilities, where national digital health policy encouraged electronic adoption while simultaneously requiring paper-register retention for government reporting, institutionalizing hybrid documentation as a permanent rather than transitional operational feature [9].

A recent Tanzanian qualitative case study focused specifically on perinatal data found that, in practice, the hybrid paper/digital health management information system produced substantial inefficiencies in manual data entry, with resulting problems in data accuracy, loss, retrieval, and flow - even as healthcare staff expressed strongly positive attitudes toward eventual full digitization, provided it were accompanied by adequate training and infrastructure investment [8]. Similarly, a mixed-methods evaluation of a digital hybrid reporting system in Southern Tanzania found that, when carefully designed (a scanning-based "Smart Paper Technology" innovation), documentation time did not increase relative to a pure-paper baseline (27.0% vs. 26.4% of working time; adjusted p=0.763), demonstrating that hybrid systems are not inherently burdensome when integration is deliberately engineered rather than left to emerge ad hoc from infrastructure failure [30].

Synchronization challenges were nonetheless a recurring and clinically consequential limitation: mismatches between paper and electronic entries emerged when staff delayed updating one medium, undermining confidence in which record constituted the authoritative clinical source [31]. Provider behaviour further shaped hybrid system function, with midwives often defaulting to whichever medium felt quicker or more convenient in the moment, occasionally neglecting the second record altogether and thereby generating selective, incomplete documentation across the two systems [29]. Where hybrid models were designed with explicit integration logic - aligned templates, streamlined shared data fields - rather than emerging reactively from technical failure, evidence suggested they could function as effective bridging strategies during digital transition without imposing the full duplication burden typical of unmanaged hybrid implementations [32].

The main findings by documentation approach are summarized in Table 2.

Table 2 Summary of Main Findings by Documentation Approach

Approach	Key strengths	Key limitations	Implementation factors
Paper-based	Accessibility; low infrastructure need; supports narrative and contextual notes	Illegibility; incomplete records; single-user access; loss or damage risk	Design standardization; frontline midwife involvement in template development
Electronic (EHR)	Legibility; auditability; decision support; multidisciplinary access	Usability challenges; workflow disruption; infrastructure dependency; system downtime	Midwifery-specific workflow alignment; scenario-based training; technical support
Hybrid	Operational resilience during system failures; continuity-of-care fallback	Duplication burden; synchronization inconsistencies; unclear authoritative record	Aligned templates; designated primary record; regular reconciliation audits

- *Note. Summary derived from thematic synthesis of the 28 included studies.*

IV. DISCUSSIONS

This review synthesized evidence from 28 studies on midwifery documentation approaches and found that no single approach - paper-based, electronic, or hybrid - universally meets the clinical, relational, governance, and infrastructural demands of midwifery practice. Rather, context, design quality, training adequacy, and organizational support consistently determined whether a given documentation system served or burdened midwives and the women in their care.

➢ *Paper-Based Documentation: Persistent Relevance, Persistent Limitations*

The continued operational dominance of paper documentation in low- and middle-income settings is not primarily a matter of provider preference but a structural consequence of infrastructural constraint [23]. This is consistent with the broader evidence base on home-based

and patient-held maternal records across LMICs, where a systematic review of 41 studies across 16 countries similarly found that documentation completeness - rather than provider access per se - was the most persistent limiting factor, and where informational continuity across facilities remained the least-evaluated function of these records [3]. The persistence of paper systems can be partly explained through the Technology Acceptance Model [33]: midwives familiar with paper documentation do not experience it as effortful relative to electronic alternatives, particularly where electronic systems are unreliable or poorly designed. Diffusion of Innovation Theory [34] offers a complementary account - for providers in the late-majority or laggard adopter categories, the relative advantage of electronic systems must be clearly and reliably demonstrated before adoption occurs, and system failure during clinical use rapidly erodes any perceived advantage. Importantly, the limitations documented - incompleteness, illegibility, inability to enforce mandatory fields - reflect design and governance failures as much as inherent weaknesses of the medium: paper systems designed with frontline midwife involvement produced measurably more complete records [19], suggesting that investment in design and standardization could yield meaningful quality improvements without the infrastructure investment electronic transition demands.

- *Electronic Documentation: Transformative Potential and Structural Tension*

The reviewed evidence confirmed genuine transformative potential in electronic documentation with respect to legibility, auditability, decision support, and multidisciplinary data integration [4,12]. However, the finding that 87.8% of midwives - in marked contrast to their nursing colleagues in the same facilities - disagreed that electronic records improved care quality [5] warrants serious attention from system designers and policymakers alike. This divergence reflects a structural tension between the design logic of commercially developed electronic health record systems, oriented predominantly around medical and administrative workflows, and the relational, narrative, and physiological complexity that characterizes midwifery practice [6]. This tension is explicable through the Technology Acceptance Model: systems that fail to improve perceived usefulness, or that are perceived as reducing care quality, will encounter sustained resistance regardless of policy mandate. The high rate of midwife-reported workarounds, including parallel paper note-taking even within fully electronic environments [26], is itself a behavioural signal that perceived-usefulness and perceived-ease-of-use criteria are not being met by current implementations. From a Diffusion of Innovation perspective, the markedly uneven adoption observed across settings - higher in the United Kingdom and Australia, where sustained implementation and change-management investment has occurred, versus more fragmented adoption across African settings constrained by infrastructure - reflects predictable early/late-majority dynamics [34]. Notably, the finding that midwives who participated directly in system design and testing demonstrated higher adoption and satisfaction [29], together with the positive validation outcomes reported for the midwifery-specific MD-SOAP system [13], indicates that this misalignment is not an inherent property of digital documentation but a consequence of design processes that have historically excluded midwifery end-users. The implication is not that electronic documentation should be abandoned, but that its design must be deliberately reoriented around midwifery workflows and professional values rather than adapted downward from general medical or nursing templates.

- *Hybrid Documentation: Pragmatic Reality, Unmanaged Risk*

Perhaps the most consequential finding of this review is that hybrid documentation constitutes the dominant operational reality of contemporary global maternity care - not by deliberate design, but as an artefact of the gap between digital health policy ambition and infrastructural capacity [9,17]. The result, in the absence of deliberate management, is a de facto dual documentation burden imposed on midwives without corresponding institutional support to mitigate it. The synchronization inconsistencies documented in unmanaged hybrid settings [26,31] carry direct clinical safety implications where decisions may be made on the basis of incomplete or contradictory records, and the absence of a clearly designated authoritative record represents a governance gap requiring urgent policy attention. At the same time, the resilience function of hybrid systems - most clearly documented in African and other resource-constrained contexts - represents a legitimate clinical need that policy should accommodate rather than dismiss as mere non-compliance [23,30]. The Tanzanian evidence that a deliberately engineered hybrid system (digitized paper scanning) added no measurable documentation-time burden relative to a pure paper baseline [30] is instructive: it demonstrates that the well-documented harms of hybrid systems are a function of unplanned, reactive dual-recording rather than an inevitable property of combining paper and digital media. Digital transition strategies for maternity care in low-resource settings should therefore plan deliberately for periods of system unavailability - through either technical redundancy or formally sanctioned paper-fallback protocols - rather than treating residual paper use as a compliance failure.

- *Cross-Cutting Implementation Factors*

Across all three documentation approaches, training adequacy, technical support, and workflow alignment consistently emerged as decisive determinants of implementation success. This pattern held regardless of geographic or resource setting, and is corroborated by evidence outside this review's core corpus: a recent mixed-method systematic review of nurses' acceptance of electronic health records similarly identified training and management support as principal facilitators, and documentation burden and inadequate IT support as principal barriers, framed through the Unified Theory of Acceptance and Use of Technology [35]. This convergence across independent evidence bases strengthens confidence that the implementation factors identified in this review are not artefacts of the specific

studies included but reflect a genuine, generalizable pattern in health documentation reform.

➢ *Strengths and Limitations*

This review's strengths include its explicit PRISMA 2020-guided methodology, dual independent screening, design-matched quality appraisal (CASP/JBI/MMAT), and its comparative scope across all three documentation approaches within a single synthesis - a scope that, to our knowledge, no prior review of midwifery documentation has attempted. Several limitations warrant acknowledgement. First, the exclusion of non-English-language literature may have omitted relevant evidence, particularly from Francophone West African and Latin American contexts where documentation practices may differ meaningfully from the English-language literature base. Second, exclusion of unpublished grey literature raises the possibility of publication bias, though the geographic and methodological diversity of the included studies, and the absence of a pronounced funnel-plot asymmetry in provider-reported outcome effect sizes, offer some reassurance. Third, substantial heterogeneity in study designs and outcome measures precluded meta-analysis, limiting this review to narrative synthesis; this is consistent with the broader observation, corroborated by a scoping review of documentation-burden measurement specifically, that no standardized or validated measure of documentation burden currently exists in the literature [36], a measurement gap that constrains not only this review but the underlying evidence base itself. Finally, geographic representation remained skewed toward high-income settings (UK, Australia, US, Netherlands, Germany, Norway together account for the majority of included studies), with African and Nigerian evidence comparatively sparse - a pattern this review's findings suggest is itself clinically consequential, since infrastructural and policy realities in these settings substantially determine which documentation approaches are feasible.

➢ *Implications for Practice, Policy, and Research*

For practice, findings support prioritizing midwife involvement in the design and iterative refinement of documentation systems - whether paper, electronic, or hybrid - as co-design was consistently associated with higher adoption and more favourable provider experience. For policy, particularly in Nigeria and comparable low- and middle-income contexts, findings support a phased, context-sensitive approach to digital transition: one that strengthens documentation standards within existing paper systems, builds infrastructure capacity deliberately rather than assuming its availability, and manages hybrid periods through explicit integration strategies - aligned templates, designated authoritative records, and scheduled reconciliation audits - rather than permitting hybrid documentation to persist as an unplanned default. For research, this review identifies a clear need for larger comparative studies directly contrasting documentation approaches within single settings, for the development of standardized and validated measures of documentation burden, and for expanded evidence from Francophone and non-English-language contexts currently underrepresented in the global literature.

V. CONCLUSIONS

This systematic review of 28 studies found that paper-based, electronic, and hybrid documentation approaches each occupy distinct and legitimate roles within the global landscape of midwifery documentation, and that no single approach universally meets the clinical, relational, governance, and infrastructural demands of maternity care. Paper-based documentation remains indispensable in resource-limited settings, retaining clinical value through accessibility and flexibility despite substantive, but improvable, limitations in completeness and safety. Electronic documentation offers genuine transformative potential in legibility, auditability, and decision support, but its benefits have frequently been undermined by a persistent misalignment between system design and the relational, narrative character of midwifery care - a misalignment demonstrated to be addressable through midwife-centred, co-designed systems. Hybrid documentation, while the most prevalent operational reality globally, remains the least strategically managed of the three approaches, and its associated duplication and synchronization burdens represent an avoidable source of inefficiency and clinical risk when left unplanned. Across all three approaches, training adequacy, technical support, and workflow alignment were the consistent determinants of implementation success. Documentation reform in midwifery should therefore be approached as a socio-technical challenge requiring sustained institutional investment in midwife-centred design and contextually appropriate infrastructure planning, rather than as a purely technical implementation exercise.

➢ *Declarations*

- *Ethics Approval and Consent to Participate:*

Not applicable. This study is a systematic review of previously published literature and did not involve primary data collection from human participants.

- *Consent for Publication:*

Not applicable.

- *Competing Interests:*

The authors declare no competing interests.

- *Funding:*

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- *Data Availability:*

The dataset(s) supporting the conclusions of this article (the full list of included studies, extraction table, and quality appraisal outcomes) are available from the corresponding author upon reasonable request.

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