Meta-Analysis of Factors Affecting Electronic Medical Record Implementation Success in Healthcare Organizations

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Abstract

Electronic medical record (EMR) implementation frequently fails to achieve sustained adoption despite substantial investment. This systematic review and factor-specific meta-analysis synthesized evidence on determinants of EMR/EHR implementation success in healthcare organizations. A working corpus of 73 references was classified, while quantitative pooling was restricted to primary studies reporting compatible odds ratios and 95% confidence intervals. Random-effects models were computed in Python on the log-odds-ratio scale. Five studies contributed to knowledge and attitude syntheses and three to computer literacy/skills. Good knowledge was associated with higher readiness/adoption (pooled OR 2.42), favorable attitude showed a pooled OR of 2.13, and computer literacy/skills showed the largest pooled association (OR 3.03). Heterogeneity was low for knowledge and computer literacy/skills and low-to-moderate for attitude. The findings indicate that human readiness is a central implementation domain, but the wider literature also identifies organizational, technical, workflow, training, and governance conditions. Because effect estimates were not available in a common metric for all 73 references, the pooled estimates represent compatible quantitative subsets rather than all cited studies.

Keywords: *Electronic Medical Record; Electronic Health Record; Implementation Success; Readiness; Adoption; Meta-Analysis.*

A. INTRODUCTION

Electronic medical records (EMRs) and electronic health records (EHRs) are core components of digital health transformation. Their implementation is not a purely technical installation: it requires alignment among users, workflows, leadership, infrastructure, training, governance, and organizational readiness. Prior systematic evidence has grouped implementation success criteria across functionality, organizational conditions, technical infrastructure, training, finance, policy, and ethical domains. Consequently, a synthesis focused on determinants of successful implementation should distinguish between human readiness factors and broader organizational and technological conditions.

The literature is methodologically heterogeneous. Some studies report adjusted odds ratios for readiness or adoption, whereas others use structural-equation coefficients, correlations, qualitative themes, satisfaction outcomes, or post-implementation performance indicators. Pooling these measures indiscriminately would violate the comparability assumption of meta-analysis. The present study therefore uses a systematic evidence map of the broader 73-reference corpus and

performs factor-specific random-effects meta-analyses only where compatible OR/AOR estimates and confidence intervals are available.

The objective was to estimate the association of knowledge, attitude, and computer literacy/skills with EMR/EHR readiness or adoption, while situating these quantitative effects within the wider implementation-success literature. EMR implementation has developed from an adoption problem into a broader implementation problem. Early evidence documented uneven uptake and variable use of electronic records across ambulatory and hospital settings (DesRoches et al., 2008; Jha et al., 2009). Subsequent studies showed that increasing availability of EHR technology did not automatically translate into comprehensive use or information exchange (DesRoches et al., 2010; Furukawa et al., 2014). This distinction is important because implementation success involves sustained and meaningful use rather than installation alone.

At the system level, adoption expanded substantially over time, particularly where policy and institutional incentives supported digitalization. Adler-Milstein et al. (2015) documented continued progress in hospital EHR adoption, while Adler-Milstein & Jha (2017) linked later gains to the policy environment created by the HITECH Act. Gabriel et al. (2014), however, showed that smaller and critical-access hospitals continued to face implementation challenges. These findings suggest that diffusion can increase while organizational capability remains uneven.

Earlier work also raised questions about whether electronic records improve clinical work in practice. Poissant et al. (2005) examined time efficiency among physicians and nurses, illustrating that workflow consequences are central to the value of digital records. Ammenwerth et al. (2006) subsequently emphasized the fit among tasks, technology, and individual users. Together, these studies shifted attention from technology availability toward the conditions under which technology can be integrated into routine work.

Systematic reviews reinforce this multidimensional interpretation. Boonstra et al. (2014) identified a broad range of barriers to hospital EHR implementation, whereas Fritz et al. (2015) organized success criteria in low-resource settings around functional, organizational, technical, training, financial, and policy-related conditions. Kruse et al. (2016a) similarly synthesized adoption factors, while Kruse et al. (2016b) focused specifically on barriers. The review literature therefore indicates that no single determinant is sufficient to explain implementation success.

More recent syntheses have extended this argument. Fennelly et al. (2020) examined lessons for national EHR implementation, and Tsai et al. (2020) synthesized both effects of EHR implementation and barriers to adoption and use. Dutta & Hwang (2020) focused on physician adoption, while Kavandi et al. (2024) reviewed benefits, facilitators, and barriers in outpatient settings. Dehghan et al. (2026) further mapped contemporary implementation challenges and facilitators. Collectively, this literature supports a factor-specific rather than a single-score approach to implementation success.

User readiness represents one of the most consistently studied domains. Biruk et al. (2014) reported that readiness among health professionals was associated with individual-level characteristics, including knowledge. Awol et al. (2020) subsequently examined readiness across primary hospitals, and Abdulai & Adam (2020) provided related evidence from northern Ghana. More recent studies by Abore et al. (2022), Ngusie et al. (2022), and Hailegebreal et al. (2023) continued to identify variation in readiness across healthcare professionals and organizational contexts.

Digital competence is closely related to, but conceptually distinct from, general readiness. Oo et al. (2021) explicitly examined ICT literacy, knowledge, and readiness, highlighting the practical capability required to engage with electronic systems. Dimitrovski et al. (2021) investigated readiness to accept and use EHRs among general practitioners, whereas Gelchu et al. (2025) examined factors influencing EMR implementation readiness in Southern Oromia. Bouh et al. (2024) further linked access to digital records with physicians' willingness to adopt EHR systems. These studies indicate that implementation depends on both cognitive readiness and usable digital capability.

Acceptance research provides a complementary explanation. Gagnon et al. (2014) tested an integrated model of physician EHR acceptance, and Gagnon et al. (2016) extended the analysis to multilevel influences on adoption. Kim et al. (2016) examined mobile EMR adoption using UTAUT, while Hossain et al. (2019) investigated physician adoption in Bangladesh. Spatar et al. (2019), Tsai et al. (2019), and Almarzouqi et al. (2022) likewise examined behavioral and technological determinants. This stream suggests that perceived value, usability, social influence, and self-efficacy can shape adoption intentions alongside knowledge and skills.

Organizational conditions form a second major domain. Cucciniello et al. (2015) approached EMR implementation from a sociotechnical perspective, while Abdekhoda et al. (2015) examined organizational contextual influences on physicians' attitudes. Perez et al. (2017) considered internal organizational factors supporting technological innovation, and Arkorful et al. (2021) examined institutional pressures and organizational culture. These studies imply that individual willingness is embedded within organizational structures rather than operating independently.

Evidence from implementation settings makes this organizational dependence more concrete. Kabukye et al. (2020) assessed organizational readiness in a resource-constrained cancer hospital, whereas De Benedictis et al. (2020) investigated individual and organizational determinants within hospitals. Alzghaibi & Hutchings (2022) identified facilitators of EHR implementation in Saudi Arabia, and Alzghaibi et al. (2023) examined readiness for large-scale implementation from a project-team perspective. Recent evidence from Bekele et al. (2024), Hossain et al. (2025), and Mamae & Mamo (2025) further highlights the importance of implementation context, infrastructure, organizational practice, and local readiness.

Workflow and setting also influence how implementation is experienced. Jawhari et al. (2016) identified barriers and facilitators to EMR use in an urban low-resource setting, while Sockolow et al. (2014) examined point-of-care EHR adoption

in home care. Janssen et al. (2019) and Janssen et al. (2021) investigated implementation in a tertiary cancer centre, and Ngugi et al. (2018) considered low-resource implementation more broadly. These studies caution against assuming that a determinant observed in one service environment will have the same magnitude in another.

Finally, implementation outcomes extend beyond initial readiness. Alsohime et al. (2019) examined satisfaction and perceived usefulness after EHR implementation; Williams et al. (2019) assessed physician satisfaction and perceived patient impact; and Mohd Salleh et al. (2021) evaluated provider performance following adoption. Tubaishat (2017) evaluated hospital EHR implementation, Al Otaybi et al. (2022) examined performance, barriers, and satisfaction, and Rhayha et al. (2025) investigated clinician performance after implementation. This wider outcome literature shows why readiness, adoption, use, satisfaction, and performance should not be treated as interchangeable endpoints.

Against this background, the present study addresses a specific evidence problem: the EMR/EHR literature identifies many determinants, but the reported effect measures are heterogeneous and are often synthesized narratively. The present review therefore maps the wider evidence base while quantitatively pooling only compatible OR/AOR estimates for knowledge, attitude, and computer literacy/skills. This approach preserves the conceptual breadth of the 73-reference corpus without treating reviews, qualitative studies, SEM coefficients, satisfaction outcomes, and adjusted odds ratios as statistically equivalent.

B. METHOD

The study was structured as a systematic review with quantitative meta-analysis and reported with reference to PRISMA 2020. The organization of methods and results follows the uploaded exemplar's sequence of data sources/search strategy, inclusion and exclusion criteria, screening, quantitative synthesis, results, discussion, and conclusions.

Eligible evidence concerned EMR/EHR implementation, readiness, acceptance, adoption, use, or implementation success in healthcare organizations. For quantitative pooling, a report additionally had to provide a factor-outcome association as an OR/AOR with a 95% confidence interval, or sufficient information to derive an equivalent log odds ratio and standard error. Reviews and qualitative studies were retained for contextual synthesis but were not treated as independent primary effects.

For each compatible estimate, study, factor, odds ratio, lower confidence limit, and upper confidence limit were extracted. Odds ratios were log-transformed. Standard errors were reconstructed as SE = [ln(upper CI) - ln(lower CI)]/(2 x 1.96). Effects were pooled separately by factor to avoid combining conceptually different determinants.

Random-effects models were implemented in Python. Cochran's Q quantified dispersion, tau-squared represented estimated between-study variance, and I-squared described the percentage of variability attributable to heterogeneity rather

than sampling error. Pooled log odds ratios were exponentiated back to the OR scale. Forest plots display study-level effects and 95% confidence intervals together with the pooled estimate.

The review used the supplied 73-reference EMR/EHR corpus as the evidence base for systematic synthesis. All 73 references were assessed for relevance to implementation success, readiness, acceptance, adoption, use, workflow, organizational context, satisfaction, or performance. Quantitative eligibility was more restrictive: only primary reports providing a compatible OR/AOR with a 95% confidence interval for a comparable factor–outcome relationship were pooled. Five primary reports met this requirement for at least one factor. The remaining 68 references were retained for contextual and thematic interpretation but were not statistically pooled because their designs, outcomes, or effect measures were not directly harmonizable.

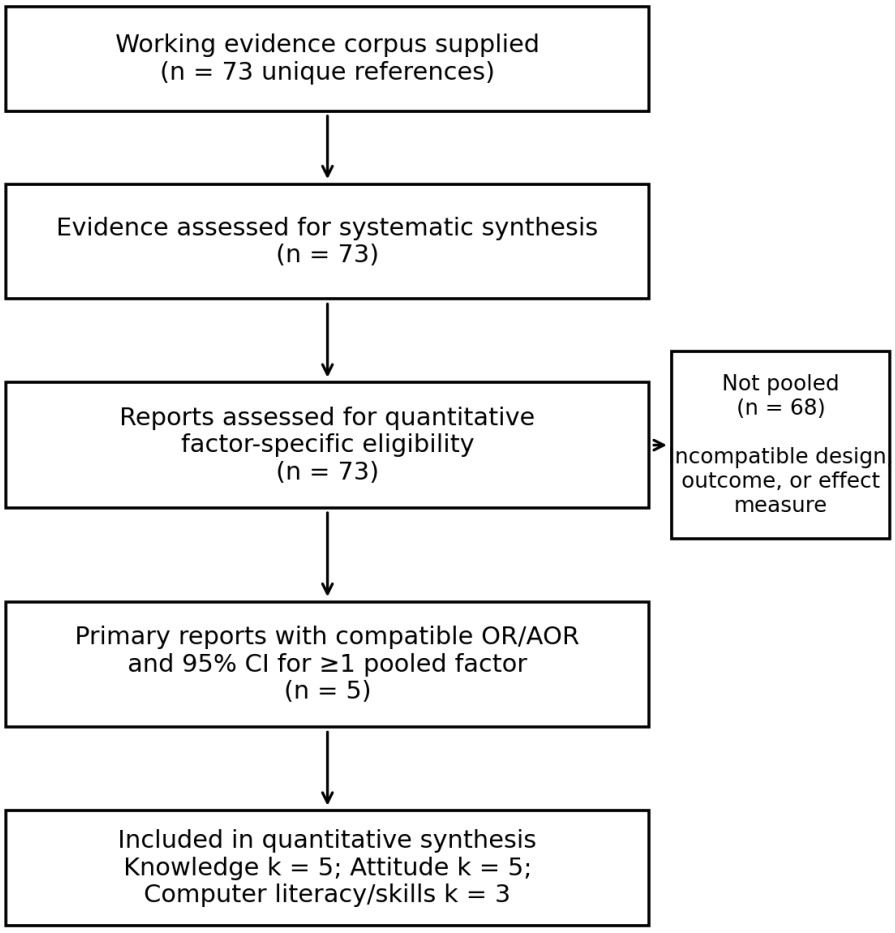

Figure 1. PRISMA-style study-selection flow for the supplied EMR/EHR evidence corpus.

The 73-reference corpus was retained for systematic synthesis, whereas five primary reports contributed compatible OR/AOR estimates to at least one factor-specific meta-analysis. Database-level identification and duplicate-removal counts are not reported because the original search export and screening log were unavailable; no counts were fabricated.

C. RESULTS AND DISCUSSION

1. Systematic Literature Review Findings

The systematic synthesis showed that successful EMR/EHR implementation is best understood as a multilevel process. Across the broader corpus, evidence converged on five interacting domains: individual readiness and capability; technology acceptance and perceived value; organizational readiness, leadership, and culture; workflow and sociotechnical fit; and post-implementation use, satisfaction, and performance. These domains were synthesized narratively because the underlying studies used heterogeneous designs and effect measures.

Individual readiness was the domain most directly connected to the quantitative meta-analysis. Studies of healthcare professionals repeatedly examined knowledge, attitude, computer literacy, self-efficacy, and readiness. Biruk et al. (2014), Awol et al. (2020), Abore et al. (2022), Hailegebreal et al. (2023), and Gelchu et al. (2025) provided a consistent empirical basis for treating knowledge as an implementation determinant, while Oo et al. (2021) and Dimitrovski et al. (2021) emphasized the practical importance of digital capability.

A second evidence stream concerned acceptance and perceived usefulness. Gagnon et al. (2014), Gagnon et al. (2016), Kim et al. (2016), Hossain et al. (2019), Tsai et al. (2019), and Almarzouqi et al. (2022) indicate that intention to use EMR/EHR systems is shaped by perceived value, usability, social influence, and related acceptance mechanisms. These findings help explain why favorable attitude was positively associated with readiness/adoption in the pooled analysis.

Organizational and sociotechnical evidence broadened the interpretation beyond the individual user. Cucciniello et al. (2015) emphasized sociotechnical interaction, Kabukye et al. (2020) examined organizational readiness in a resource-constrained hospital, and De Benedictis et al. (2020) demonstrated the joint relevance of individual and organizational determinants. Jawhari et al. (2016), Sockolow et al. (2014), and Janssen et al. (2021) further showed that workflow, setting, and implementation support influence how electronic records are integrated into routine care.

Finally, the corpus distinguished initial readiness from sustained implementation outcomes. Alsohime et al. (2019), Williams et al. (2019), Ngugi et al. (2021), Mohd Salleh et al. (2021), Al Otaybi et al. (2022), and Rhayha et al. (2025) examined actual use, satisfaction, perceived usefulness, or performance after implementation. This evidence supports a process interpretation in which readiness and acceptance are antecedents, whereas routine use, satisfaction, and performance represent later manifestations of implementation success.

Table 1. Thematic Synthesis of the Systematic Literature Review

Systematic-Review Domain	Core Determinants/Outcomes	Representative Evidence	Synthesis Interpretation
Individual readiness and capability	Knowledge, attitude, computer literacy/skills, self-efficacy, readiness	Biruk et al. (2014); Awol et al. (2020); Oo et al. (2021); Abore et al. (2022); Hailegebreal et	Directly supports factor-specific pooling where compatible OR/AOR

		al. (2023); Gelchu et al. (2025)	estimates were available.
Acceptance and perceived value	Perceived usefulness, behavioral intention, social influence, technology acceptance	Gagnon et al. (2014, 2016); Kim et al. (2016); Hossain et al. (2019); Tsai et al. (2019); Almarzouqi et al. (2022)	Explains adoption intention, but the reported measures are not statistically interchangeable.
Organizational readiness and implementation support	Leadership, culture, governance, infrastructure, technical support	Cucciniello et al. (2015); De Benedictis et al. (2020); Kabukye et al. (2020); Alzghaibi & Hutchings (2022); Alzghaibi et al. (2023)	Shows that individual readiness is embedded within organizational capacity and governance.
Workflow and sociotechnical fit	Workflow integration, usability, setting-specific barriers/facilitators	Sockolow et al. (2014); Jawhari et al. (2016); Janssen et al. (2019, 2021); Jung et al. (2021)	Highlights context dependence and the need to align technology with clinical work.
Sustained use and post-implementation outcomes	Actual use, satisfaction, perceived usefulness, provider performance	Alsohime et al. (2019); Williams et al. (2019); Ngugi et al. (2021); Mohd Salleh et al. (2021); Al Otaybi et al. (2022); Rhayha et al. (2025)	Distinguishes readiness from downstream indicators of successful and sustained use.

2. Characteristics of the Quantitative Evidence

Five primary reports contributed at least one compatible OR/AOR estimate. Knowledge and favorable attitude were each represented by five study-level estimates; computer literacy/skills was represented by three. This means that the 73-reference corpus informs the systematic review, whereas the numerical meta-analysis is based on the compatible subsets shown below;

Table 2. Effect sizes included in factor-specific meta-analyses.

Study	Factor	OR/AOR	95% CI lower	95% CI upper
Biruk et al., 2014	Good knowledge	2.12	1.34	3.34
Awol et al., 2020	Good knowledge	2.64	1.62	4.29
Abore et al., 2022	Good knowledge	3.33	1.69	6.56
Hailegebreal et al., 2023	Good knowledge	2.02	1.19	3.39
Gelchu et al., 2025	Good knowledge	2.56	1.53	4.29
Biruk et al., 2014	Favorable attitude	1.56	1.03	2.36
Awol et al., 2020	Favorable attitude	1.63	1.01	2.63
Abore et al., 2022	Favorable attitude	2.43	1.26	4.68
Hailegebreal et al., 2023	Favorable attitude	3.00	1.76	4.97
Gelchu et al., 2025	Favorable attitude	2.77	1.66	4.63
Awol et al., 2020	Computer literacy/skills	3.30	2.05	5.31
Hailegebreal et al., 2023	Computer literacy/skills	3.06	1.49	6.29
Gelchu et al., 2025	Computer literacy/skills	2.67	1.53	4.66

3. Pooled Effects

Table 3. Random-effects meta-analysis of human readiness factors.

Factor	k	Pooled OR	95% CI lower	95% CI upper	Q	I^2 (%)	τ^2
Computer literacy/skills	3	3.03	2.19	4.18	0.32	0.00	0.00
Favorable attitude	5	2.13	1.61	2.82	6.18	35.24	0.04
Good knowledge	5	2.42	1.92	3.05	1.80	0.00	0.00

4. *Good knowledge*

The pooled association for good knowledge was OR 2.42 (95% CI 1.92-3.05), based on 5 study-level estimates. Estimated heterogeneity was I^2=0.0%.

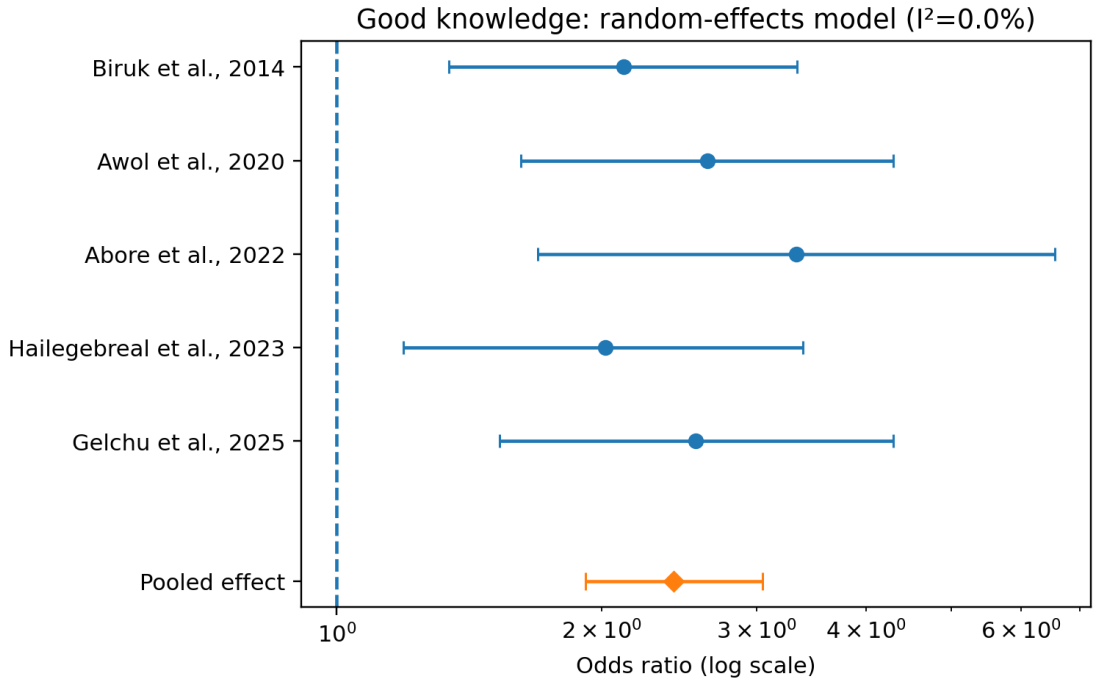

Figure 2. Forest plot for good knowledge and EMR/EHR readiness or adoption.

5. *Favorable attitude*

The pooled association for favorable attitude was OR 2.13 (95% CI 1.61-2.82), based on 5 study-level estimates. Estimated heterogeneity was I^2=35.2%.

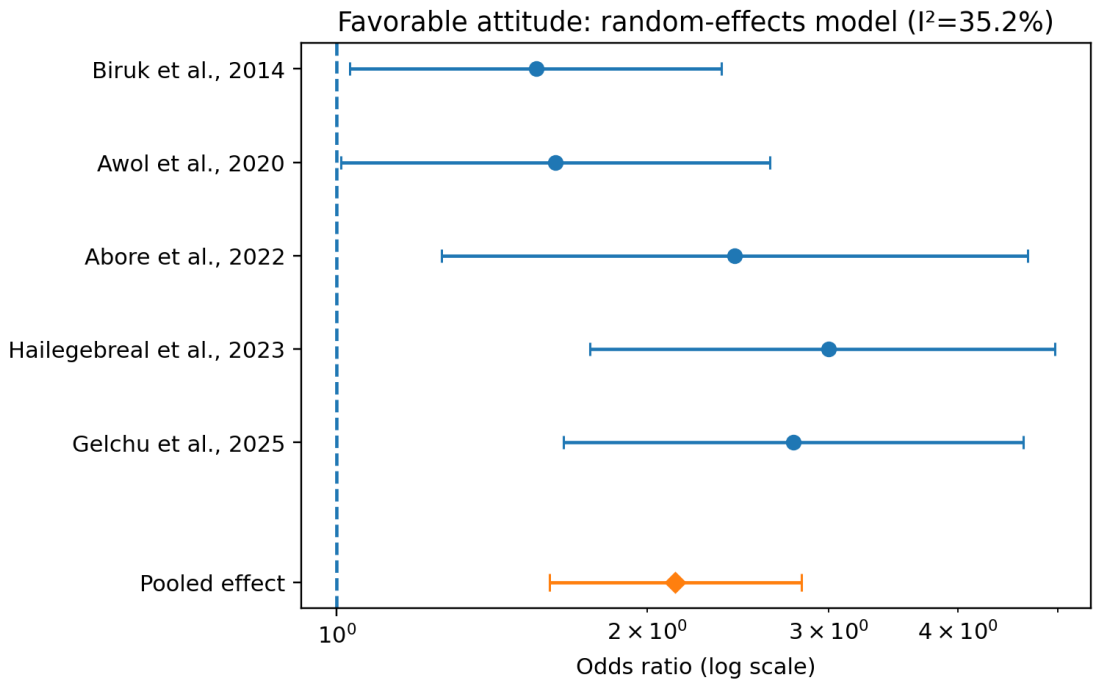

Figure 3. Forest plot for favorable attitude and EMR/EHR readiness or adoption.

6. *Computer literacy/skills*

The pooled association for computer literacy/skills was OR 3.03 (95% CI 2.19-4.18), based on 3 study-level estimates. Estimated heterogeneity was I^2=0.0%.

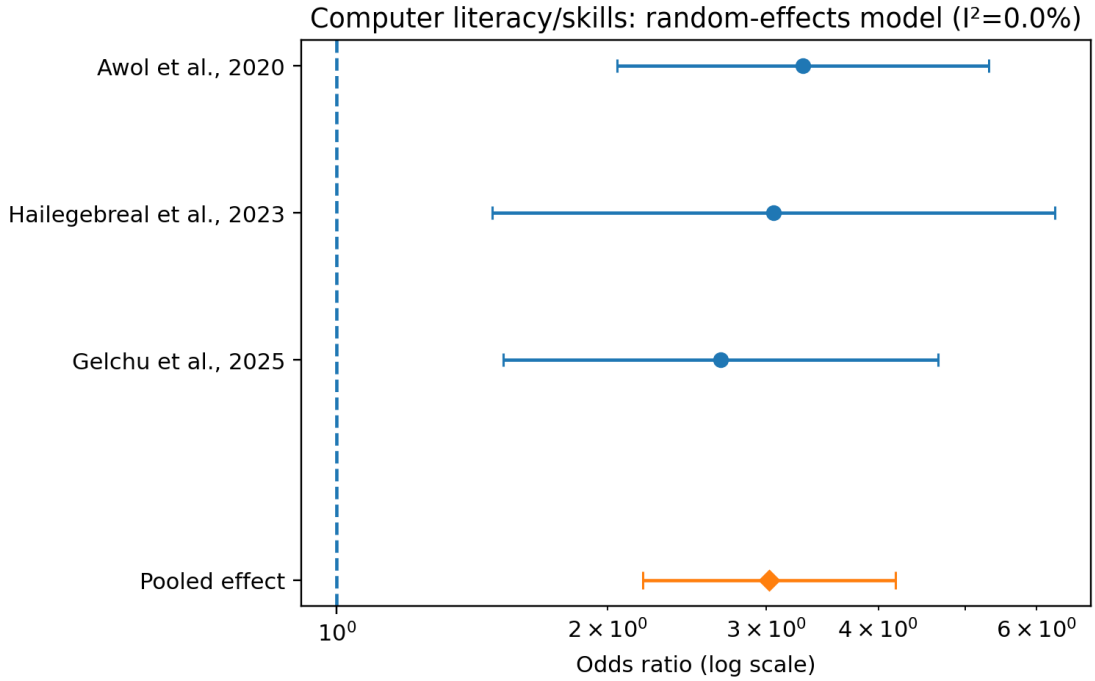

Figure 4. Forest plot for computer literacy/skills and EMR/EHR readiness or adoption

7. Integration of Systematic Review and Meta-Analysis

The qualitative and quantitative strands were interpreted together. The systematic review indicates that implementation success is produced by interacting human, organizational, technical, and workflow conditions, whereas the meta-analysis quantifies three individual readiness factors for which compatible effect estimates were available. The pooled effects therefore should not be interpreted as a complete ranking of all implementation determinants. Rather, they provide quantitative estimates within a broader evidence architecture in which organizational readiness, sociotechnical fit, implementation support, and sustained use remain important but were not statistically pooled.

The meta-analysis identified a consistent positive association between EMR-related knowledge and readiness or adoption. The pooled odds ratio of 2.42 indicates that healthcare professionals with better knowledge had substantially higher odds of being ready to adopt or implement EMR systems. Importantly, the estimated heterogeneity for this synthesis was negligible ($I^2 = 0\%$), suggesting that the direction and magnitude of the association were comparatively stable across the compatible studies included in the model.

This result is consistent with the progression of readiness research. Biruk et al. (2014) identified knowledge as an important correlate of readiness in Ethiopian hospitals, and Awol et al. (2020) reported a similar pattern across primary hospitals. Abore et al. (2022) and Hailegebreal et al. (2023) subsequently observed comparable associations, while Gelchu et al. (2025) extended the evidence to a more recent implementation context. The convergence of these studies suggests that knowledge is not merely an attitudinal correlate; it may represent a basic cognitive resource that allows users to understand system purpose, functions, and expected changes in clinical documentation.

The pooled effect for favorable attitude was also positive (OR = 2.13), although heterogeneity was higher than for knowledge ($I^2 = 35.2\%$). This pattern is plausible because attitudes are more sensitive to implementation context. Users may recognize the potential value of an EMR yet remain concerned about usability, workload, reliability, or disruption to established routines. Kalayou et al. (2021) specifically examined physicians' attitudes toward EMR systems, while Abdekhoda et al. (2019) investigated determinants of applying EMRs in healthcare. Al-Rayes et al. (2019) similarly examined physician adoption, indicating that favorable orientation toward the technology operates within a wider set of professional and organizational influences.

Acceptance-model studies help explain why attitude may vary across settings. Gagnon et al. (2014) showed that physician acceptance can be examined through an integrated theoretical model, and Gagnon et al. (2016) demonstrated that adoption is influenced at more than one analytical level. Kim et al. (2016) emphasized technology-acceptance mechanisms in mobile EMR use, while Hossain et al. (2019) and Tsai et al. (2019) examined physician adoption through behavioral and technology-related determinants. Almarzouqi et al. (2022) further modeled EMR adoption using SEM and

an artificial neural network approach. These studies support interpreting attitude as one component of a broader acceptance process rather than an isolated predictor.

Computer literacy/skills produced the largest pooled association (OR = 3.03; I^2 = 0%). This finding suggests that practical digital capability may be especially important when implementation requires healthcare professionals to translate positive intentions into routine system use. Oo et al. (2021) directly connected ICT literacy with knowledge and readiness, while Dimitrovski et al. (2021) examined readiness to accept and use an EHR system among general practitioners. Bouh et al. (2024) also showed that access to digital health records is relevant to willingness to adopt. Taken together, the evidence distinguishes knowing about an EMR from being able to work effectively with one.

These three pooled effects should nevertheless be interpreted within their organizational environment. Cucciniello et al. (2015) emphasized the sociotechnical character of implementation, and De Benedictis et al. (2020) demonstrated the relevance of both individual and organizational determinants. Kabukye et al. (2020) showed why organizational readiness is particularly salient in resource-constrained settings. Safdari et al. (2015) likewise identified critical success factors that extend beyond end-user characteristics. Thus, strengthening knowledge, attitude, and digital skills is unlikely to compensate for inadequate infrastructure, weak leadership, or poorly aligned workflows.

Implementation studies from different service settings reinforce this point. Jawhari et al. (2016) described barriers and facilitators in an urban low-resource environment, whereas Sockolow et al. (2014) examined adoption in home care. Janssen et al. (2021) focused on a tertiary cancer centre, and Kruse et al. (2015) synthesized evidence from long-term care facilities. These settings differ in staffing, workflow, technical support, patient complexity, and documentation requirements. Contextual variation therefore provides a credible explanation for why the same implementation strategy may not produce equivalent outcomes across organizations.

Qualitative evidence adds an important user-centered perspective to these quantitative patterns. Jung et al. (2021) showed that barriers and facilitators are experienced through everyday interaction with EHR systems, reinforcing the need to interpret readiness within actual clinical work. This perspective complements survey-based evidence because resistance or hesitation may reflect workflow mismatch, usability problems, or insufficient implementation support rather than a simple lack of willingness.

Organizational culture and governance also appear to shape whether readiness is converted into sustained use. Arkorful et al. (2021) examined institutional pressures and organizational culture, while Fragidis & Chatzoglou (2018) considered nationwide EHR implementation. Alzghaibi & Hutchings (2022) identified implementation facilitators in Saudi Arabia, and Alzghaibi et al. (2023) examined readiness for large-scale implementation. Recent studies by Bekele et al. (2024) and Hossain et al. (2025) further emphasize local organizational conditions and

recordkeeping culture. The implication is that readiness should be treated as a multilevel property involving both users and the organizations in which they work.

The distinction between adoption and successful use is also supported by post-implementation evidence. Raymond et al. (2019) examined extended EHR use among primary care physicians, and Ngugi et al. (2021) evaluated actual use of EHR implementations in Kenya. Wong et al. (2020) examined adoption of an EHR sharing system, whereas Alsohime et al. (2019) focused on satisfaction and perceived usefulness after implementation. Williams et al. (2019) and Al Otaybi et al. (2022) similarly addressed satisfaction and perceived impact. These studies indicate that initial readiness is best understood as an antecedent to, rather than a substitute for, sustained and effective use.

Performance consequences provide a further layer of evidence. Mohd Salleh et al. (2021) evaluated the effects of EHR adoption on healthcare-provider performance, while Rhayha et al. (2025) examined clinician performance after implementation. Nguyen et al. (2021) reviewed EHR-related influences on physician well-being, illustrating that implementation can generate both intended benefits and burdens. Kruse et al. (2018) considered the use of EHRs for population health, demonstrating that value can also emerge at levels beyond individual clinical encounters. Accordingly, implementation success should ultimately be evaluated through multiple outcomes rather than adoption status alone.

The broader review literature is consistent with this multilevel interpretation. McGinn et al. (2011) compared barriers and facilitators across user groups, Gagnon et al. (2012) synthesized factors influencing healthcare professionals' adoption of information and communication technologies, and Boonstra et al. (2014) reviewed hospital EHR implementation. Fritz et al. (2015) focused on success criteria in low-resource settings, while Fennelly et al. (2020), Dutta & Hwang (2020), and Tsai et al. (2020) synthesized national implementation, physician adoption, and barriers to use, respectively. More recent syntheses by Kavandi et al. (2024) and Dehghan et al. (2026) confirm that implementation remains a multidimensional challenge.

From a practical perspective, the pooled results support a staged implementation strategy. Organizations can first assess baseline knowledge and digital capability, then provide role-specific training before deployment and targeted support during early use. However, training should be accompanied by reliable infrastructure, workflow redesign, responsive technical assistance, and visible management support. Evidence from Ebnehoseini et al. (2020), Perez et al. (2017), and Abdekhoda et al. (2015) supports attention to organizational and technological conditions, while Arikan et al. (2022) highlights barriers experienced by nurses. Implementation programs should therefore avoid framing low adoption solely as user resistance.

The findings also have implications for lower-resource health systems. Ngugi et al. (2018) emphasized the combination of barriers and facilitators in low-resource settings, while Fritz et al. (2015) showed that successful implementation depends on several interdependent criteria. Mamae & Mamo (2025) identified implementation

challenges in an Ethiopian hospital, and Hossain et al. (2025) described differences in EMR implementation and recordkeeping culture across Indonesian hospitals. These studies suggest that capacity-building interventions should be adapted to local infrastructure, staffing, governance, and documentation practices rather than transferred unchanged between settings.

Several limitations constrain inference. First, only studies reporting compatible OR/AOR estimates could contribute to the quantitative synthesis; therefore, the pooled effects do not numerically represent all 73 references. Second, the factor-specific models contain only three to five study-level estimates, making formal small-study or publication-bias tests underpowered. Third, adjusted estimates may differ in their covariate sets and operational definitions. Fourth, the wider corpus includes reviews, qualitative studies, acceptance models, satisfaction studies, and performance studies that appropriately inform interpretation but cannot be pooled with readiness odds ratios without effect-size harmonization. These boundaries are important because a statistically larger pooled OR should not be interpreted as proof that one determinant is universally more important than all others.

D. CONCLUSION

Successful EMR/EHR implementation is multifactorial, but the available compatible quantitative evidence shows a clear contribution of human readiness. Good knowledge was associated with approximately 2.4-fold higher odds of readiness/adoption, favorable attitude with approximately 2.1-fold higher odds, and computer literacy/skills with approximately 3.0-fold higher odds. These estimates support investment in workforce capability alongside organizational and technical implementation strategies. The broader 73-reference corpus should not be represented as 73 pooled studies until compatible effect sizes and independence of primary datasets have been verified.

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