

Literature Review: Effect of Limited Medical Record Professional Competencies on Job Design

Literature Review: Pengaruh Keterbatasan Kompetensi Perekam Medis Terhadap Desain

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ABSTRACT

Background: Medical recorders play a vital role in improving healthcare quality through accurate and efficient health information management. However, competency gaps among medical recorders remain a challenge, making competency-based job design essential for optimizing performance in Primary Health Care Centers.

Objective: To analyze the relationship between limited medical recorder competencies and job design in Community Health Centers (Puskesmas).

Methods: This study employed a structured literature review using the PRISMA 2020 framework. National scientific articles and Ministry of Health policy documents on medical recorder competencies were systematically identified, screened using predefined inclusion and exclusion criteria, and appraised with the Mixed Methods Appraisal Tool. The findings were synthesized through thematic analysis and narrative synthesis based on job design theories.

Result: From 186 records identified, 11 studies met the eligibility criteria. The review found that limited competencies were consistently associated with inappropriate job design, overlapping responsibilities, increased workload, and reduced quality of medical record management, ultimately affecting service effectiveness.

Conclusion: Competency-based job design is essential to align professional responsibilities with workforce capabilities, improve the quality of medical record management, and strengthen healthcare service delivery in Primary Health Care Centers.

Keywords: Competency, Electronic Medical Records, Human Resources, Job Design, Primary Health care.

ABSTRAK

Latar Belakang: enaga perekam medis berperan penting dalam mendukung kualitas pelayanan kesehatan. Namun, keterbatasan kompetensi masih ditemukan dan dapat memengaruhi kesesuaian desain pekerjaan serta kinerja perekam medis.

Tujuan: Menganalisis hubungan keterbatasan kompetensi perekam medis dengan desain pekerjaan di Puskesmas.

Metode: Penelitian menggunakan structured literature review dengan kerangka PRISMA 2020. Artikel diseleksi berdasarkan kriteria inklusi dan eksklusi serta dinilai kualitasnya menggunakan Mixed Methods Appraisal Tool (MMAT). Data dianalisis melalui analisis tematik dan sintesis naratif dengan pendekatan Job Characteristics Model dan Job Demands-Resources Model.

Hasil: Dari 186 artikel yang teridentifikasi, 11 studi memenuhi kriteria dan dianalisis. Keterbatasan kompetensi berkaitan dengan ketidaksesuaian desain pekerjaan, tumpang tindih tugas, peningkatan beban kerja, serta penurunan kualitas pengelolaan rekam medis.

Kesimpulan: Penyesuaian desain pekerjaan berbasis kompetensi diperlukan untuk meningkatkan efektivitas pengelolaan rekam medis dan kualitas pelayanan di Puskesmas.

Kata Kunci: Kompetensi, Rekam Medis Elektronik, Sumberdaya Manusia, Desain Pekerjaan, Pelayanan Kesehatan Primer

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INTRODUCTION

Community Health Centers (Puskesmas) constitute the backbone of Indonesia's primary health care system and play a crucial role in clinical documentation, disease coding, and medical record management. High-quality medical records are essential to ensure continuity of care, service efficiency, and the availability of reliable health information for decision-making at the primary care level. As the number of Puskesmas continues to increase nationwide, effective medical record management has become increasingly important in maintaining data integrity and supporting health system accountability (Ministry of Health, 2023). Globally, the competency of the health workforce is recognized as a fundamental determinant of care quality and system performance (World Health Organization [WHO], 2020). Within this broader context, the effectiveness of medical record services in Indonesia is strongly influenced by the competencies of medical record and health information professionals. Previous studies consistently report that technical competencies in data management and clinical coding, managerial competencies related to supervision and task coordination, and digital competencies are key determinants of medical record performance (Hasanah & Putra, 2024; Irmawati et al., 2021; Ritonga & Manurung, 2019). Inadequate competencies have been associated with incomplete documentation, reduced accuracy, and delays in service processes, which ultimately compromise service quality in primary health care settings (Fauziah et al., 2023).

In addition to competency limitations, workload imbalance further exacerbates performance issues. Insufficient staffing and heavy workloads are recognized as persistent challenges

across health systems worldwide, contributing to fatigue, burnout, and reduced workforce retention (Buchan et al., 2020). Studies using workload analysis methods demonstrate that insufficient staffing combined with limited competencies increases administrative delays, fatigue, and documentation errors in medical record units (Zein et al., 2021; Asriyanti et al., 2023). Under such conditions, medical record professionals are often required to perform multiple tasks beyond their formal roles, resulting in inefficient work arrangements.

The challenges related to competency limitations have become more pronounced with the implementation of Electronic Medical Records (EMRs), consistent with the global shift toward digital health transformation (WHO, 2022; Van der Kleij et al., 2022). Several studies indicate that limited digital competencies among medical record personnel hinder effective EMR utilization, slow system adoption, and disrupt workflow organization (Fauzan & Arnawilis, 2021). These conditions suggest that job design in medical record units is frequently shaped by system demands rather than workforce capacity.

Despite extensive research on competencies and workload, existing studies largely address these issues separately. National studies have examined medical record professional competencies and unit performance (Prasetyo & Handayani, 2021), yet limited attention has been given to how competency constraints directly and systematically influence job design including task allocation, role clarity, and workflow structure within an explicit theoretical framework. Therefore, this literature review aims to analyze the effect of limited competencies among medical record and health information professionals on job design in Puskesmas.

By synthesizing evidence from previous studies through a structured search protocol and interpreting the findings through established job design theory, described in the following section, this review seeks to provide theoretically grounded insights for improving job design, optimizing workforce utilization, and strengthening medical record management in primary health care settings.

Theoretical Framework

This review is guided by two complementary theories of job design and occupational well-being that together frame how competency limitations translate into job design problems.

First, the Job Characteristics Model (JCM) developed by Hackman and Oldham (1976) proposes that five core job dimensions skill variety, task identity, task significance, autonomy, and feedback shape employees' experienced meaningfulness, sense of responsibility, and knowledge of results, which in turn determine work motivation, performance, and satisfaction. When competency limitations restrict professionals' ability to perform tasks independently and coherently, these core dimensions, particularly skill variety and task identity, are weakened, producing job roles that become fragmented and overly procedural rather than integrated and meaningful.

Second, the Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2007) explains performance and well-being as a function of the balance between job demands (e.g., workload, task complexity, system requirements) and job resources (e.g., competency, supervision, training, autonomy). Within this framework, professional competency functions as a personal resource that buffers the negative effects of job demands; when competency is limited, the same volume of work

becomes more taxing, increasing fatigue, error risk, and role strain. This is consistent with the job-person fit principle emphasized in international health workforce policy, which stresses aligning the right skills with the right jobs in the right places (OECD, 2021).

Together, the JCM and JD-R model provide the conceptual lens applied throughout this review: they frame competency limitations both as a constraint on core job characteristics and as a depleted personal resource relative to job demands. This dual perspective structures the four themes examined in the Results and Discussion section technical competency, managerial competency, workload, and digital competency and their combined influence on task allocation, role clarity, and workflow structure in medical record units.

MATERIALS AND METHODS

A. Research Design

This study employed a literature review design combined with policy analysis to examine the influence of competency limitations among medical record and health information professionals on job design in Primary Health Care Centers (Puskesmas). Given the heterogeneity of study designs available on this topic, a narrative review approach was adopted; nonetheless, the search, screening, and reporting processes followed the PRISMA 2020 framework (Page et al., 2021) to enhance transparency and methodological rigor, and results are reported using a PRISMA flow diagram (Figure 1).

B. Population and Sample

Literature was searched systematically across Google Scholar, the Garba Rujukan Digital (Garuda) portal, national health-journal databases, and the Ministry of Health of the Republic of

Indonesia's policy repository, covering publications from January 2019 to December 2024. Search terms were combined using Boolean operators: ("medical record competenc*" OR "perekam medis") AND ("job design" OR "desain pekerjaan") AND ("workload" OR "beban kerja") AND ("primary health care" OR "Puskesmas"). Reference lists of eligible articles were also hand-searched (backward citation searching) to identify additional relevant sources.

C. Eligibility Criteria

Table 1 presents the explicit inclusion and exclusion criteria applied during screening.

Table 1. Inclusion and Exclusion Criteria (1)

Criterion	Inclusion	Exclusion
Study type	Empirical studies (quantitative, qualitative, or mixed methods) or official policy/regulatory documents	Editorials, opinion pieces, or conference abstracts without full text
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Table 1. Inclusion and Exclusion Criteria (2)

Criterion	Inclusion	Exclusion
Publication period	Published January 2019 – December 2024	Published before 2019
Topic focus	Medical record / health information professional competency, workload, or job design	Unrelated to the medical record / health information workforce
Setting	Primary or referral health care facilities in Indonesia (Puskesmas prioritized)	Non-health-care occupational settings with no transferable relevance
Language / access	Full text available in Indonesian or English	Full text inaccessible; duplicate or overlapping dataset already captured

D. Study Selection Process

Two reviewers independently screened titles and abstracts against the criteria in Table 1, followed by independent full-text assessment of potentially eligible articles; disagreements were resolved through discussion and consensus. The complete selection process is summarized in the PRISMA 2020 flow diagram (Figure 1).

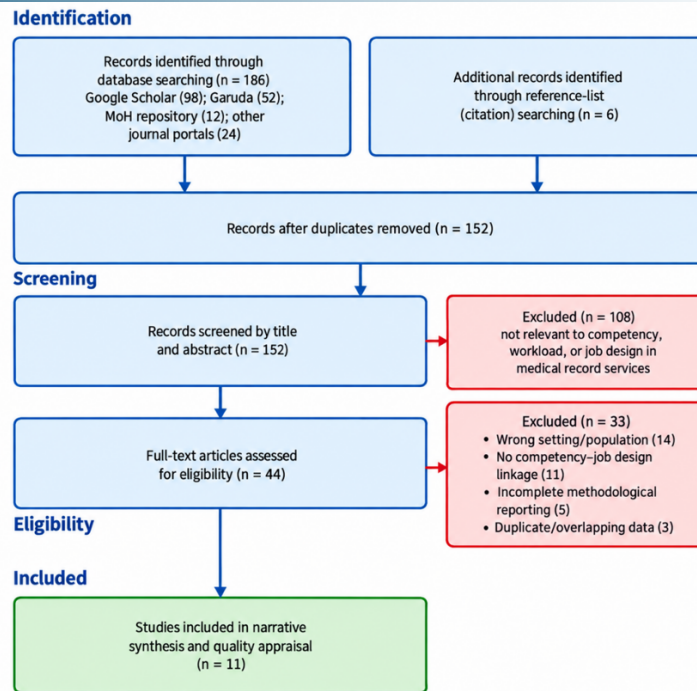


Figure 1. PRISMA 2020 Flow Diagram of the Study Selection Process

E. Quality Appraisal

The methodological quality of the 11 included empirical studies was appraised using the Mixed Methods Appraisal Tool (MMAT), version 2018 (Hong et al., 2018), which evaluates qualitative, quantitative, and mixed-methods studies against five design-specific criteria. Each study was rated independently by two reviewers, with disagreements resolved by consensus. Studies meeting four to five criteria were classified as high quality, two to three as moderate quality, and zero to one as low quality. No study was excluded on quality grounds alone; instead, quality ratings were used to contextualize the strength of evidence contributed by each study to the four discussion themes. Table 2 summarizes the appraisal results

Table 2. Quality Appraisal Summary of Included Studies (MMAT, 2018) (1)

Study	Design category (MMAT)	Criteria met	Overall quality
Hasanah & Putra (2024)	Quantitative (survey)	4/5	Moderate-High
Garmelia et al. (2021)	Quantitative (survey)	4/5	Moderate-High

Table 2. Quality Appraisal Summary of Included Studies (MMAT, 2018) (2)

Study	Design category (MMAT)	Criteria met	Overall quality
Hasanah & Putra (2024)	Quantitative (survey)	4/5	Moderate–High
Garmelia et al. (2021)	Quantitative (survey)	4/5	Moderate–High
Irmawati et al. (2021)	Quantitative (observation /audit)	3/5	Moderate
Ritonga & Manurung (2019)	Quantitative (survey)	3/5	Moderate
Asriyanti, et al. (2023)	Quantitative (workload analysis)	4/5	High
Zein et al. (2021)	Quantitative (workload analysis)	4/5	High
Fauzan & Arnawilis (2021)	Quantitative (survey + regression)	4/5	Moderate–High
Biruk et al. (2022)	Mixed methods	5/5	High
Fauziah et al. (2023)	Quantitative (survey + observation)	4/5	Moderate–High

F. Data Extraction and Synthesis

A structured literature review matrix (Table 3) was used to extract key information including study objectives, methods, and key findings from each included source. Data were analyzed using thematic analysis (Braun & Clarke, 2006) and narrative synthesis (Popay et al., 2006), guided by the Job Characteristics Model and the Job Demands-Resources model described in the Theoretical Framework, to identify patterns and relationships between professional competency limitations and job design and to formulate practical implications for primary health care management and policy development.

RESULT AND DISCUSSION

A. Selection Result

Of 186 records identified through database searching and six additional records identified through citation searching, 152 remained after removal of duplicates. Following title/abstract screening, 44 full-text articles were assessed for eligibility, of which 11 met all inclusion criteria in Table 1 and were retained for narrative synthesis (Figure 1).

B. Result

Quality appraisal using the MMAT (Table 2) indicated that most included studies were of moderate-to-high methodological quality, although several relied on cross-sectional designs and self-report measures, which limit causal inference and may introduce response bias; these limitations are considered when interpreting the themes below.

Table 3. Data Analysis Matrix of Articles Included in the Review

No.	Authors & Year	Study Title	Objective	Method	Key Findings
1	Hasanah & Putra (2024)	Competency Analysis of Medical Record Officers in Bima City Primary Health Care Centers	To measure the effect of medical record professional competencies on medical record performance	Quantitative approach using standardized questionnaires assessing technical, managerial, and health information competencies; statistical analysis of inter-variable relationships	All competency domains were significantly associated with performance; low competency reduced accuracy, completeness, and timeliness of medical record documentation
2	Garmelia et al. (2021)	Work Effectiveness of Medical Record Unit Heads Based on Professional Competencies	To assess the work effectiveness of medical record unit heads	Quantitative survey assessing competencies and work-effectiveness indicators; descriptive and inferential analysis	21.7% of unit heads showed low effectiveness, mainly due to limited managerial skills such as supervision, task allocation, and coordination
3	Irmawati et al. (2021)	Technical Competencies of Medical Record and Health Information Professionals and Their Implications for Documentation Quality	To examine technical competencies and their implications for medical record documentation quality	Quantitative method using work-process observation, medical record audits, and competency standard assessment	Documentation quality improved when data management and coding competencies were met; most staff still showed technical competency gaps affecting service quality
4	Ritonga & Manurung (2019)	Medical Record Staff Competencies and Service Quality	To identify the relationship between competency and service quality	Quantitative survey; service quality assessed through completeness, accuracy, and orderliness of documentation	Technical competencies significantly influenced service quality, particularly data completeness and accuracy
5	Asriyanti, et al. (2023)	Analysis of Medical Record and Health Information Workforce Needs in Inpatient and Non-Inpatient Primary Health Care Centers	To calculate the ideal number of medical record professionals	Workload Analysis Method (ABK-Kes) calculating effective working time, service volume, and task duration	A significant workforce deficit was identified; disproportionate workload increased fatigue risk and documentation errors
6	Zein et al. (2021)	Medical Record Workforce Requirements in Primary Health Care Centers: An Analysis of Workload and Capacity Gaps	To analyze medical record workload and workforce capacity gaps	ABK-Kes with detailed analysis of daily, weekly, and monthly task duration	High workload directly reduced data-recording accuracy and increased the risk of errors

Table 3. Data Analysis Matrix of Articles Included in the Review

No.	Authors & Year	Study Title	Objective	Method	Key Findings
7	Fauzan & Arnawilis (2021)	Casemix Competency of Medical Record-Based Personnel	To measure casemix staff competencies	Quantitative study using coding and casemix knowledge tests and claim audits; regression analysis	Technical coding and casemix competencies significantly affected claim accuracy and quality; competency gaps caused delayed or inaccurate claims
8	Biruk et al. (2022)	Health care providers' readiness for electronic health record adoption: A cross-sectional study during pre-implementation phase	To assess human resource and system readiness for EMR implementation	Mixed methods: quantitative survey of digital competency followed by in-depth interviews	Human resources were not fully prepared; low digital literacy and limited EMR training resulted in slow and suboptimal implementation
9	Fauziah et al. (2023)	The Relationship between Medical Record Professionals' Competencies and the Quality of Health Data Processing in Health Care Facilities	To identify the relationship between competency and performance	Quantitative survey using competency questionnaires and performance observation	Only 50% of professionals were categorized as competent; major weaknesses were managerial and data-management skills, leading to low unit performance

C. Discussion

This literature review synthesizes evidence from 11 selected studies to examine how limitations in medical record professional competencies influence job design in Primary Health Care Centers (Puskesmas). Thematic analysis of the reviewed literature, guided by the Job Characteristics Model ([Hackman & Oldham, 1976](#)) and the Job Demands-Resources model ([Bakker & Demerouti, 2007](#)), revealed four interrelated themes: technical competency limitations, managerial competency gaps, workload imbalance, and digital competency constraints. These themes collectively explain how competency limitations shape task allocation, role clarity, and workflow structure within medical record units.

Technical Competency Limitations and Core Job Functions

Several studies consistently report that insufficient technical competencies among medical record professionals negatively affect the execution of core job functions, particularly in data management, clinical coding, and documentation processes. [Hasanah and Putra \(2024\)](#) and [Irmawati et al. \(2021\)](#) demonstrate that low levels of technical competency are associated with reduced accuracy, completeness, and timeliness of medical records. Similar findings are reported by [Ritonga and Manurung \(2019\)](#), who found that service quality indicators were strongly influenced by technical competency levels, and by [Prasetyo and Handayani \(2021\)](#), who linked technical competency directly to medical record unit

performance. In addition, Fauzan and Arnawilis (2021) highlight that inadequate coding and casemix competencies result in delayed and inaccurate claims, while Fauziah et al. (2023) report that limited technical skills contribute to suboptimal unit performance. From a job design perspective, these findings indicate that competency limitations restrict professionals' ability to perform essential tasks independently. Interpreted through the Job Characteristics Model, this weakens skill variety and task identity in particular: job roles become fragmented and overly procedural, with increased emphasis on error correction rather than preventive quality assurance, ultimately reducing work effectiveness and service quality.

Managerial Competency Gaps and Role Clarity

Managerial competency emerged as a critical theme influencing job design and work effectiveness. Studies focusing on leadership and coordination roles reveal that limited managerial skills, such as supervision, task delegation, and coordination, lead to low work effectiveness and unclear role distribution within medical record units (Garmelia et al., 2021). Fauziah et al. (2023) note that weaknesses in managerial competencies contribute to reduced unit performance and inconsistent task implementation. Within the JD-R model, managerial competency functions as a job resource that enables coordination and workload distribution; when this resource is depleted, task allocation is no longer aligned with individual capacity, and medical record professionals are often required to perform duties beyond their formal roles or competencies. This misalignment reduces autonomy and accountability, which are essential components of effective job design under both the JCM and the JD-R framework.

Workload Imbalance and Job Overload

Workload imbalance was identified as a recurring theme across studies employing workload analysis methods. Asriyanti, et al. (2023) report significant workforce shortages in Puskesmas, resulting in disproportionate workloads that increase fatigue and documentation errors. Similar conclusions are drawn by Zein et al. (2021) and Asriyanti et al. (2023), who demonstrate that excessive workload directly affects documentation accuracy and disrupts daily workflow, evidence from hospital settings may provide useful supporting insights; however, its direct applicability to Puskesmas settings may be limited due to differences in organizational and operational contexts. From a job demands-resources perspective, these findings indicate a mismatch between job demands (workload) and job resources (competency and staffing). Limited competencies exacerbate the impact of high workload, as professionals require more time and effort to complete tasks. Consequently, job design becomes inefficient, characterized by task overload and reduced work sustainability consistent with the JD-R model's prediction that unmet demands, unbuffered by adequate resources, erode both performance and well-being.

Digital Competency Constraints in Electronic Medical Record Implementation

Digital competency limitations emerged as a significant theme in studies examining EMR implementation, reflecting the broader global shift toward digital health systems (WHO, 2022; Van der Kleij et al., 2022). Biruk et al. (2022) This quantitative cross-sectional study involved 47 health workers at a primary health care center (Puskesmas) to assess their readiness to adopt Electronic Medical Records (EMR) in accordance with Ministry of Health Regulation No. 24 of

2022. The results showed that age, education level, and length of service had no significant association with readiness ($p > 0.05$). However, in terms of profession, only 20% of medical record and health information officers (PMIK) were found to be ready — indicating a need for further socialization and training by Wahyuni et al. (2024) in their assessment of digital competency readiness for EMR implementation. Supporting evidence from other studies indicates that gaps in data management and information system competencies further constrain digital workflows (Hasanah & Putra, 2024; Irmawati et al., 2021; Fauziah et al., 2023). The introduction of EMRs increases job complexity by adding tasks related to system operation, data validation, and digital reporting—new job demands in JD-R terms. However, when digital competencies (a personal resource) are inadequate, job design fails to adapt to these new demands. As a result, medical record professionals experience role strain and inefficient workflows, limiting the potential benefits of digital health systems.

Overall, the reviewed studies demonstrate that limitations in medical record professional competencies influence job design through interconnected mechanisms involving task execution, role clarity, workload distribution, and digital adaptation. These findings support the Job Characteristics Model and the Job Demands-Resources model, both of which emphasize the importance of aligning job requirements and demands with individual competencies and resources to achieve effective performance and sustainable well-being (Hackman & Oldham, 1976; Bakker & Demerouti, 2007). When such alignment is absent, job design becomes reactive and fragmented, leading to inefficiencies, declining data quality, and reduced service accountability.

Importantly, this review highlights that competency limitations should be understood as organizational and systemic issues rather than individual deficiencies. Addressing these challenges requires competency-based job design, targeted capacity development, and evidence-based workforce planning, consistent with international health workforce policy guidance on aligning skills, jobs, and deployment (OECD, 2021). Integrating professional competencies into job design processes is therefore essential to improve medical record management and support sustainable primary health care services.

CONCLUSION

This literature review confirms that the competencies of Medical Record and Health Information professionals are critical to the effectiveness of medical record management in Primary Health Care Centers (Puskesmas). The findings indicate a consistent mismatch between job demands and professional competencies across technical, managerial, and digital domains. This mismatch contributes to reduced workflow efficiency, unclear task structures, overlapping responsibilities, increased workload, and declining data quality. Limited digital competencies also hinder the effective implementation of Electronic Medical Records and reduce organizational capacity to adapt to digital health transformation. Therefore, strengthening professional competencies should be accompanied by competency-based workforce planning, appropriate job redesign, workload adjustment, clear allocation of responsibilities, and continuous digital capacity development. Aligning professional competencies with job requirements is essential to improve workforce performance, enhance the quality of medical record management, and support sustainable, efficient, and high-quality primary health care services.

REFERENCES

- Asriyanti, N., Abdullah, F., & Rasyid, A. (2023). Analysis of the Need for Medical Recorders and Health Information (PMIK) at Inpatient and Non-Inpatient Health Centers. *Journal of Aafiyah Health Research*, 5(2), 120–129. <https://doi.org/10.52103/jahr.v4i2.1562>
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309–328. <https://doi.org/10.1108/02683940710733115>
- Biruk, S., Yilma, T., Andualem, M., & Tilahun, B. (2022). Health care providers' readiness for electronic health record adoption: A cross-sectional study during pre-implementation phase. *BMC Health Services Research*, 22, 282. <https://doi.org/10.1186/s12913-022-07688-x>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Buchan, J., Catton, H., & Shaffer, F. A. (2020). Sustain and retain in 2020 and beyond. *International Council of Nurses*.
- Butler-Henderson, K. (2025). Analysis of the international classification of occupations for the health informatics and information management workforce. *Health Information & Libraries Journal*. <https://doi.org/10.1111/hir.12556>
- Fauziah, U., & Fadly, F. (2023). Gambaran persepsi tenaga kesehatan dalam penggunaan RME di RSUD Singaparna Medika Citrautama. *J-REMI: Jurnal Rekam Medik dan Informasi Kesehatan*, 4(4), 257–264. <https://doi.org/10.25047/j-remi.v4i4.3846>
- Garmelia, E., Lestari, D., & Golo, Y. (2021). Work effectiveness of medical record unit heads based on professional competencies. *Jurnal Informasi Kesehatan Indonesia*, 8(2), 87–96. <https://doi.org/10.33560/jmiki.v9i1.324>
- Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance*, 16(2), 250–279. [https://doi.org/10.1016/0030-5073\(76\)90016-7](https://doi.org/10.1016/0030-5073(76)90016-7)
- Hasanah, N., & Putra, R. (2024). Competency analysis of medical record officers in Bima City primary health care centers. *Jurnal Kesehatan Masyarakat Nusantara*, 12(1), 55–66. <https://doi.org/10.25047/j-remi.v5i2.4264>
- Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M.-P., Griffiths, F., Nicolau, B., O'Cathain, A., Rousseau, M.-C., Vedel, I., & Pluye, P. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for Information*, 34(4), 285–291. <https://doi.org/10.3233/EFI-180221>
- Irmawati, Garmelia, E., Golo, Z. A., & Ilyas, A. A. (2024). Analysis of medical record unit performance based on PMIK competency standards in hospitals in the South Sulawesi region. *Jurnal Rekam Medis dan Informasi Kesehatan*, 7(1), 70–77. <https://doi.org/10.31983/jrmik.v7i1.11312>
- Luftiana, R. M., & Anggraeni, I. (2024). The relationship between perceived usefulness, perceived ease of use, and user attitudes toward the actual use of e-Puskesmas electronic medical records at Sidomulyo Primary Health Care Center, Samarinda. *Media Kesehatan Masyarakat Indonesia*, 23(4), 356–360. <https://doi.org/10.14710/mkmi.23.4.356-360>
- Kristinawati, D. (2024). Analysis of the digital maturity level of Electronic Medical Record (EMR)

- implementation in primary healthcare facilities in Bantul Regency. *Journal of Information Systems for Public Health*, 9(3). <https://doi.org/10.22146/jisph.97287>
- Ministry of Health of the Republic of Indonesia. (2020). Professional standards for medical record and health information professionals: Minister of Health Decree No. HK.01.07/Menkes/312/2020. Secretariat of the Indonesian Health Workforce Council.
- Ministry of Health of the Republic of Indonesia. (2023). Indonesia health profile 2023. Directorate General of Public Health.
- OECD. (2021). Health workforce policies in OECD countries: Right jobs, right skills, right places. OECD Publishing. <https://doi.org/10.1787/9789264239517-en>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., et al. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., Britten, N., Roen, K., & Duffy, S. (2006). Guidance on the conduct of narrative synthesis in systematic reviews: A product from the ESRC Methods Programme (Version 1). Lancaster University. <https://doi.org/10.13140/2.1.1018.4643>
- Prasetyo, A., & Handayani, T. (2021). Human resource competencies and performance of medical record units in community health centers. *Indonesian Journal of Health Administration*, 9(1), 45–54. <https://doi.org/10.20473/jaki.v9i1.2021.33-54>
- Wahyuni, A., & Oktavia, D. (2024). Evaluasi kesiapan profesional kesehatan dalam mengadopsi rekam medis elektronik di fasilitas kesehatan. *J-REMI: Jurnal Rekam Medik dan Informasi Kesehatan*, 5(2), 162–167. <https://publikasi.polije.ac.id/j-remi/article/view/4343>
- Ritonga, Z. A., & Manurung, R. O. (2019). Review of medical record staff competencies and healthcare service quality at the Special Eye Hospital. *Jurnal Ilmiah Perekam dan Informasi Kesehatan Imelda (JIPIKI)*, 4(1), 567–572. <https://doi.org/10.52943/jipiki.v4i1.78>
- Van der Kleij, R., et al. (2022). Digital health adoption and workforce competencies. *Journal of Medical Internet Research*, 24(4). <https://doi.org/10.2196/31977>
- World Health Organization. (2020). State of the world's nursing 2020: Investing in education, jobs and leadership.
- World Health Organization. (2022). Global strategy on digital health 2020–2025.
- Zein, R., Mahendra, A., & Yusuf, M. (2021). Medical record workforce requirements in primary health care centers: An analysis of workload and capacity gaps. *Jurnal Administrasi dan Informasi Kesehatan*, 5(2), 89–98. <https://doi.org/10.31004/jkt.v3i3.13408>