WORKLOAD ANALYSIS OF MEDICAL RECORD PERSONNEL IN ELECTRONIC MEDICAL RECORD-BASED SERVICES

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ABSTRACT

The transition from hybrid medical records to electronic medical records changes the distribution of tasks and may alter staffing needs in medical record services. This study aimed to analyze the workload and staffing requirements of medical record personnel in hybrid medical record services during the transition to electronic medical records. A descriptive quantitative workload data from the Medical Record Installation of a hospital using a hybrid medical record system during the transition to electronic medical records. Available working time, activity time standards, annual activity quantities, supporting-task factors, and staffing availability were analyzed using the Health Workload Analysis approach while retaining the hospital's actual available working time. The available working time was 112,320 minutes/year for five-day medical record services and 119,280 minutes/year for the 24-hour registration service. The calculated staffing requirements were 1.02 personnel for distribution and data transfer, 1.46 for medicolegal services, 1.48 for inpatient coding and filing, 1.47 for assembling and reporting, and 9.03 for registration. The unrounded total staffing requirement was 14.46 personnel. After rounding the staffing requirement at each subunit, the operational staffing requirement was 16 personnel compared with 13 personnel currently available, indicating a shortage of 3 personnel. The findings indicate a workload–staffing gap, particularly in several medical record subunits, and support periodic workforce redistribution and staffing evaluation alongside the transition toward electronic medical record implementation.

KEYWORDS

workload analysis; electronic medical records; medical record personnel; staffing; hospital

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INTRODUCTION

The digital transformation of healthcare has positioned electronic medical records (EMR) as an important component of hospital service delivery. Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 stipulates that healthcare facilities are required to implement EMR, with its management directed toward improving service quality, ensuring data security and availability, and establishing integrated digital medical record management (Ministry of Health of the Republic of Indonesia, 2022). At the time of data collection, the study site was still implementing a hybrid medical record system, in which electronic medical records operated alongside conventional medical record documents and processes as part of the transition toward more comprehensive EMR implementation. This transitional condition resulted in digital and manual activities being performed simultaneously and therefore had the potential to affect the distribution of work and medical record staffing requirements.

EMR implementation does not necessarily result in a reduced workload. Empirical evidence indicates that technology can improve efficiency in some activities, while in others it may increase documentation time, administrative work, or cognitive workload. Veenstra et al. (2022) showed that EHR implementation can change the work characteristics of healthcare personnel. Among intensive care nurses, EHR use accounted for approximately 17% of working time and was predominantly used for documentation (Collins et al., 2022). Shan et al. (2023) also demonstrated that task duration, interruptions, task difficulty, and system usability are associated with mental workload when healthcare personnel perform EHR-based tasks.

In the context of hybrid medical record services during the transition toward EMR, changes in workflow are relevant to human resource planning. Medical record personnel continue to perform registration, coding, assembling, reporting, medicolegal, distribution, retention, scanning, validation, and data management functions, with some processes already digitized while others still follow conventional workflows. Studies in Indonesia have shown that EMR implementation may make core activities more efficient than manual processes; however, staffing requirements still need to be evaluated because workload volume and activity characteristics differ across units (Budi, 2022; Widiyanto, 2023). Therefore, staffing decisions should not be based solely on the number of personnel currently available, but should also consider available working time, activity time standards, and activity quantities.

Health Workload Analysis (ABK-Kes) is an approach used to estimate human resource requirements based on the work actually performed. The main calculation components include available working time (AWT), workload components and activity time standards, standard workload, activity achievements or quantities, and supporting tasks. This activity-based approach allows staffing requirements to be estimated according to the characteristics of each subunit. In this study, the hospital's actual AWT was retained so that the results reflected the operational work patterns applied at the study site.

Operational data from the Medical Record Installation of a hospital using a hybrid medical record system during the transition toward EMR in 2026 showed different working-time patterns between five-day medical record services and 24-hour registration services. Medical record services had an AWT of 112,320 minutes per year, whereas registration had an AWT of 119,280 minutes per year. The recorded activities were also

highly diverse, ranging from medicolegal services, inpatient coding and filing, assembling and reporting, distribution and data transfer, to 26 types of registration activities. This condition indicates that staffing requirements should be evaluated at the subunit level rather than solely on the basis of the total number of personnel in the installation.

Staffing analysis is increasingly important because a mismatch between workload and human resource capacity may affect service timeliness, data quality, and the continuity of EMR processes. International studies have shown that EHR time and workload are strongly influenced by system design, work intensity, and documentation patterns (Benson et al., 2023; Overhage et al., 2024). A systematic review also identified EHR usability and time spent using EHRs as important factors associated with stress and burnout among healthcare personnel (Poon et al., 2024). Therefore, workforce planning in a digital environment should be based on actual workload measurement.

RESEARCH METHOD

This study used a descriptive quantitative approach with secondary data analysis. The study was conducted at the Medical Record Installation of a hospital that, during 2026, was still implementing a hybrid medical record system as part of the transition toward EMR. The data source was the 2026 workload calculation document of the Medical Record Installation. The analyzed data included available working time, the time standard for each activity, average daily activity volume, annual activity quantity, supporting activities, and the number of personnel available. The analysis used only variables contained in the source documents; individual productivity data and inter-hospital comparisons were not analyzed because they were not available in the raw data.

The calculations were reprocessed using the ABK-Kes framework while retaining the hospital's actual AWT. The AWT for five-day medical record services was 112,320 minutes/year, whereas the AWT for 24-hour registration services was 119,280 minutes/year. The standard workload for each activity was calculated by dividing AWT by the activity time standard. Staffing requirements for core activities were calculated by dividing the annual activity quantity by the standard workload.

The source data recorded time allocated to supporting activities, including in-house training (IHT), social activities, meetings, meals, and recreational/retreat activities. For consistency in data processing, the proportion of supporting-task time to AWT was used as the Supporting Task Factor (STF), and the Supporting Task Standard (STS) was then calculated using the formula STS = 1/(1-STF). The final staffing requirement was obtained by multiplying the core-activity staffing requirement by the STS. To determine operational staffing requirements, the calculated requirement was rounded within each subunit, summed, and descriptively compared with the number of personnel available.

RESULT AND DISCUSSION

Available working time showed two different service patterns. In the medical record subunits operating on a five-day workweek, 234 working days/year were available at 8 working hours/day, resulting in an AWT of 112,320 minutes/year. In the 24-hour registration service, 284 working days/year were available at 7 working hours/day, resulting in an AWT of 119,280 minutes/year. These differences in AWT were retained in the calculations because they represented the hospital's operational patterns.

Table 1. Available Working Time by Service Group

Service group	Available days/year	Hours/day	AWT (minutes/year)
Medical record, five-day service	234	8	112,320
24-hour registration	284	7	119,280

Based on supporting-task time in the source documents, the STF for the medical record group was 8.07% and the STS was 1.088. For registration, the STF was 9.00% and the STS was 1.099. After supporting tasks were taken into account, staffing requirements differed among subunits. The highest requirement was found in registration at 9.03 personnel, whereas the lowest was found in distribution and data transfer at 1.02 personnel. After rounding within each subunit, the operational staffing requirement was 16 personnel.

Table 2. Staffing Requirement Based on Workload Analysis

Subunit	Core workload need	STP	Final need (unrounded)	Rounded need / available staff	Shortage*
Distribution and data transfer	0.940	1.088	1.022	1 / 1	0
Medicolegal	1.342	1.088	1.460	2 / 1	1
Inpatient coding and filing	1.358	1.088	1.478	2 / 1	1
Assembling and reporting	1.351	1.088	1.469	2 / 1	1
Registration	8.214	1.099	9.027	9 / 9	0
Total	13.205	–	14.456	16 / 13	3

*Shortage = rounded staffing need − available staff.

Overall, the staffing requirement for core activities before supporting tasks was 13.205 personnel. After the STS was applied, the final unrounded requirement was 14.456 personnel. To determine the operational staffing requirement, rounding was performed within each subunit: 1 person for distribution and data transfer, 2 for medicolegal services, 2 for inpatient coding and filing, 2 for assembling and reporting, and 9 for registration. Thus, the total staffing requirement after rounding was 16 personnel. Compared with the 13 personnel currently available, there was a shortage of 3 personnel. These findings indicate that staffing adequacy should be assessed according to the requirement of each subunit rather than merely by summing the unrounded decimal values.

In the medicolegal, inpatient coding and filing, and assembling and reporting subunits, only one staff member was available in each subunit, while the final unrounded requirements ranged from 1.46 to 1.48 personnel. After rounding, each of these subunits required 2 personnel, resulting in a shortage of 1 person in each subunit. Distribution and data transfer required 1.02 personnel and was rounded to 1 person, corresponding to the number of personnel available.

Registration was the largest component, with a core-activity staffing requirement of 8.214 personnel and a requirement of 9.027 personnel after supporting tasks were included. After rounding, registration required 9 personnel, equal to the nine personnel currently available. Registration involved 26 types of activities, including outpatient registration, emergency department registration, inpatient admission, National Health

Insurance (JKN) services, SEP management, EMR review, approval, and reporting. This diversity of activities should be considered in scheduling because workload is determined not only by the number of patients but also by the complexity and time standard of each activity.

These findings are consistent with Budi (2022) and Widiyanto (2023), who reported that EMR implementation changes the efficiency of medical record activities and that staffing requirements should continue to be evaluated on the basis of actual workload. In a broader context, EHR studies have shown that digitalization may reduce workload in some processes while also creating substantial documentation and system-use burdens (Benson et al., 2023; Naamneh & Bodas, 2024). This explains why EMR implementation should not be assumed to automatically reduce staffing requirements.

CONCLUSION

Based on 2026 operational data from the Medical Record Installation using a hybrid system during the transition toward EMR, the AWT for five-day medical record services was 112,320 minutes/year and the AWT for 24-hour registration was 119,280 minutes/year. The ABK-Kes-based analysis showed a final unrounded requirement of 14.456 personnel. After rounding the staffing requirement within each subunit, the total operational requirement was 16 personnel compared with 13 personnel available, resulting in a shortage of 3 personnel. Shortages were identified in medicolegal services, inpatient coding and filing, and assembling and reporting. These findings indicate that during the transition from a hybrid system toward EMR, workforce distribution and staffing requirements should continue to be evaluated according to activity volume, activity time standards, shift patterns, and workflow changes.

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