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The Effect of Hospital Management Information System (HMIS) Implementation on Nurses' Performance at Sumedang Regional Public Hospital

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Abstract: Technological advances and increasing public expectations require hospitals to improve the quality and efficiency of healthcare management. The Hospital Management Information System (HMIS), locally known in Indonesia as SIMRS, supports the integration of hospital administrative and clinical services. support the integration of administrative and clinical services. In nursing practice, HMIS facilitates patient monitoring, care planning, intervention evaluation, and accurate clinical documentation. According to the Human-Organization-Technology Fit Model, information-system success is influenced by the suitability of human, organizational, technological, and net benefit aspects, which have an impact on individual and organizational performance. However, its implementation at Sumedang Regional Public Hospital continues to face challenges that may affect nurses' performance. This study aimed to analyze the effect of HMIS implementation on nurses' performance at Sumedang Regional Public Hospital. A quantitative cross-sectional study with a descriptive and explanatory approach was conducted among 104 nurses selected using purposive sampling. Data were collected using structured questionnaires and analyzed using simple linear regression. HMIS implementation had a positive and statistically significant effect on nurses' performance ($B = 0.456$; $t = 8.064$; $p < 0.001$), accounting for 38.9% of the variance in nurses' performance ($R^2 = 0.389$). These findings indicate that better HMIS implementation is associated with higher nurses' performance. Improving system quality, usability, and alignment with nursing workflows may contribute to enhanced nursing performance and healthcare service delivery.

Keywords: HMIS, Nurse Performance, Management Information System.

INTRODUCTION

Healthcare services constitute one of the main pillars of human resource development because they contribute directly to improving population health. As referral healthcare facilities, hospitals play a strategic role in delivering comprehensive care. Rapid advances in health science and technology have transformed healthcare delivery, particularly in the management of increasingly large and complex clinical and administrative data. Consequently, conventional systems are no longer sufficient to support modern hospital operations. Non-integrated administrative systems may result in poor interdepartmental coordination, delayed access to information, reduced quality of care, an increased risk of medical errors, and inappropriate decision-making. Therefore, digital transformation through the implementation of health information systems has become an important strategy for improving hospital management and service quality. According to the HOT-Fit Model developed by Yusof et al. (2008), which integrates concepts from the DeLone and McLean Information Systems Success Model and Morton's IT–Organization Fit Model, the success of an information system is evaluated through four interrelated components: human, organization, technology, and net benefits. The model suggests that an information system that is well designed, easy to use, and aligned with user and organizational needs is more likely to be accepted and effectively utilized, thereby contributing to improved user performance (Nur Zannuba et al., 2020). This theoretical perspective is supported by Wibowo (2022), who reported that HMIS implementation was significantly associated with employee performance at Permata Hospital in Depok, West Java, explaining 72.25% of the variation in employee performance.

Based on the 2021–2022 Sumedang Regency Health Office Profile, Sumedang Regional Public Hospital, a Type B referral hospital within Indonesia's National Health Insurance (BPJS) system, recorded the highest number of outpatient and inpatient visits among the three public hospitals in Sumedang Regency. From 2021 to 2022, outpatient and inpatient visits increased by 19.1% and 26.6%, respectively. This growing service demand may increase nurses' workloads and affect their performance, given their essential role in delivering comprehensive and continuous nursing care. To support nursing performance and improve healthcare quality, the hospital has implemented a Hospital Management Information System (HMIS). The system assists nurses in monitoring changes in patients' conditions, identifying potential problems or complications, developing care plans, evaluating interventions, and minimizing errors in documentation and patient care. However, preliminary questionnaire findings and discussions with nurses indicated several implementation challenges. These included a lack of alignment between certain HMIS features and the needs of individual work units, limited ease of use due to insufficient user education and training, slow system response when accessed by multiple users, and the potential loss of previously entered patient data during network disruptions. These challenges may interfere with nurses' workflow and performance in delivering nursing care.

Nurses' performance refers to the quality and quantity of work achieved in accordance with established professional standards. One approach to evaluating nurses' performance is self-assessment, which enables nurses to reflect on their competence in clinical practice and identify areas for professional development to ensure that nursing care meets established standards. According to the Indonesian Minister of Health Regulation No. 40 of 2017, clinical nurse performance can be evaluated across five dimensions: assessment and care management, technical competence, professional and ethical competence, communication skills, and patient safety practices.

Previous studies have reported varying findings regarding the relationship between HMIS implementation and employee performance. Saragih et al. (2024) found that nurses who did not use HMIS optimally were eight times more likely to demonstrate poor performance. In contrast, Maramis and Prasetyo (2018) reported that HMIS implementation explained only 4%

of the variation in employee performance at Gatot Soebroto Army Hospital, which they attributed partly to a shortage of personnel with adequate information-system competencies. Similarly, Aqeeli (2022) found that electronic management systems improved work efficiency and reduced errors, thereby contributing to better performance quality. These inconsistent findings indicate the need for further investigation into the relationship between HMIS implementation and nurses' performance. A better understanding of this relationship may support the development of more efficient and user-responsive information systems and ultimately improve the quality of hospital services.

Literature Review

Management

Management is a systematic process involving the planning, organizing, directing, coordinating, and controlling of organizational resources to achieve predetermined objectives effectively and efficiently. Effective management requires the integration of interrelated resources commonly represented by the 7M + 1I framework: human resources (man), financial resources (money), materials, machines, methods, markets, time (minutes), and information (Yudha, 2021). Similarly, Hasibuan (2014) identifies planning, organizing, directing, and controlling as the principal management functions that ensure organizational activities are implemented consistently with established objectives and plans.

Management Information Systems

The word "system" comes from the Greek word "systema," which means a set of parts that are interconnected in an orderly manner. The word "information" is derived from the Latin "informationem," meaning "concept, idea, outline." A management information system (MIS) is an integrated set of procedures and resources used to collect, process, analyze, store, and present accurate, relevant, and organized information to support organizational operations and decision-making (Yoraeni, 2023). An MIS comprises four principal components: hardware, including computers and supporting equipment; software, including applications used to process and manage data; network resources, which enable connectivity and data exchange; and human resources, who operate, manage, and use the system. The integration and coordination of these components are essential for ensuring the effectiveness and reliability of the MIS.

Hospital Management Information System

The Hospital Management Information System (HMIS), known in Indonesia as Sistem Informasi Manajemen Rumah Sakit (SIMRS), is an integrated system designed to manage hospital operational, clinical, and administrative activities. It provides comprehensive and timely patient information to support service efficiency, care continuity, and organizational decision-making. Under the Regulation of the Indonesian Minister of Health No. 82 of 2013, all hospitals in Indonesia are required to implement SIMRS as part of their efforts to improve the quality and efficiency of healthcare services. In nursing practice, HMIS supports patient administration, nursing care documentation, and the systematic collection, analysis, and evaluation of clinical data. These functions assist nurses in monitoring changes in patients' conditions, identifying potential problems or complications, evaluating the effectiveness of nursing interventions, and making informed clinical decisions. Furthermore, HMIS supports quality management by facilitating communication, coordination, and information exchange among nurses and other members of the healthcare team.

Moradipour (2021) reported that the characteristics of HMIS implemented in public hospitals in southern Iran had a significant positive association with individual performance. Six HMIS dimensions were identified as relevant to performance: user-friendliness, system

speed, system quality, system up-to-dateness, conformity with work conditions, and user proficiency. User-friendliness refers to the extent to which a system is intuitive, understandable, comfortable to use, and requires minimal effort from users. A user-friendly interface may enable healthcare professionals to perform their tasks more efficiently and effectively. Consistent with this concept, Azeez et al. (2019) reported a significant positive relationship between system ease of use and hospital unit performance. System speed encompasses responsiveness in accessing data, timely delivery of information, and minimal system downtime. These characteristics may improve user satisfaction and productivity, whereas slow system performance may disrupt workflows, reduce work motivation, and decrease productivity (Bere et al., 2014).

System quality comprises several attributes, including accuracy, completeness, precision, adaptability, usability, and reliability. Ker et al. (2018) identified a significant relationship between hospital information system quality and unit performance. A high-quality system may reduce administrative burdens, improve work efficiency, and enhance user satisfaction, thereby contributing to improved performance (Rukmiyati & Budiartha, 2016). Meanwhile, system up-to-dateness refers to the system's ability to provide current, relevant, and regularly updated information according to users' needs. The use of an updated system and the timely renewal of information have been associated with improved service quality and unit performance (Azeez et al., 2019).

Conformity with work conditions reflects the degree to which HMIS functions are aligned with existing workflows and users' operational needs. A well-integrated system that corresponds to clinical work processes may improve the efficiency and effectiveness of service delivery (Abugabah et al., 2009). Finally, user proficiency refers to the knowledge and skills required to operate HMIS effectively. Appropriate training and enhanced user proficiency may improve system utilization and organizational performance (Ozonoff, 2018). Therefore, users' ability to operate the system effectively constitutes an important determinant of successful HMIS implementation (Ajami & Bertiani, 2012).

Nurses' Performance

Individual performance refers to the quality and quantity of work accomplished by an individual in accordance with predetermined organizational standards (Manengal, 2022). Organizational goal attainment depends on the effective utilization of available resources by employees. In the context of nursing, performance refers to nurses' ability to provide nursing care in accordance with their authority, duties, professional competencies, and responsibilities. It can be evaluated in terms of both the quality and quantity of care delivered and reflects nurses' contributions to achieving professional and organizational objectives (Amran, 2023). Accordingly, optimal nurses' performance is essential for maintaining the quality, safety, and continuity of patient care. Based on the Regulation of the Indonesian Minister of Health No. 40 of 2017 and standards established by the Indonesian National Nurses Association (PPNI), clinical nurses' performance encompasses five principal dimensions: assessment and care management, technical competence, professional and ethical competence, communication skills, and patient safety practices. Assessment and care management involve conducting holistic patient assessments, establishing nursing diagnoses, planning and implementing appropriate interventions, and evaluating patients' responses to those interventions. Nursing care should consider patients' biological, psychological, social, and spiritual needs while adhering to professional and ethical standards.

Technical competence includes the procedural, pharmacological, and documentation skills required to provide safe, effective, and high-quality nursing care (Datak & Sylvia, 2022). Communication competence includes therapeutic communication, which enables nurses to establish trusting relationships with patients, obtain relevant clinical information, and provide

accurate and understandable information regarding care (Melinda et al., 2022). Professional and ethical competence requires nurses to comply with applicable standards and guidelines, practise within the boundaries of their competence and authority, protect the confidentiality of patients' personal and medical information, and refer patients to appropriately qualified healthcare professionals when necessary. Patient safety practices reflect nurses' responsibility to minimize preventable harm throughout the care process, including medication and procedural errors, patient injuries, and healthcare-associated infections (Regulation of the Indonesian Minister of Health No. 40 of 2017).

The Relationship Between HMIS Implementation and Nurses' Performance

Employee performance is influenced by multiple factors, including organizational systems, workflows, and supporting infrastructure. In hospitals, the HMIS constitutes an important component of work infrastructure because it supports the management and exchange of clinical and administrative information. Its successful implementation depends not only on technological quality but also on its alignment with users' needs, professional responsibilities, and existing clinical workflows. Therefore, evaluating HMIS implementation is essential to determine whether the system effectively supports employee performance and healthcare delivery.

Previous studies have reported inconsistent findings regarding the relationship between HMIS implementation and employee performance. Muntari et al. (2020) found that HMIS quality had a positive but statistically nonsignificant association with employee performance at Jemursari Islamic Hospital, Surabaya. The authors suggested that employees continued to perform their duties according to established standard operating procedures and professional ethics, irrespective of HMIS utilization. Similarly, Maramis and Prasetyo (2018) reported that HMIS implementation explained only 4% of the variation in employee performance at Gatot Soebroto Army Hospital in Jakarta. This limited contribution was partly attributed to an insufficient number of personnel with adequate information-system competencies. These findings suggest that the availability of an information system alone may not be sufficient to improve performance without appropriately trained users and alignment between the system and existing work processes.

In contrast, other studies have demonstrated favorable outcomes associated with HMIS implementation. Waneka and Spetz (2010) identified HMIS as a potential catalyst for improving nurses' performance by enhancing the quality of nursing documentation and reducing reporting errors by 56%. Sheikhtaheri et al. (2020) similarly reported improvements in nursing performance following HMIS implementation. Furthermore, Wibowo (2022) found a statistically significant relationship between HMIS implementation and employee performance at Permata Hospital in Depok, West Java, stating that the implementation of HMIS had a 72.25% impact on employee performance. Collectively, these findings indicate that HMIS may support nurses' performance by facilitating timely access to patient data, accurate clinical documentation, interdepartmental coordination, and information-based decision-making. However, variations across previous findings demonstrate that its effectiveness may depend on system quality, user competence, organizational readiness, and alignment with clinical workflows.

METHODS

This study employed a descriptive-verificative design using a quantitative cross-sectional approach to examine the relationship between HMIS implementation and nurses' performance at Sumedang Regional Public Hospital. The study was conducted from June to July 2024. The study population comprised all 470 active nurses employed at the hospital in 2024. The minimum sample size calculated using Slovin's formula was 83; however, 104 nurses who met

the eligibility criteria were recruited through purposive sampling to increase the precision of the estimates. Nurses who were willing to participate and able to complete the study procedures were included, whereas those who were on leave during the data-collection period or declined to participate were excluded. Primary data were collected using Likert-scale questionnaires and observation. Secondary data were obtained from institutional documents, including nurses' performance records for 2022–2024, annual SOMEAH reports, Ongoing Professional Practice Evaluation (OPPE) reports, and Employee Performance Target (*Sasaran Kinerja Pegawai* [SKP]) reports. The validity and reliability of the questionnaires were assessed before the main analysis. Descriptive statistics and continuum-based score interpretation were used to describe HMIS implementation and nurses' performance. Inferential analysis was conducted using simple linear regression, preceded by the relevant regression assumption tests. Hypothesis testing included the F-test, t-test, and coefficient of determination (R^2). Data were processed and analyzed using Microsoft Excel and IBM SPSS Statistics version 26.

RESULTS AND DISCUSSION

A total of 104 active nurses participated in the study. Respondents' demographic characteristics, including age, length of service, sex, and educational attainment, are presented in Tables 1 and 2.

Table 1. Respondents' demographic Characteristics by Age and Length of Service (n = 104)

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age (years)	104	19	54	35.79	8.25
Length of service	104	1	34	11.68	8.63

Table 2. Distribution of Respondents by Sex and Educational Attainment (n = 104)

Characteristics		Frequency	Percentage
Gender	Male	26	25.0%
	Female	78	75.0%
	Total	104	100.0%
Education	Diploma III in Nursing	68	65.4%
	Nursing Professional Degree	25	24.0%
	Bachelor's Degree in Nursing	11	10.6%
	Total	104	100.0%

The respondents' ages ranged from 19 to 54 years, with a mean of 35.79 years, while their length of service ranged from 1 to 34 years. Most respondents were female (n = 78; 75.0%) and held a Diploma III in Nursing as their highest educational qualification (n = 68; 65.4%).

Table 3. Descriptive Statistics for HMIS Implementation by Dimension

Dimension	Average (%)	Category
User-friendliness	3.06	Good
Information System Speed	2.98	Good
Information System Quality	2.89	Good
Information System Up-to-Dateness	2.99	Good
Conformity with Work Conditions	3.03	Good
User Proficiency	2.90	Good
Total average	2.98	Good

Table 3 presents respondents' assessments of HMIS implementation at Sumedang Regional Public Hospital. The overall mean score across all dimensions was 2.98, corresponding to the "good" category based on the predetermined classification criteria. HMIS implementation was evaluated across six dimensions: ease of use, system speed, system

quality, system up-to-dateness, conformity with work conditions, and user proficiency. These findings indicate that respondents generally perceived HMIS implementation as supportive of nursing care, although several aspects require further improvement.

The item with the lowest average score was found in the information system quality dimension—specifically, the statement regarding the completeness of information available in HMIS—with an average score of 2.89. Although this score remained within the "good" category, the distribution of responses suggests that some nurses considered the information provided by the system insufficient to fully meet their needs. Observational findings supported this result, showing that patient information—including demographic data, medical and nursing assessments, and diagnostic test results—was not presented in an integrated view when a patient record was selected. Consequently, nurses had to navigate multiple menus to obtain complete patient information, which may reduce workflow efficiency. Similar limitations were identified in the system speed dimension. Although this dimension was generally rated as "good," the item concerning network speed when accessing documents obtained a mean score of 2.88, indicating that system responsiveness did not consistently meet users' needs. Delayed access to clinical documents may interrupt nursing workflows and increase the time required to obtain information, particularly during periods of high system utilization.

User proficiency is also essential for effective HMIS utilization. The user-proficiency dimension obtained a mean score of 2.90 and was categorized as "good," indicating that respondents generally perceived themselves as capable of operating the system. Nevertheless, some respondents continued to experience difficulties, suggesting a need for ongoing training and technical support. This finding is consistent with the HOT-Fit Model, which proposes that the success of information system implementation depends not only on technological quality but also on human factors, including users' knowledge, skills, and ability to operate the system effectively (Yusof et al., 2008; Tawar et al., 2022).

Table 4. Descriptive Statistics for Nurses' Performance by Dimension

Dimension	Average (%)	Category
Assessment and Care Management	3.64	very good
Technical Skills	3.58	very good
Professionalism and Ethics	3.87	very good
Communication Skills	3.88	very good
Patient Safety Practices	3.87	very good
Total average	3.74	very good

Nurses' performance reflects the extent to which nurses fulfil their professional responsibilities and achieve established nursing care objectives. In this study, performance was measured using nurses' self-assessments of their competencies in providing nursing care. As shown in Table 4, the overall mean performance score was 3.74, corresponding to the "very good" category based on the predetermined classification criteria. This finding indicates that respondents generally perceived their nursing performance as consistent with the applicable competency and service standards.

Across the performance dimensions, communication skills obtained the highest mean score (3.88), followed by professional and ethical competence and patient safety practices, each with a mean score of 3.87. Technical competence obtained the lowest dimension-level mean score (3.58), although it remained within the "very good" category. At the item level, the lowest mean score was recorded for nurses' ability to explain the pathophysiology of patients' conditions and the expected outcomes (3.21), which was categorized as "good." In contrast, accurate and clear documentation of communication obtained the highest item-level mean score (3.95). Overall, respondents reported a high level of nursing performance, particularly in communication, professional and ethical competence, and patient safety practices.

Nevertheless, the comparatively lower scores for technical competence and the ability to explain pathophysiology and expected outcomes indicate areas that may benefit from further professional development. Strengthening these competencies through continuing education, case-based learning, and clinical training may contribute to further improvements in the quality of nursing care.

Table 5. Simple Linear Regression Analysis of HMIS Implementation and Nurses' Performance

Hypothesis	Regression Coefficient (B)	T-Statistic	Sig. (p-value)
X → Y	0.456	8.064	0.000

As shown in Table 5, HMIS implementation was positively and significantly associated with nurses' performance (B = 0.456, t = 8.064 > tcritical = 1.983, p < 0.001). Therefore, the null hypothesis was rejected, and the research hypothesis proposing a significant association between HMIS implementation and nurses' performance was supported. The unstandardized regression coefficient indicates that each one-unit increase in the HMIS implementation score was associated with an estimated increase of 0.456 units in the nurses' performance score. Thus, better HMIS implementation was associated with higher nurses' performance.

Table 6. Model Summary and Coefficient of Determination

Model Summary[b]				
Model	**R**	**R-Square**	**Adjusted R-Square**	**Std. Error of the Estimate**
1	0.624[a]	0.389	0.383	4.04082

a. Predictors: (Constant), SIMRS (X)
b. Dependent Variable: Nurse Performance (Y)

As shown in Table 6, the correlation coefficient (R = 0.624) indicates a positive association between HMIS implementation and nurses' performance, according to the prespecified interpretation criteria. The coefficient of determination ($R^2 = 0.389$) indicated that the regression model containing HMIS implementation accounted for 38.9% of the variance in nurses' performance. The remaining 61.1% represented unexplained variance by the model and may be attributable to other factors, measurement error, or random variability.

CONCLUSION

This study found a positive and statistically significant association between HMIS implementation and self-reported nurses' performance at Sumedang Regional Public Hospital. The regression model accounted for 38.9% of the variance in nurses' performance (adjusted $R^2 = 0.383$). These findings suggest the importance of optimizing system quality, reliability, usability, and alignment with nurses' work requirements to support nursing workflows and service performance.

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