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# HOSPITAL INFORMATION SYSTEM USE AND OUTPATIENT STAFF WORK EFFECTIVENESS

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**ABSTRACT**
Hospital information systems are expected to reduce fragmented documentation and support timely outpatient care, yet technical availability does not necessarily translate into effective work. To examine associations between five dimensions of Hospital Management Information System (SIMRS) use and five dimensions of outpatient staff work effectiveness. A quantitative cross-sectional survey was conducted at Rumah Sakit Islam Jakarta Sukapura, Indonesia, from December 2025 to June 2026. Proportionate stratified random sampling was planned for 160 eligible staff; 103 respondents completed a validated 18-item questionnaire. Item validity was assessed using item-total correlations, while internal consistency reliability was evaluated using Cronbach's alpha before the questionnaire was used for analysis. Frequencies, percentages, and chi-square tests were used, with statistical significance set at $p < 0.05$. Overall SIMRS use was high among 59.2% of respondents, while 55.3% reported effective work performance. Five of 25 indicator-level tests were significant: software with work quantity ($p = 0.016$) and work quality ($p = 0.039$), procedures with work quality ($p < 0.001$), hardware with timeliness ($p = 0.014$), and internet connectivity with attendance ($p = 0.005$). SIMRS use was selectively associated with particular dimensions of work effectiveness. The findings favour targeted investment in reliable hardware, usable software, stable connectivity, and workable procedures rather than treating digitalisation as a uniform solution.

Keywords: digital health; health workforce; hospital information system; outpatient service; work effectiveness

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## INTRODUCTION

Hospitals depend on accurate and timely information to coordinate clinical, administrative, and reporting activities. In Indonesia, the Hospital Management Information System, commonly abbreviated as SIMRS, is a regulatory and operational mechanism for integrating these activities (Regulation of the Minister of Health of the Republic of Indonesia Number 82 of 2013 Concerning Hospital Management Information Systems, 2013). The national health framework also places information governance and service quality within broader institutional responsibilities (Law of the Republic of Indonesia Number 17 of 2023 Concerning Health, 2023). Digital infrastructure, however, creates value only when staff can use it reliably within actual workflows.

The distinction between system availability and meaningful system use is crucial. A hospital may have computers, network access, and an installed application while staff continue to face delayed screens, duplicate steps, unclear responsibilities, or workarounds outside the formal system. In such circumstances, digitalisation can create the appearance of integration without consistently reducing the effort required to deliver care. Evaluations therefore need to examine the fit between technical resources, human capability, and organisational routines rather than asking only whether a system has been implemented (Handayani et al., 2018; Vantissha et al., 2022).

Outpatient departments are a demanding setting for this integration because registration, clinical documentation, pharmacy, laboratory, financing, and medical-record functions meet within short service cycles. Indonesian regulation treats outpatient care as a distinct hospital service requiring

coordinated professional and administrative processes (Regulation of the Minister of Health Number 11 of 2016 Concerning Executive Outpatient Services in Hospitals, 2016). Previous studies have reported relationships between SIMRS implementation and employee performance (Anwar et al., 2020; Ichsan & Sari, 2024; Utomo et al., 2024). Electronic records may improve access and workflow efficiency, but implementation barriers can redistribute rather than remove workload (Hendratno & Gunawan, 2024; Setiorini et al., 2021). Consequently, a single overall score can conceal which technical or organisational components matter for particular work outcomes.

Rumah Sakit Islam Jakarta Sukapura replaced an earlier system with the integrated Healthical SIMRS in June 2024. Preliminary observations described intermittent slowness, freezing, maintenance-related disruption, and limited flexibility when correcting clinical data after bridging with the national insurance system. These problems occurred in a service environment that recorded 101,514 outpatient visits over 11 months in 2025. The practical issue was therefore not simply whether SIMRS existed, but whether hardware, software, staff capability, internet connectivity, and procedures were associated with quantity, quality, timeliness, attendance, and teamwork. This study examined those indicator-level associations among outpatient staff.

The indicator-level approach extends the practical usefulness of earlier studies. An overall association may tell managers that SIMRS matters, but it does not reveal whether the immediate weakness lies in workstation performance, application usability, user competence, network stability, or the procedures governing use. Likewise, work effectiveness is not a single behaviour. A system may help staff complete more tasks or document more accurately without improving attendance or interpersonal cooperation. Separating these dimensions provides a more defensible basis for prioritising limited hospital resources and avoids presenting technology as a universal remedy.

## METHOD

This quantitative cross-sectional survey was conducted at Rumah Sakit Islam Jakarta Sukapura, North Jakarta, from December 2025 to June 2026. The eligible population comprised 160 outpatient staff who used SIMRS, including medical-record, registration, pharmacy, medical, nursing, rehabilitation, haemodialysis, laboratory, and casemix personnel. A target sample of 114 was calculated using Slovin's formula with a 5% margin of error, followed by proportionate stratified random sampling, consistent with the quantitative sampling approach described by Sugiyono (Sugiyono, 2023). The achieved sample was 103 because the hospital restricted the number of physicians who could participate and participation remained voluntary.

Data were collected using observation and a self-administered questionnaire adapted from Stenly and Prasetyo (Stenly & Prasetyo, 2018). The questionnaire consisted of nine items assessing SIMRS use across hardware, software, human resources, internet connectivity, and procedures, and nine items assessing work effectiveness across work quantity, work quality, timeliness, attendance, and teamwork. Responses were measured using a five-point Likert scale.

The validity and reliability of the adapted questionnaire were reassessed because modifications were made to the number and wording of items. Item validity was evaluated by examining the correlation between each item score and its corresponding total construct score. An item was considered valid when its calculated correlation coefficient exceeded the critical correlation value at a significance level of 0.05. Internal consistency reliability was assessed using Cronbach's alpha, with a coefficient of at least 0.70 considered acceptable. The original instrument developed by Stenly & Prasetyo (2018) reported Cronbach's alpha coefficients of 0.904 for SIMRS and 0.785 for employee performance. However, these values were treated only as evidence of reliability of the original instrument, while the validity and reliability of the adapted version were evaluated using data from the present study. Scale construction followed established psychometric principles (Azwar, 2012), while descriptive categorisation referred to health-research procedures described by

Notoatmodjo (Notoatmodjo, 2010). Scores were dichotomised using the mean for normally distributed scores or the median for non-normal scores.

The five SIMRS dimensions represented complementary parts of routine use. Hardware referred to the adequacy and responsiveness of the computers used during service. Software concerned the operation and usability of the Healthical application. Human resources represented the user's ability to operate and adapt to the system. Internet connectivity captured the network support required for integrated and bridged functions. Procedures referred to compliance with the prescribed sequence and standard operating procedures. Work quantity, work quality, timeliness, attendance, and teamwork were treated as distinct expressions of effectiveness because improvement in one dimension does not guarantee improvement in the others.

Data were analysed in SPSS using descriptive statistics and chi-square tests. Twenty-five indicator-level associations were tested at $\alpha = 0.05$. Because the design was cross-sectional and did not establish temporal order or control confounding, results are described as associations rather than causal effects. Ethical approval was granted by the Rumah Sakit Islam Jakarta Sukapura ethics committee (No. 037/KOMPEN/12/2025). Participants provided informed consent and confidentiality was maintained.

Frequencies and percentages were first calculated for respondent characteristics, SIMRS-use categories, and work-effectiveness categories. Each of the five SIMRS dimensions was then cross-tabulated with each of the five effectiveness dimensions. The chi-square p-value was used to screen for evidence of an association at the conventional 5% threshold. The analysis did not estimate adjusted associations or control potential confounders. It also did not apply a formal correction for the 25 comparisons. Accordingly, the complete matrix of p-values is reported so readers can distinguish the five nominally significant findings from the wider pattern of non-significant results.

## RESULT

The 103 respondents were predominantly aged 20 to 39 years (62.1%), female (75.7%), educated to diploma level (43.7%), and employed for 10 to 20 years (37.9%).

Table 1.
Respondent characteristics (n = 103)

| Characteristic | n | % |
|---|---|---|
| Age 20-39 years | 64 | 62.1 |
| Age 40-49 years | 30 | 29.1 |
| Age ≥50 years | 9 | 8.7 |
| Male | 25 | 24.3 |
| Female | 78 | 75.7 |
| Secondary school | 6 | 5.8 |
| Diploma | 45 | 43.7 |
| Bachelor's degree | 36 | 35.0 |
| Master's degree | 16 | 15.5 |
| <5 years employed | 33 | 32.0 |
| 5-9 years employed | 16 | 15.5 |
| 10-20 years employed | 39 | 37.9 |
| >20 years employed | 15 | 14.6 |

Overall, 59.2% of respondents were classified as having high SIMRS use. Internet connectivity had the largest high-use proportion (91.3%), whereas hardware had the smallest (55.3%). Work effectiveness was classified as effective for 55.3% of respondents. Attendance (86.4%) and work quality (82.5%) had the highest effective proportions, while timeliness was nearly evenly divided.

Table 2.
SIMRS use and work-effectiveness classifications (n = 103)

| Dimension | Lower/ineffective n (%) | Higher/effective n (%) | Total |
|---|---|---|---|
| Overall SIMRS use | 42 (40.8) | 61 (59.2) | 103 |
| Hardware | 46 (44.7) | 57 (55.3) | 103 |
| Software | 26 (25.2) | 77 (74.8) | 103 |
| Human resources | 40 (38.8) | 63 (61.2) | 103 |
| Internet connectivity | 9 (8.7) | 94 (91.3) | 103 |
| Procedures | 35 (34.0) | 68 (66.0) | 103 |
| Overall work effectiveness | 46 (44.7) | 57 (55.3) | 103 |
| Work quantity | 39 (37.9) | 64 (62.1) | 103 |
| Work quality | 18 (17.5) | 85 (82.5) | 103 |
| Timeliness | 51 (49.5) | 52 (50.5) | 103 |
| Attendance | 14 (13.6) | 89 (86.4) | 103 |
| Teamwork | 49 (47.6) | 54 (52.4) | 103 |

Five of the 25 chi-square tests reached the 0.05 significance threshold. High software use was associated with greater proportions of effective work quantity and quality. High procedural use was strongly associated with effective work quality. High hardware use was associated with effective timeliness, while high internet connectivity was associated with effective attendance. The remaining 20 tests were not statistically significant.

Table 3.
Significant indicator-level associations

| SIMRS dimension | Work outcome | Effective in lower-use group | Effective in higher-use group | p-value |
|---|---|---|---|---|
| Software | Work quantity | 11/26 (42.3%) | 53/77 (68.8%) | 0.016 |
| Software | Work quality | 18/26 (69.2%) | 67/77 (87.0%) | 0.039 |
| Procedures | Work quality | 22/35 (62.9%) | 63/68 (92.6%) | <0.001 |
| Hardware | Timeliness | 17/46 (37.0%) | 35/57 (61.4%) | 0.014 |
| Internet connectivity | Attendance | 5/9 (55.6%) | 84/94 (89.4%) | 0.005 |

Table 4.
Chi-square p-values for all indicator-level tests

| SIMRS dimension | Work quantity | Work quality | Timeliness | Attendance | Teamwork |
|---|---|---|---|---|---|
| Hardware | 0.061 | 0.122 | 0.014* | 0.112 | 0.401 |
| Software | 0.016* | 0.039* | 0.061 | 0.332 | 0.232 |
| Human resources | 0.190 | 0.591 | 0.196 | 0.356 | 0.991 |
| Internet connectivity | 0.252 | 0.190 | 0.281 | 0.005* | 0.616 |
| Procedures | 0.239 | <0.001* | 0.127 | 0.173 | 0.574 |

Note: *p < 0.05. P-values are unadjusted for multiple comparisons.

## DISCUSSION

The findings do not support a simplistic claim that greater SIMRS use uniformly improves every aspect of staff performance. Only five of 25 indicator pairs were significant. This selective pattern is more informative than an overall positive-versus-negative judgement because it identifies where digital resources intersect with concrete work demands. It also agrees with socio-technical evaluations in which system success depends on alignment among human, organisational, and technological conditions (Setiorini et al., 2021; Vantissha et al., 2022).

At the descriptive level, the hospital had already achieved broad acceptance of several SIMRS components. Software, connectivity, and procedures were more often rated high than low. Even so, overall effective work was reported by only 55.3% of respondents. The difference warns against using adoption or access as a proxy for performance. A system can be frequently used because it is mandatory, yet still create delay, cognitive burden, or extra corrective work. Conversely, experienced staff may maintain acceptable service through informal coordination even when a

system component performs poorly.

Software use was associated with both work quantity and work quality. Staff reporting high software use had a markedly higher proportion of effective work quantity than those in the lower-use group. A similar pattern appeared for quality. Usable software can reduce repeated entry, improve retrieval, and provide more consistent workflow prompts. Indonesian outpatient studies have likewise connected SIMRS implementation with better employee performance and service processes (Ichsan & Sari, 2024; Safitri et al., 2025). Nevertheless, the present analysis cannot determine whether software use improved performance or whether already effective staff used the software more confidently.

The joint pattern for software and procedures deserves attention. Software was related to the amount and quality of work, whereas procedures were related only to quality. One interpretation is that application usability influences the speed and volume of routine transactions, while procedures become particularly important when accuracy, verification, and consistency are at stake. This interpretation fits the practical division between what the system enables and how the organisation expects staff to use that capability. Improvements should therefore pair interface and workflow changes with revised instructions. Updating one without the other risks creating a mismatch between the available function and the required practice.

Procedural use showed the clearest association with work quality. This matters because digital systems do not standardise practice by themselves. Clear operating procedures translate software functions into shared routines for entering, checking, and correcting data. The result supports the view that hospital information systems require coherent organisational rules, training, and monitoring alongside technical deployment (Handayani et al., 2018; Utomo et al., 2024). It is also consistent with national attention to measurable hospital service quality (Regulation of the Minister of Health Number 30 of 2022 Concerning National Quality Indicators for Health Services, 2022). A hospital that buys software but leaves staff to improvise its use has digitised the mess, not solved it.

Hardware was associated with timeliness. The practical explanation is direct: slow computers, freezing, and delayed response add friction to short outpatient service cycles. By contrast, hardware was not significantly related to work quantity, quality, attendance, or teamwork. This boundary is plausible because a functioning computer may reduce delay without changing interpersonal coordination or professional judgement. The near-even split in effective and ineffective timeliness indicates that infrastructure deserves attention even though most respondents rated overall SIMRS use highly.

This result has a concrete managerial implication. Hardware replacement should be based on workflow exposure and measured response problems rather than an indiscriminate hospital-wide purchase. Workstations used for registration, clinical entry, pharmacy verification, and other time-sensitive tasks should be mapped according to transaction volume, freezing incidents, start-up time, and average response delay. Targeted replacement or memory and network-interface upgrades may therefore produce more value than buying identical equipment for units with different workloads.

Internet connectivity was associated with attendance, although this result should be interpreted cautiously. Only nine respondents were in the lower-connectivity category, so the contingency table was imbalanced. Attendance is ordinarily shaped by discipline, health, scheduling, and organisational climate, and a cross-sectional association does not establish that connectivity caused staff presence. The finding may instead reflect a broader work-environment difference or chance arising from multiple testing. With 25 separate tests and no multiplicity adjustment, approximately one false-positive result could be expected at $\alpha = 0.05$ even if no true associations existed.

The non-significant findings are not evidence that hardware, software, staff capability, connectivity, or procedures are unimportant. Statistical non-significance can reflect a genuinely weak relationship, limited variability, small subgroup sizes, measurement error, or inadequate power. For example, when 91.3% of respondents fall into the high-connectivity category, the analysis has little information for making a stable comparison with the lower category. The responsible interpretation is therefore narrow: the study did not detect evidence of association for those pairs under its design and categorisation, not that the relationships are absent in every setting.

No SIMRS dimension was associated with teamwork. This suggests that collaboration in the study setting remained largely interpersonal and organisational rather than system-mediated, consistent with evidence that technology alone cannot substitute for communication and shared practice (Shintya & Maritasari, 2020). Human-resource theory likewise treats attendance, cooperation, and performance as outcomes shaped by individual responsibility, organisational context, and management, not merely by equipment (Bangun, 2012; Mangkunegara, 2011; Ratnasari et al., 2020). The need for ongoing competence development is also consistent with current health-workforce regulation (Regulation of the Minister of Health Number 13 of 2025 Concerning Health Human Resources Management, 2025). Future research should use validated multi-item scales without unnecessary dichotomisation, report effect sizes and confidence intervals, test overall constructs before exploratory subdimensions, and adjust for profession, age, education, and tenure. Longitudinal or pre-post designs would offer stronger evidence about change after system upgrades.

Human-resource capability was not significantly associated with any of the five work outcomes. That finding should not be read as permission to neglect training. The measure may have captured general confidence or adaptation rather than task-specific competence, and respondents from different professions may require different functions from the same system. A physician correcting a diagnosis, a registration officer confirming identity data, and a pharmacy officer verifying medication all interact with different risks and bottlenecks. Aggregating them into one human-resource category can dilute profession-specific relationships. Training evaluation should therefore move beyond participation counts and assess whether users can complete critical tasks correctly under ordinary and downtime conditions.

The study has several limitations. The achieved sample was below the target and physician participation was restricted. Self-reported exposure and outcomes may share common-method bias. Dichotomising continuous scores reduced information and may have changed statistical power. The single-hospital setting limits generalisability, and the analysis did not control confounding. Finally, multiple indicator-level tests increase the risk of chance findings. These limitations do not erase the observed patterns, but they sharply limit causal interpretation.

For practice, the results support a staged improvement strategy. First, the hospital should document recurrent hardware and response-time failures at high-volume outpatient points. Second, software problems should be separated into usability defects, training gaps, and constraints imposed by external bridging so each is assigned to the correct owner. Third, standard operating procedures should specify verification, correction, escalation, and downtime processes in language that reflects actual staff tasks. Fourth, refresher training should be linked to system updates and followed by direct observation of use, rather than treated as a one-off attendance activity. These steps connect investment to measurable service problems while preserving the human support required for safe digital work.

Future evaluation should establish a smaller number of primary outcomes before examining exploratory indicator pairs. Preserving continuous questionnaire scores would retain information lost through dichotomisation, while regression models could estimate associations after accounting for profession, age, education, and tenure. Reporting odds ratios or prevalence ratios with

confidence intervals would also show the size and precision of relationships rather than reducing interpretation to whether p falls below 0.05. Qualitative interviews and direct workflow observation could then explain why users experience delay, which workaround is used, and whether a problem originates in the hospital system, the external insurance bridge, local equipment, or procedural design.

A stronger design would also connect staff-reported experience with routinely recorded service indicators. Candidate outcomes include registration time, incomplete records, correction requests, system downtime, queue length, and delayed completion of outpatient documentation. Repeated measurement before and after a defined hardware, software, or procedural intervention would provide clearer temporal evidence than a single survey. Such evaluation would help the hospital distinguish perceived ease of use from observable service improvement while keeping staff experience visible as a legitimate component of digital quality.

## CONCLUSION

SIMRS use was high among 59.2% of outpatient staff, while 55.3% were classified as working effectively. Significant associations were confined to software with work quantity and quality, procedures with work quality, hardware with timeliness, and internet connectivity with attendance. The hospital should prioritise responsive computers, usable software, stable connectivity, practical operating procedures, and recurrent user support. Because the evidence is cross-sectional and based on multiple unadjusted tests, the results should guide targeted quality improvement rather than be treated as proof that SIMRS use caused better performance.

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