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Overview of the Information Quality of Electronic Medical Records and User Satisfaction at RS X Wonosobo

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Abstract

Digital transformation in healthcare offers both convenience and challenges, particularly regarding the quality of information generated by electronic systems. Key issues include accuracy, completeness, and timeliness, which are not always ensured due to delays in data entry after procedures, resulting in information that does not fully reflect current conditions. This study aimed to describe the quality of medical record information from healthcare digitalization and assess user satisfaction at RS X Wonosobo. A quantitative descriptive design was employed. Data were collected in April–May 2025 from 63 healthcare professionals using HIMS/EMR, selected through purposive sampling. The instrument was a closed-ended questionnaire with a 4-point Likert scale, covering six variables: accuracy, completeness, format, timeliness, relevance, and user satisfaction. Data were analyzed descriptively by frequency and percentage distribution, with scoring based on a two-category classification using the median cut-off. Results indicated that positive responses were dominant in accuracy (65,08%), format (68,25%), and relevance (60,32%), while completeness, timeliness, and user satisfaction showed balanced perceptions. Overall, these findings indicate that information quality is not yet optimal and affects user satisfaction. It is recommended that the hospital strengthen data entry supervision, conduct regular evaluations, and raise healthcare workers' awareness of information quality to support service excellence.

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Introduction

The development of technology has also significantly influenced the health sector, especially through the process of digitalization. Health services that were previously paper based are now being transformed into digital systems.(Laksono, 2022) This digitalization includes two main aspects: the use of technology in service delivery and the digital management of medical data.(Lukitawati & Novianto, 2023) One of the main forms of digitalization in hospitals is the Hospital Management Information System (HMIS), which integrates all service processes into one information network. Electronic Medical Records (EMR) are one of the core components of HMIS and are mandated for use in health facilities in Indonesia.

EMRs have brought significant changes in the management of medical records, making them easier to read, safer, and more accessible. However, several challenges remain, particularly related to the quality of the information generated. Previous studies found that issues such as incomplete, outdated, or delayed information entry reduce the effectiveness of EMR and limit their benefits. For example, delays in data entry after clinical procedures often lead to incomplete or untimely medical records, which in turn affect service quality and clinical decision making.

At RS X Wonosobo, the digitalization of healthcare services has been carried out through the implementation of EMR system, although the level of implementation differs between outpatient and inpatient services. Since June 2024, outpatient services have fully adopted the EMR, enabling digital documentation and access to patient data without reliance on paper forms. In contrast, inpatient services

have applied a hybrid system since early 2024, where most patient information is digitalized but several forms, such as informed consent, doctors' notes, and laboratory results remain in paper format. Based on a preliminary survey conducted in November 2024, it was found that the quality of EMR information still requires improvement, particularly in terms of timeliness and completeness. Laboratory results, for instance, are first recorded manually on paper before being entered into the system by nurses, and this delayed data entry often causes information to be outdated when needed for care. To address these issues, the hospital has begun efforts to encourage timely digital input. However, challenges remain, especially in ensuring consistent documentation practices among healthcare workers. As a result, despite the progress in digitalization, the EMR system has not yet achieved optimal information quality, particularly within inpatient services.

Several studies have examined EMR implementation and user satisfaction. A study at RS Wahidin Sudiro Husodo Mojokerto (2024) evaluated user satisfaction and found that system benefits were not yet optimal due to low utilization. Another study at RSUPN Dr. Cipto Mangunkusumo (2020) analyzed EMRs using DeLone and McLean's model but was limited to qualitative methods and focused only on medical record staff.(Hendaryanti, R. A. T., & Deharja, 2020) Research at RS Dr. Oen Kandang Sapi Solo (2023) emphasized satisfaction with EMR implementation in general, while a study at RSUD Kembangan Jakarta (2023) assessed the relationship between system quality, information quality, and service quality with user satisfaction.(Risa Setia Ismandani et al., 2023)(Rafikasani et al., 2024) Meanwhile, research at RSKIA Sadewa Yogyakarta (2022) focused only on outpatient services.(Astia Putri et al., 2023)

These variations highlight that each study has strengths and limitations, but none has yet provided a comprehensive description of information quality and user satisfaction across different health worker professions in a hospital using a hybrid EMR system. Some studies reported positive impacts of EMRs on satisfaction, while others highlighted persisting barriers such as incomplete or delayed data. These diverging results show the need for further study.

This research aims to describe the quality of information in EMRs and user satisfaction at RS X Wonosobo, a hospital currently implementing a hybrid system (digital for outpatient care and partly paper based for inpatient care). The novelty of this study lies in its focus on information quality elements (accuracy, timeliness, completeness, relevance, and format) as perceived by multiple healthcare professions, which has not been fully explored in previous studies. In addition to evaluating information quality, this study also considers healthcare workers' user satisfaction, as their perceptions reflect the overall success of EMR utilization. This study is expected to contribute practical insights for improving medical record information quality and supporting better healthcare service delivery.

Methods

This study employed a descriptive quantitative design conducted at RS X Wonosobo during April–May 2025. The research aimed to describe the quality of Electronic Medical Record (EMR) information and user satisfaction. The conceptual framework was guided by the DeLone and McLean Information System Success Model, particularly emphasizing the dimension of information quality in the context of health information systems. Information quality in this study was operationalized into five elements adapted from DeLone and McLean, namely accuracy, completeness, timeliness, format, and relevance.(DeLone & McLean, 2003) In addition, user satisfaction was also considered as one of the variables examined.(DeLone & McLean, 1992)

The population consisted of healthcare workers actively using the Hospital Management Information System (HMIS) including doctors, midwives, nurses, pharmacists & pharmaceutical technicians, laboratory staff, and medical record & health information technicians. From a total population of 75, the sample size was calculated using the Slovin formula with a 5% margin of error, resulting in 63 respondents. The sampling technique applied was purposive sampling, ensuring participants were directly involved in EMR utilization.

The data were collected through a questionnaire adapted from a previous study by Risdiyanto (2014), which had been validated through expert judgment and demonstrated high reliability with Cronbach's alpha values of 0.911 for information quality and 0.944 for user satisfaction.(Risdiyanto, 2014) Since the instrument was established in prior research, this study only adopted and applied it without modification. The questionnaire used a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree).

The collected responses were processed and analyzed using descriptive statistical methods. Frequency distribution and percentage were calculated to show the distribution of respondents' answers. In addition, scoring and classification were applied to present aggregated results, with median scores used as the cut-off point to categorize responses into two groups: positive or negative perception. Categories were labeled according to operational definitions, such as Accurate/Not Accurate, Complete/Not

Complete, Timely/Not Timely, Informative/Not Informative, Relevant/Not Relevant, and Satisfied/Not Satisfied.

This research obtained ethical clearance from RS X Wonosobo with approval number 445/146/RSIAA/2025. Participation was voluntary, and respondents were asked for informed consent before completing the questionnaire.

Results

Respondence Characteristics

Table 1. Respondence Characteristics

Characteristic	f	%
Gender		
- Male	5	7,94
- Female	58	92,06
Age Group		
- 20 – 30	42	66,67
- 31 – 40	19	30,16
- 41 – 50	2	3,17
Education		
- Diploma III	45	71,43
- Diploma IV/Bachelor	17	26,98
- Master	1	1,59
- Doctoral/PhD	0	0,00
Healthcare Profession		
- Doctor	2	3,17
- Midwife	20	31,75
- Nurse	29	46,03
- Laboratory Staff	1	1,59
- Pharmacist & Pharmaceutical Technician	7	11,11
- Medical Record & Health Information Technician	4	6,35
Years of Service		
- ≤ 5 Years	36	57,14
- > 5 Years	27	42,86
Total	63	100,00

A total of 63 healthcare workers participated in this study. The majority of respondents were female, accounting for 58 (92.06%), while only 5 (7.94%) were male. Most respondents were in the 20–30 years age group, comprising 42 (66.67%) participants. In terms of educational background, the largest proportion were Diploma III graduates, 45 (71.43%), followed by Diploma IV/Bachelor 17 (26.98%), and one respondent with a Master's degree (1.59%). Regarding professional categories, nurses represented the largest group with 28 (44.44%), followed by midwives 20 (31.75%). Smaller proportions included doctors, pharmacists and pharmacy technicians, medical record officers, and laboratory staff. Finally, based on years of service, 36 respondents (57.14%) had ≤ 5 years of experience, while 27 respondents (42.86%) had > 5 years. Overall, the respondent characteristics illustrate that the study sample was dominated by female healthcare workers, mostly in early to mid-career stages, who are actively involved in daily patient care and frequent users of the electronic medical record system.

Frequency Distribution and Percentage

Table 2. Frequency Distribution and Percentage

No	Variable	Statement	SD		D		A		SA	
			f	%	f	%	f	%	f	%
1	Accuracy	The Hospital Management Information System provides accurate information.	1	1,59	20	31,75	31	49,21	11	17,46
		The Hospital Management Information System provides error-free information.	7	11,11	28	44,44	25	39,68	3	4,76
		The Hospital Management Information System presents reliable information.	0	0,00	10	15,87	47	74,60	6	9,52
2	Completeness	The Hospital Management Information System provides complete and detailed information.	4	6,35	27	42,86	24	38,10	8	12,70
3	Format	The information presented in the Hospital Management Information System is concise.	0	0,00	19	30,16	37	58,73	7	11,11
		The Hospital Management Information System presents information in a clear and understandable format.	0	0,00	6	9,52	50	79,37	7	11,11
		The Hospital Management Information System presents information in an easy-to-read format.	0	0,00	7	11,11	47	74,60	9	14,29
4	Timeliness	The Hospital Management Information System provides timely information.	3	4,76	25	39,68	30	47,62	5	7,94
		The Hospital Management Information System provides up-to-date information.	6	9,52	20	31,75	31	49,21	6	9,52
5	Relevance	The Hospital Management Information System provides information according to users' needs.	1	1,59	17	26,98	37	58,73	8	12,70
		The information presented in the Hospital Management Information System is relevant to users' needs.	1	1,59	21	34,92	33	52,38	7	11,11
6	User Satisfaction	The Hospital Management Information System facilitates efficient information retrieval.	3	4,76	10	15,87	38	60,32	12	19,05
		The Hospital Management Information System effectively assists users in	1	1,59	18	28,57	34	53,97	10	15,87

No	Variable	Statement	SD		D		A		SA	
			f	%	f	%	f	%	f	%
		managing patient data and transactions.								
		The performance of the Hospital Management Information System is satisfactory.	1	1,59	34	53,97	25	39,68	3	4,76
		The Hospital Management Information System is engaging and not monotonous when used.	0	0,00	30	47,62	29	46,03	4	6,35
		The Hospital Management Information System is excellent.	3	4,76	31	49,21	25	39,68	4	6,35
		The Hospital Management Information System is very easy to use.	2	3,17	19	30,16	33	52,38	9	14,29

Accuracy

Perceptions of healthcare workers regarding the accuracy of information in the EMR system showed mixed results. The strongest positive response appeared in the statement that the system provides convincing information, with 47 respondents (74.60%) agreeing and none strongly disagreeing. However, concerns emerged in the statement about error-free information, where 28 respondents (44.44%) disagreed and 7 respondents (11.11%) strongly disagreed. This indicates that despite general trust in the information, doubts remain about its accuracy.

Completeness

Assessment of completeness revealed a considerable proportion of negative responses. A total of 27 respondents (42.86%) disagreed and 4 respondents (6.35%) strongly disagreed that the information provided was complete and detailed. This highlights a significant concern among users regarding insufficiently comprehensive data, suggesting the need for more thorough documentation to ensure information is available when needed in daily practice.

Format

The format of information received the most positive assessment among all elements. Nearly all respondents agreed that the format was easy to read and understand, with 47 respondents (74.60%) agreeing on readability, and none strongly disagreeing with any of the statements. This shows that the EMR system is considered user-friendly in terms of clarity, conciseness, and comprehensibility, which supports its effective use in daily operations.

Timeliness

Responses regarding timeliness were divided. While almost half of the respondents agreed, a notable proportion expressed dissatisfaction: 20 respondents (31.75%) disagreed and 6 respondents (9.52%) strongly disagreed that the information was always up to date. These findings indicate concerns that delays or outdated information could disrupt healthcare service delivery, pointing to timeliness as a critical issue in system performance.

Relevance

Most respondents agreed that the information provided matched their needs. However, doubts were still evident, with 17 respondents (26.98%) disagreeing that the information was aligned with user needs, and 21 respondents (34.92%) disagreeing on its overall relevance. This implies that improvements are required to ensure the information is more contextual and directly supportive of healthcare professionals' tasks.

User Satisfaction

Overall, respondents reported positive experiences with the system, particularly in terms of efficiency and ease of use. Nonetheless, dissatisfaction emerged regarding overall system performance: 34 respondents (53.97%) disagreed that the system performance was satisfying, while only 3 respondents (4.76%) expressed strong satisfaction. This gap between expectations and actual performance highlights system performance as a critical area for improvement.

Skoring and Category

Table 3. Scoring and Category

Variable	Median	Positive Category (A & SA)		Negative Category (D & SD)		Total (%)
		f	%	f	%	
Accuracy	8,00	41	65,08	22	34,92	100
Completeness	3,00	32	50,79	31	49,21	100
Format	9,00	43	68,25	20	31,75	100
Timeliness	6,00	32	50,79	31	49,21	100
Relevance	6,00	38	60,32	25	39,6	100
User Satisfaction	16,00	32	50,79	31	49,21	100

The scoring results indicate that overall perceptions of the Electronic Medical Record (EMR) information quality were predominantly positive, although considerable variation was observed across variables. The format element received the highest appreciation, with 68.25% of respondents rating it positively, reflecting the system's strength in terms of clarity, readability, and presentation of information. Similarly, Accuracy (65.08%) and Relevance (60.32%) were also largely evaluated favorably, suggesting that most healthcare workers trust the correctness and contextual suitability of the information provided.

In contrast, completeness, timeliness, and user satisfaction demonstrated a more balanced distribution between positive and negative categories, each showing less than a 2% gap. This pattern highlights the mixed experiences among respondents in relation to the comprehensiveness of data, the timeliness of updates, and the overall satisfaction with system performance. Taken together, the scoring and classification results emphasize that while the system's primary strength lies in information format, greater attention is needed to improve completeness, timeliness, and user satisfaction to ensure a more consistent positive user experience.

Discussion

A. Accuracy of Electronic Medical Record (EMR) Information

The findings indicate that the majority of healthcare workers perceived the information in the EMR system at RS X Wonosobo as accurate. This is reflected by 65.08% of respondents who gave a positive assessment. This positive perception may be related to the respondent profile, where most were nurses and midwives with less than five years of experience. As the professions most frequently involved in documenting and verifying patient data, they are more familiar with the EMR content and workflow, which may lead them to perceive the recorded information as accurate. However, 34.92% still expressed doubts about its accuracy. This suggests that while most users trust the system, there are still concerns regarding possible errors in the recorded data. This result is consistent with a study conducted at RS Pelabuhan Jakarta (2022), which highlighted that the accuracy of medical records is highly dependent on the consistency and thoroughness of healthcare workers during data entry. Lack of standardization and variation in documentation practices between professions were identified as key factors that may reduce accuracy.(Putri Nurindahsari et al., 2023)

B. Completeness of Electronic Medical Record (EMR) Information

In terms of completeness, the results revealed a nearly equal distribution of perceptions, with 50.79% of respondents rating the information as complete and 49.21% rating it as incomplete. This balance illustrates uncertainty among healthcare workers regarding the comprehensiveness of information available in the system. This uncertainty may relate to the dominance of young healthcare workers aged 20–30 years (66.67%) who may still be adapting to documentation routines and digital system workflows. Additionally, most respondents had a Diploma III background, representing technical-level professionals such as nurses, midwives, and laboratoty staff who primarily focus on clinical service delivery rather than detailed or analytical documentation. Consequently, differences in educational focus and work priorities may influence data completeness. This issue corresponds with the actual situation at RS X Wonosobo, where delays and inconsistencies in data entry by healthcare workers remain common. As a result, the EMR does not always provide a comprehensive description of patient conditions. Similar findings were reported in RS Dr. Hadrianus Sinaga, Kabupaten Samosir (2023), which emphasized that low discipline, absence of Standard Operating Procedures (SOP), and heavy workloads significantly affect data completeness.(Tambun et al., 2023)

C. Format of Electronic Medical Record (EMR) Information

The format of information emerged as one of the strongest aspects in this study, with 68.25% of respondents providing positive responses. The system's readability and structured layout likely benefited the majority of users who are in their 20s to early 30s**,** which is an age group more accustomed to digital technology and interface navigation. Moreover, nurses and midwives, as the largest user groups, may find the EMR menus easier to operate for daily patient documentation. This finding suggests that the EMR system at RS X Wonosobo is well-designed in terms of readability and accessibility. A supporting study at Puskesmas Kesunean, Cirebon (2025), also emphasized that intuitive and systematic menu layouts enhance the effectiveness of system use. Thus, format can be considered a notable strength of the current system.(Listawati et al., 2025)

D. Timeliness of Electronic Medical Record (EMR) Information

For timeliness, the findings again revealed a nearly balanced distribution, with 50.79% of respondents assessing the information as timely and 49.21% stating otherwise. This indicates persistent challenges in ensuring that information is updated promptly. Delays in data entry by healthcare workers were identified as a key issue, leading to records that do not always reflect real-time patient conditions. The majority of respondents with less than five years of service may still struggle with workload management and system efficiency during busy shifts, leading to delayed documentation. Healthcare professionals such as doctors and nurses, who often handle multiple patients simultaneously, may face greater difficulties updating records immediately after procedures. These delays can hinder clinical decision-making that relies on up-to-date information. A literature review (2024) on EMR implementation also noted that timeliness is strongly influenced by workload and user motivation, factors that remain significant barriers in practice.(Jaya, 2024)

E. Relevance of Electronic Medical Record (EMR) Information

The majority of respondents (60.32%) perceived the information in the EMR system as relevant to their daily work needs. This may be attributed to the system's ability to provide essential clinical data that supports routine tasks of nurses and midwives, who dominate the respondent group. However, 39.68% expressed that the information did not always fully align with their professional requirements. This suggests that while the EMR system generally meets the needs of healthcare workers across different roles, improvements are needed to provide more contextual and profession-specific information. A study at Saiful Anwar Hospital, Malang (2020), similarly emphasized that the ability of an EMR system to deliver relevant and role-specific information significantly enhances user effectiveness.(Putri et al., 2020)

F. User Satisfaction with the Quality of Electronic Medical Record (EMR) Information

The study revealed a moderate level of user satisfaction, with 50.79% of respondents expressing satisfaction while 49.21% expressing dissatisfaction. This nearly equal distribution reflects that while the system supports many healthcare workers, a gap remains between user expectations and actual system performance, particularly among younger or less experienced users. Satisfaction was primarily influenced by positive perceptions of format, accuracy, and relevance. However, concerns about completeness and timeliness negatively impacted overall satisfaction. Previous studies at RSKIA Sadewa Yogyakarta (2022) and Balimed Hospital Denpasar (2023) also confirmed that information quality is directly associated with user satisfaction in healthcare information systems. Therefore, enhancing information completeness and timeliness should be prioritized to improve user satisfaction and ensure the EMR system fully supports healthcare service delivery.(Suandari et al., 2024)(Astia Putri et al., 2023)

Conclussion

This study provides an overview of the quality of information produced by the Electronic Medical Record (EMR) system as well as the perceived level of user satisfaction at RS X Wonosobo. Overall, the EMR system has demonstrated good information quality, particularly in accuracy, relevance, and presentation, while completeness and timeliness still require improvement. User satisfaction tends to be moderate, reflecting that the system has been useful in daily practice but still needs further optimization to meet users' expectations fully. These findings suggest that continuous efforts are needed to enhance the consistency and timeliness of data input to ensure that the information provided is always accurate and up to date. Efforts such as establishing structured internal monitoring, appointing unit-level PICs, periodically reviewing information content based on user needs, and strengthening staff awareness of information quality could further improve EMR utilization and user satisfaction in the future.

Author Contributions

Conceptualization, AYR and WRW; methodology, AYR and WRW; validation, WRW, ER and MTA; formal analysis, AYR; investigation, AYR; resources, AYR; data curation, AYR; writing—original draft

preparation, AYR; writing—review and editing, AYR, WRW, ER and MTA; visualization, AYR; supervision, WRW; project administration, AYR; funding acquisition, none.

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by RS X Wonosobo (protocol code: 445/146/RSIAA/VII/2025).

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Conflicts of Interest

The author declares no conflict of interest.

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