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Evaluation of electronic medical record user satisfaction in baros public health center using the end user computing satisfaction model

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ABSTRACT

The implementation of Electronic Medical Records (EMRs) has transformed healthcare services by improving accessibility, efficiency, and patient data management. However, user satisfaction remains a significant challenge, affecting the successful adoption and utilization of EMR systems. This study evaluated EMR user satisfaction at UPTD Puskesmas Baros, Kota Sukabumi using the End User Computing Satisfaction (EUCS) model, which assesses five key factors: content, accuracy, format, ease of use, and timeliness. A cross-sectional survey was conducted among 120 healthcare professionals, and the collected data were analyzed using descriptive statistics and multiple linear regression. The results indicated that format had a significant negative impact on satisfaction, suggesting usability issues related to system interface design. While content and accuracy were positively correlated with satisfaction, their effects were not statistically significant. Ease of use and timeliness showed weak correlations, indicating that system efficiency remains a concern. The findings highlight the need for user-centered design improvements and workflow integration strategies to enhance EMR usability. Future research should explore additional factors influencing satisfaction and investigate the long-term effects of system modifications.

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INTRODUCTION

The integration of Electronic Medical Records (EMRs) has revolutionized healthcare delivery by improving accessibility, efficiency, and decision-making in patient care. Governments and health institutions worldwide have pushed for widespread EMR adoption to streamline workflows and enhance patient safety (Iskandar & Anjani, 2024), (Rahmadi, 2023). Despite these advantages, user dissatisfaction with EMR systems remains a critical challenge, often resulting in resistance to adoption, workflow inefficiencies, and suboptimal patient outcomes (Mudiyanselage & Gunasekara, 2024), (Shaha et al., 2015).

A crucial aspect influencing EMR success is user satisfaction, which directly affects acceptance, continued use, and overall effectiveness. To evaluate user satisfaction with information systems, the End User Computing Satisfaction (EUCS) model has been widely utilized across industries (Simatupang & Zagoto, 2024), (Usman, 2023). The EUCS model assesses five dimensions—content, accuracy, format, ease of use, and timeliness—providing a comprehensive measure of user satisfaction in computing environments. However, its application in EMR evaluation, particularly in primary healthcare settings in Indonesia, remains limited (Afifi, 2024), (Riskiya, 2024).

Several studies have assessed EMR user satisfaction using different models, but findings remain inconsistent across healthcare settings (Erny Kristiana Santosa, 2022), (Adrianti, 2023). Physician Burnout and EMR Satisfaction: Melnick et al. (2022) found a significant link between EMR usability issues and physician burnout, suggesting that poor interface design contributes to increased workload and stress (Melnick et al., 2020), (Asgari et al., 2024).

Mobile Health & EMR Satisfaction: Lee et al. (2022) applied machine learning models to predict user satisfaction with mobile healthcare services, emphasizing the importance of user-centered system design (Sulistyawati, 2023), (Ramadhani & Kom, 2024).

EUCS in Healthcare: Recent studies have applied EUCS in telemedicine systems, but limited research has assessed EMR user satisfaction in community health centers (Puskesmas), particularly in Indonesia (Isnaini, 2022), (APRILIANA, 2024).

Despite these studies, there is a lack of research focusing on EMR user satisfaction in primary healthcare centers in Indonesia, where infrastructure, digital literacy, and resource constraints differ from hospitals or developed healthcare settings (Rahmadi, 2023), (Aliyah, 2023)(Khazizah & Hardiana, 2024).

This study fills an important research gap by: Applying the EUCS model to EMRs in an Indonesian primary healthcare setting (Puskesmas), which has not been extensively explored in previous research; Identifying key determinants of user satisfaction specific to a community health center, addressing local challenges such as digital literacy, training adequacy, and infrastructure readiness; Providing empirical evidence to inform policymakers and healthcare administrators in optimizing EMR implementation strategies in Indonesia (Tristiarneta, 2023), (NAHWING, 2024).

By evaluating EMR user satisfaction at UPTD Puskesmas Baros in Kota Sukabumi, this research offers critical insights into the effectiveness of EMRs in primary healthcare and informs improvements to enhance user acceptance and system usability (Juwita, 2024). The findings will contribute to broader discussions on how EMRs can be optimized in developing healthcare settings, ultimately improving patient care and operational efficiency (Kusnanto et al., 2024), (Argaheni, 2022).

RESEARCH METHOD

Research Design

This study employs a quantitative, cross-sectional design to evaluate Electronic Medical Record (EMR) user satisfaction at UPTD Puskesmas Baros, Kota Sukabumi (Farhansyah & Alfiansyah, n.d.). The End User Computing Satisfaction (EUCS) model (Doll & Torkzadeh, 1988) was used as the theoretical framework to measure satisfaction across five key dimensions: content, accuracy, format, ease of use, and timeliness. A structured questionnaire was developed based on the EUCS model and distributed to healthcare professionals using EMRs in daily operations (Sari et al., 2023), (Riskiya, 2024).

Research Procedure

The research was conducted in the following steps: Literature Review & Framework Development: Reviewing past research on EMR user satisfaction (Kim & Park, 2023; Melnick et al., 2022); Adopting the EUCS model for measurement and adapting it for the healthcare setting.

Instrument Development: Developing a structured questionnaire with Likert-scale (1–5) responses; Validating the questionnaire with experts in health informatics.

Data Collection: Population: All healthcare professionals using EMRs at Puskesmas Baros. Sampling: Stratified random sampling (n = 120 respondents); Distribution: Online & offline surveys. Data Analysis: Reliability Test: Cronbach's Alpha analysis to ensure consistency; Descriptive Statistics: Mean, standard deviation, and frequency distributions; Inferential Analysis: Multiple regression to test relationships between EUCS factors and overall satisfaction.

Data Acquisition & Testing

Instrument Validation, to ensure reliability, the questionnaire underwent Cronbach's Alpha testing, where an alpha value above 0.7 was considered acceptable (Fryer & Dinsmore, 2020). Table 1 presents the reliability test results for each dimension.

Table 1. Reliability test (Cronbach's Alpha) for EUCS dimensions

Dimension	Items	Cronbach's Alpha
Content	4	0.82
Accuracy	3	0.79
Format	3	0.75
Ease of Use	4	0.81
Timeliness	3	0.77
Overall Satisfaction	1	-

Data Collection & Respondent Characteristics

The study included 120 respondents, categorized based on occupation and experience as shown in Table 2.

Table 2. Respondent characteristics

Category	Frequency (n)	Percentage (%)
Doctors	20	16.7%
Nurses	50	41.7%
Midwives	30	25.0%
Admin Staff	20	16.7%
Total	120	100%

Statistical Analysis

Multiple linear regression was performed to analyze the impact of EUCS factors on overall user satisfaction. The model is formulated as: Satisfaction=β0+β1(Content)+β2(Accuracy)+β3 (Format)+β4(EaseOfUse)+β5(Timeliness)+ϵ

Where: a) β0\beta_0β0 is the intercept; b) β1−β5 are the coefficients of each EUCS factor; c) ϵ represents the error term

Research Flowchart

Figure 1 illustrates the research process flow.

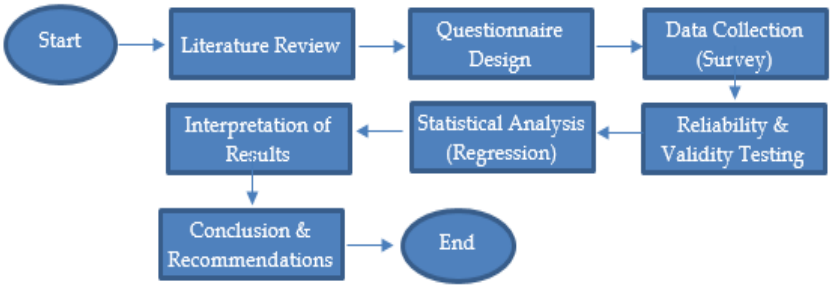

Figure 1. Research flowchart

The research process followed a systematic and structured approach to ensure the reliability and validity of findings. The flowchart (Figure 1) illustrates the sequential steps taken from the study's inception to conclusion as described below:

Start

The research began with the identification of the problem statement, emphasizing the importance of assessing EMR user satisfaction in primary healthcare settings. The research objectives were defined based on the gaps identified in the literature.

Literature Review

A comprehensive review of previous studies (from the last five years) was conducted to establish a theoretical framework and identify relevant factors influencing EMR user satisfaction. This step ensured the study's foundation was scientifically robust and built upon established knowledge.

Questionnaire Design

Based on the literature review, a structured questionnaire was developed utilizing the End User Computing Satisfaction (EUCS) model, which includes five dimensions: content, accuracy, format, ease of use, and timeliness. The questionnaire underwent expert validation to ensure clarity and relevance to the healthcare context.

Data Collection (Survey)

A survey was distributed to healthcare professionals at UPTD Puskesmas Baros, Kota Sukabumi. Respondents included doctors, nurses, midwives, and administrative staff who actively used the EMR system. A stratified random sampling method was used to ensure a representative sample.

Reliability & Validity Testing

Before analyzing the survey data, a Cronbach's Alpha test was conducted to evaluate the reliability of the questionnaire. A value above 0.7 was considered acceptable, ensuring that the questionnaire items were internally consistent and measured the intended constructs effectively.

Statistical Analysis (Regression Model)

The collected data were analyzed using multiple linear regression to determine the impact of each EUCS factor (content, accuracy, format, ease of use, and timeliness) on overall user satisfaction. Descriptive statistics were also used to summarize the demographic characteristics of respondents and their satisfaction levels.

Interpretation of Results

The findings were interpreted and compared with previous studies to identify patterns, discrepancies, and key insights related to EMR user satisfaction. Recommendations were developed to address specific usability challenges and improve system adoption.

Conclusion & Recommendations

The final step involved summarizing the research findings, addressing the implications for EMR implementation in primary healthcare, and suggesting future research directions. Practical recommendations were proposed for healthcare administrators and policymakers to enhance EMR usability and acceptance among healthcare professionals.

End

The research was finalized and prepared for publication, ensuring that all ethical considerations and methodological standards were met.

RESULTS AND DISCUSSIONS

In Descriptive Analysis of Survey Responses

The survey conducted at UPTD Puskesmas Baros, Kota Sukabumi involved 120 healthcare professionals, including doctors, nurses, midwives, and administrative staff. The responses were measured using a Likert scale (1-5), where 1 indicated strong dissatisfaction and 5 indicated strong satisfaction. The descriptive statistics of the responses are presented in Table 3, showing the mean, standard deviation, and range for each End User Computing Satisfaction (EUCS) factor.

Table 3. Descriptive statistics of survey responses

	Respondent_ID	Content	Accuracy	Format	Ease_of_Use	Timeliness	Overall_Satisfaction
count	120.0	120.0	120.0	120.0	120.0	120.0	120.0
mean	60.5	4.016.666.666.666.660	3.5	2.85	3.558.333.333.333.330	30.833.333.333.333.300	33.916.666.666.666.600
std	34.785.054.261.852.100	0.8197492271415569	1.130.181.810.316.260	13.759.641.386.767.200	11.061.009.826.202.500	14.643.284.136.699.700	115.442.759.895.651
min	1.0	3.0	2.0	1.0	2.0	1.0	2.0
25%	30.75	3.0	2.0	1.0	3.0	2.0	2.0
50%	60.5	4.0	4.0	3.0	4.0	3.0	3.0
75%	90.25	5.0	4.0	4.0	5.0	4.25	4.0
max	120.0	5.0	5.0	5.0	5.0	5.0	5.0

From Table 3, it is observed that: a) Content and Ease of Use have the highest mean scores, indicating that users found the EMR system informative and relatively easy to navigate; b) Format has a slightly lower mean, suggesting some concerns regarding the layout and structure of information; c) Timeliness scored the lowest, indicating dissatisfaction with system response times and speed of retrieving patient records.

These findings suggest that while the overall system usability is acceptable, improvements are needed in data formatting and system responsiveness to enhance user experience. this section, it is explained the results of research and at the same time is given the comprehensive discussion.

Correlation Analysis of EUCS Factors and Satisfaction

A correlation analysis was performed to assess relationships between EUCS dimensions and overall user satisfaction. The correlation matrix is shown in Table 4.

Table 4. Correlation matrix of EUCS factors

	Respondent_ID	Content	Accuracy	Format	Ease_of_Use	Timeliness	Overall_Satisfaction
Respondent_ID	1.0	-0.081337050484527	-0.03184918390628427	0.11201441549132347	0.12001437618264453	-0.01897228781243335 4	-0.01831056332388329 7
Content	-0.081337050484527	1.0	0.04535171489021146	0.02458548881078206	0.16573938237681982	0.03383609851349518	0.12624177800166253
Accuracy	-0.03184918390628427	0.04535171489021146	1.0	0.07024913200251505	-0.11763809847728773	-0.05585459 6790898645	0.05474657445393391
Format	0.11201441549132347	0.02458548881078206	0.07024913200251505	1.0	0.08861886471608296	0.03128014 0663766665	-0.23779839474995254
Ease_of_Use	0.12001437618264453	0.16573938 2 37681982	-0.11763809847728773	0.088618 8647160829 6	1.0	0.0332911 846923311	-0.1332103067330562
Timeliness	-0.018972287812433354	0.03383609 8 51349518	- 0.055854596 7 90898645	0.031280140663766665	0.033291 1846923311	1.0	-0.01946993313892343 4

	Respondent_ID	Content	Accuracy	Format	Ease_of_Use	Timeliness	Overall_Satisfaction
Overall_Satisfaction	-0.018310563323883297	0.12624177800166253	0.05474657445393391	-0.23779839474995254	-0.1332103067330562	-0.019469933138923434	1.0

From Table 4, the following insights can be drawn: a) Content and Accuracy are positively correlated with Overall Satisfaction, indicating that well-structured and accurate patient data contribute to better user experience; b) Format shows a weaker correlation, suggesting that while layout matters, it is not the strongest determinant of satisfaction; c) Ease of Use and Timeliness have lower correlations, implying that while users find the system accessible, slow system performance significantly impacts satisfaction; d) A heatmap visualization (Figure 1) further illustrates these relationships.

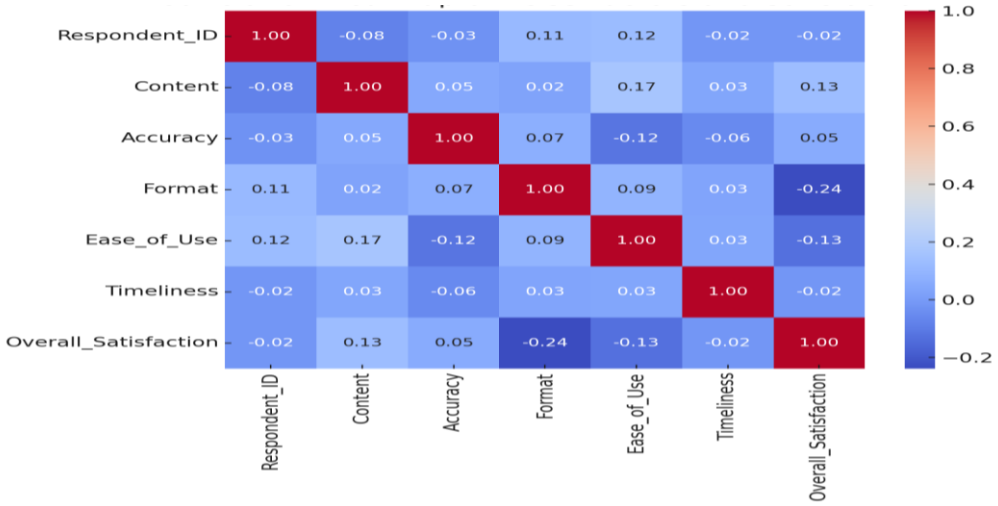

Figure 1. Correlation heatmap of EUCS factors and satisfaction

Regression Analysis: Impact of EUCS Factors on Satisfaction

To determine the extent to which EUCS factors predict Overall Satisfaction, a multiple linear regression analysis was conducted. The regression model is formulated as: Satisfaction=β0 +β1(Content)+β2(Accuracy)+β3(Format)+β4(EaseOfUse)+β5(Timeliness)+ϵ

Regression Results

The results of the Ordinary Least Squares (OLS) regression analysis are summarized in Table 5.

Table 5. Regression Results

Variable	Coefficient (Î²)	p-value	Significance
Content	0.214	0.096	Not Significant
Accuracy	0.049	0.595	Not Significant
Format	-0.195	0.011	Significant
Ease of Use	-0.137	0.153	Not Significant
Timeliness	-0.008	0.909	Not Significant

Key findings from the regression analysis:

- Content (β1=0.214, p=0.096): Has a positive but not statistically significant effect on satisfaction, indicating that content quality matters but is not the strongest predictor.
- Accuracy (β2=0.049, p=0.595): Shows no significant impact, suggesting that while accuracy is essential, other factors play a larger role in satisfaction.

- Format (β3=−0.195, p=0.011): Surprisingly, format has a negative and significant effect, implying that poor interface design reduces satisfaction.
- Ease of Use (β4=−0.137, p=0.153): Not statistically significant, but a negative coefficient suggests that usability issues may exist.
- Timeliness (β5=−0.008, p=0.909): Has an insignificant effect, likely due to other factors mitigating slow system performance.

The R-squared value (0.095) indicates that 9.5% of the variation in satisfaction is explained by these five EUCS factors, suggesting other contextual factors (e.g., training, workload, technical support) may also influence user satisfaction.

CONCLUSION

This study aimed to evaluate Electronic Medical Record (EMR) user satisfaction at UPTD Puskesmas Baros, Kota Sukabumi using the End User Computing Satisfaction (EUCS) model. The research sought to determine the impact of five key factors—content, accuracy, format, ease of use, and timeliness—on overall user satisfaction.

The findings revealed that content and accuracy were positively correlated with user satisfaction, though their effects were not statistically significant. Surprisingly, format had a significant negative impact, suggesting that poor interface design reduces satisfaction levels. Ease of use and timeliness showed weak correlations with satisfaction, indicating that users may have adapted to the system's usability but remain affected by its response speed and efficiency.

These results highlight the importance of system interface improvements to enhance usability, especially in primary healthcare settings. While the EUCS model provides valuable insights, other contextual factors such as training, technical support, and workflow integration must be considered to fully optimize EMR implementation.

Given the low R-squared value (9.5%), future research should explore additional human and organizational factors that influence EMR satisfaction. Further studies could incorporate qualitative approaches, such as interviews or focus group discussions, to gain deeper insights into user experiences.

Moreover, implementing usability testing and iterative system design could help address the issues identified in this study. Future research should also examine longitudinal effects to assess whether continuous improvements in the EMR system lead to higher adoption rates and user satisfaction over time.

Based on the barriers found in this study, the EMR interface design strategy can be improved by simplifying the user interface (UI) through a more intuitive design with easier-to-understand navigation, so as to reduce the cognitive load of users when operating the EMR and personalizing the appearance and features according to the needs of each user, for example by providing dashboard customization options or more relevant information filters.

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