



# Impact of Health System Usage, Patient Satisfaction, Information Quality, and Service Quality on Hospital Management Information System Utilization at Madani Regional General Hospital

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## Abstract

**Background:** Recruitment in healthcare, particularly in hospitals, often faces challenges in aligning employee competencies with job requirements, leading to operational inefficiencies. The increasing complexity and volume of patient data necessitate efficient information systems for optimal healthcare delivery. Hospital Management Information Systems (HMIS), which integrate workflows and enhance operational efficiency, are crucial for addressing these challenges. However, their effective implementation and utilization depend on various factors, including system usage, user satisfaction, information quality, and service quality. **Methods:** This study employed a quantitative, cross-sectional design to assess the relationships between human and technology-related factors and the net benefits of the HMIS at Madani Regional General Hospital in Palu, Indonesia. A sample of 172 respondents, determined using the Slovin formula, completed structured questionnaires evaluating system usage, user satisfaction, information quality, service quality, and perceived net benefits. Data were analyzed using

univariate, bivariate, and multivariate statistical methods, including Pearson correlation and binary logistic regression. **Results:** The findings revealed significant positive relationships between system usage, user satisfaction, information quality, and service quality with net benefits ( $p < 0.05$ ). Specifically, improved system usage, higher user satisfaction, better information quality, and superior service quality were strongly correlated with positive outcomes in HMIS utilization. Binary logistic regression identified system usage as the most influential predictor of net benefits ( $p = 0.006$ ,  $\text{Exp}(B) = 3.242$ ). The model explained 21.2% of the variance in net benefits and demonstrated an accuracy of 79.7%. **Conclusion:** The study underscores the critical role of human and technology factors in the effective utilization of HMIS. Enhancing system usage, user satisfaction, information quality, and service quality can significantly improve the benefits derived from HMIS in hospital settings. Targeted interventions, such as user training, system upgrades, and enhanced technical support, are essential for maximizing the potential of HMIS and improving healthcare delivery.

**Keywords:** Hospital Management Information System (HMIS), System Usage, User Satisfaction, Information Quality, Service Quality

**Significance** | This study explores how system usage, satisfaction, and quality factors influence the effectiveness of HMIS in improving hospital performance and patient care.

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Editor Agus Dwianto, Ph.D., And accepted by the Editorial Board November 18, 2024 (received for review August 31, 2024)

## 1. Introduction

Recruitment in various sectors often falls short of aligning

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### Please Cite This:

Rifial, M., Razak, A., Darmawansyah, D., Indar, I., Rahman, A. (2024). "Impact of Health System Usage, Patient Satisfaction, Information Quality, and Service Quality on Hospital Management Information System Utilization at Madani Regional General Hospital", *Journal of Angiotherapy*, 8(11).1-10.10061.

employee competencies with job requirements, even when rigorous protocols are followed (Townley, 2019). This misalignment can be particularly detrimental in public health, where optimizing service quality is essential to ensuring societal well-being. Health services, including general healthcare provision, necessitate meticulous management to meet the evolving needs of communities (Organization, 2020). Hospitals, as pivotal institutions in healthcare delivery, are tasked with providing comprehensive medical care, diagnosis, and treatment, supported by structured facilities and professional personnel (Aggelidis & Chatzoglou, 2012; Martínez & Martínez, 2010). Public expectations for quality service compel hospitals to continuously refine their management practices (Sudirman et al., 2024).

To meet these demands, hospitals increasingly rely on robust data and information management systems, including patient records, clinical data, and financial information. The deployment of a Health Information System (HIS) facilitates the transformation of raw data into actionable insights, aiding decision-making at all organizational levels (Hadi et al., 2024; Rao et al., 2019). HIS is indispensable for modern healthcare institutions, enabling them to streamline operations, improve patient care, and optimize administrative functions.

A subset of HIS, the Hospital Management Information System (HMIS), integrates hospital workflows into a cohesive digital framework. HMIS is designed to enhance coordination, reporting, and administrative processes, ensuring the timely delivery of accurate information (Vantishsha et al., 2022). The integration of HMIS has been shown to significantly improve service quality and operational efficiency, positioning it as an essential tool for competitive healthcare management (Handayani et al., 2018). By facilitating data exchange and communication across various hospital departments, HMIS plays a critical role in delivering patient-centered care.

Madani Regional General Hospital, a government-operated type C hospital in Palu, exemplifies the importance of HMIS in healthcare delivery. With nine outpatient clinics supported by laboratory and radiology services, the hospital has experienced a steady increase in patient visits, from 55,856 in 2021 to 56,614 in 2022 (Palu, 2022). This growth underscores the rising demand for efficient and high-quality services. The outpatient department, a cornerstone of Madani Hospital, relies on multidisciplinary collaboration among doctors, nurses, and administrative staff to ensure optimal patient care.

Recognizing the challenges posed by increasing patient volumes, Madani Hospital has implemented an HMIS to streamline its operations. This locally developed system, managed by the hospital's IT department, supports data management and policy-making with enhanced transparency, speed, and security (Farras & Hustinawati, 2022). However, preliminary assessments reveal

several operational challenges. These include user dissatisfaction with system interfaces, difficulties in system operation among older staff, inadequate data backup mechanisms, and limited integration with external platforms such as BPJS, Indonesia's national health insurance system.

These challenges highlight a critical gap between theoretical benefits and practical implementation of HMIS. For instance, while HMIS is designed to facilitate seamless data exchange, integration issues can hinder its effectiveness. Moreover, the satisfaction and competency of system users significantly impact the overall success of HMIS deployment (Achmadi & Siregar, 2021; Sebetci, 2018). Addressing these issues requires targeted interventions, such as user training programs, interface enhancements, and system integration upgrades.

The importance of addressing these gaps is further emphasized by the broader implications of HMIS on healthcare quality. Effective HMIS deployment enables real-time monitoring of hospital performance, cost management, and patient care quality. By consolidating service transaction data, HMIS facilitates evidence-based decision-making and strategic planning (Melgis et al., 2024). Furthermore, the integration of advanced technologies, such as cloud computing and data analytics, can enhance the scalability and functionality of HMIS (Li et al., 2021).

Despite its potential, HMIS implementation is often hindered by organizational and technological barriers. Studies indicate that factors such as system usability, data security, and user support are critical determinants of HMIS success (Handayani et al., 2018; Sebetci, 2018). Additionally, cultural and structural differences within healthcare organizations can pose significant challenges to system adoption and utilization (Ithnin et al., 2023). Addressing these issues requires a comprehensive approach that combines technical innovation with organizational change management.

At Madani Hospital, efforts to enhance HMIS performance must focus on improving system functionality, user experience, and interoperability. For example, adopting user-centric design principles can make system interfaces more intuitive and accessible, particularly for older staff members. Similarly, strengthening data backup protocols and integrating HMIS with BPJS can enhance system reliability and efficiency (Ferdianti et al., 2022; Ladhari, 2010). These measures are essential for aligning system performance with organizational goals and patient expectations.

## 2. Methodology

### 2.1 Study Design

This research employs a quantitative approach with a cross-sectional design, using surveys to investigate the relationships between independent and dependent variables. Independent variables encompass human factors—system usage and user satisfaction—and technology factors, namely information quality

and service quality. The dependent variable is benefit analysis, measured by the utilization of the Hospital Management Information System (HMIS).

### 2.2 Study Setting and Population

The study was conducted at Madani Regional General Hospital, Palu, in June 2024. The target population included HMIS users within the hospital. Using the Slovin formula, a sample size of 172 respondents was determined, ensuring adequate representation for reliable analysis.

### 2.3 Data Collection

Data were collected through structured questionnaires designed to capture responses about the implementation and effectiveness of the HMIS. The questionnaire items assessed system usage, user satisfaction, information quality, service quality, and perceived net benefits of the HMIS. Respondents provided information regarding their experiences, which were crucial for evaluating both the independent and dependent variables.

### 2.4 Statistical Analysis

Data processing and analysis were conducted using a computerized statistical program that provides advanced analytical capabilities and an intuitive graphical interface. The analysis was carried out in three stages.

First, in the univariate analysis, descriptive statistics were used to present frequency distributions and summarize respondent characteristics. Data were visualized in frequency distribution tables for better clarity.

Next, in the bivariate analysis, the Pearson correlation test was applied to assess the relationships between each independent variable (system usage, user satisfaction, information quality, and service quality) and the dependent variable (net benefits or HMIS utilization). This analysis determined the strength and direction of associations, as well as the nature of the relationships, such as whether they were asymmetric, symmetric, or reciprocal.

Finally, in the multivariate analysis, binary logistic regression was used to examine the combined impact of multiple independent variables on the dependent variable. This analysis helped identify the most influential predictors of HMIS utilization at the hospital. For statistical interpretation, a p-value (Sig value) less than 0.05 indicates a statistically significant partial effect between the independent and dependent variables, while a p-value greater than 0.05 suggests no significant partial effect. The magnitude of influence was determined by the  $\exp(B)$  value or odds ratio (OR), which reflects the likelihood of the outcome based on the predictor variables.

## 3. Results

### 3.1 Univariate Analysis

The univariate analysis provided an overview of the distribution and frequency of respondent characteristics and study variables.

### 3.2 Respondent Characteristics

Most respondents in this study were female (110 respondents, 64%). Respondents aged 26–35 years formed the largest age group, comprising 83 individuals (48.3%). The majority of respondents had a diploma-level education (D3), totaling 104 participants (60.5%). Regarding the duration of SIMRS usage, 108 respondents (62.8%) reported using the system for two years (Table 1).

### 3.3 Study Variables

A total of 136 respondents (79.1%) rated system usage as good. User satisfaction was reported as good by 117 respondents (68%), while 130 respondents (75.6%) assessed the quality of information positively. Furthermore, 115 respondents (66.9%) classified service quality as good (Table 2).

### 3.4 Bivariate Analysis

#### 3.4.1 Relationship Between System Usage and Net Benefits

A total of 105 respondents (98%) with good system usage reported good net benefits, while 17 respondents (10%) with poor system usage reported poor net benefits. The chi-square test yielded a p-value of 0.007 ( $p < 0.05$ ), indicating a statistically significant relationship between system usage and net benefits (Table 3).

#### 3.4.2 Relationship Between User Satisfaction and Net Benefits

A total of 93 respondents (84.3%) with high user satisfaction reported good net benefits. Conversely, 24 respondents (15.3%) with low satisfaction experienced poor net benefits. The chi-square test produced a p-value of 0.003 ( $p < 0.05$ ), signifying a significant association between user satisfaction and net benefits (Table 4).

#### 3.4.3 Relationship Between Information Quality and Net Benefits

A total of 102 respondents (93.7%) with good information quality also reported good net benefits. Meanwhile, 20 respondents (11.7%) with poor information quality reported poor net benefits. The chi-square test result ( $p = 0.002$ ) confirmed a statistically significant relationship between information quality and net benefits (Table 5).

#### 3.4.4 Relationship Between Service Quality and Net Benefits

A total of 91 respondents (82.9%) with good service quality reported good net benefits, while 24 respondents (15.9%) with poor service quality reported poor net benefits. A chi-square test p-value of 0.006 ( $p < 0.05$ ) highlighted a statistically significant relationship between service quality and net benefits (Table 6).

### 3.5 Multivariate Analysis

The binary logistic regression analysis assessed the influence of multiple independent variables on the dependent variable (net benefits).

A Hosmer and Lemeshow test yielded a significance value of 0.270 ( $p > 0.05$ ), indicating the model's suitability. Among the variables, system usage was the most influential, with a significance value of 0.006 and an  $\exp(B)$  value of 3.242. The Nagelkerke R Square value of 0.212 signifies that the independent variables explained 21.2% of the variance in net benefits. Additionally, the model demonstrated

an overall accuracy of 79.7%, suggesting a reliable predictive capacity (Table 7).

## 4. Discussion

### 4.1 Relationship of System Usage to Net Benefits

System usage refers to the user's interaction with the features and capabilities of an information system, encompassing dimensions such as frequency, duration, and purpose of use, as well as the appropriateness of its application to tasks (Sebetci, 2018). Specifically, in this study, system usage pertains to how often and effectively hospital staff use the SIMRS (Hospital Management Information System) to perform tasks such as patient data recording, medical data management, and hospital administration. According to the univariate analysis results presented in Table 2, the majority of users (79.1%) reported that the utilization of SIMRS at Madani Palu Hospital was effective. This suggests that the system is user-friendly and sufficiently supports staff in fulfilling their duties. However, a notable 20.9% of users encountered challenges in using the system. These issues may stem from inadequate training, a lack of compatibility between the system and user needs, or technical difficulties that hinder system effectiveness.

Respondents with poor system usage may face barriers related to accessibility, navigation, or the completeness of system features. These limitations could be attributed to insufficient training or socialization regarding SIMRS usage or unresolved technical issues such as slow system performance, frequent access disruptions, or difficulties in data input.

The bivariate analysis results in Table 3 reveal that among 172 respondents, 105 individuals (98%) with good system usage also reported positive net benefits. In contrast, 17 respondents (10%) with poor system usage experienced suboptimal net benefits. The chi-square test yielded a p-value of 0.007 ( $p < 0.05$ ), indicating a statistically significant relationship between system usage and net benefits.

These findings demonstrate that improved system usage is strongly associated with increased net benefits. Enhanced system usage could result from ease of use, better understanding of system features, and adequate organizational support, all of which contribute to improved outcomes. Conversely, barriers such as inadequate training, limited technical support, or resistance from users can lead to suboptimal system utilization and reduced net benefits.

This research aligns with previous studies emphasizing the importance of human factors in SIMRS evaluations. Effective system usage requires sufficient human resources, proper allocation of personnel in roles suited to their educational backgrounds and competencies, and robust organizational support. These elements are critical for optimizing the benefits of SIMRS in hospital

operations (Lumingkewas et al., 2023; Suparno et al., 2024; Suryana et al., 2022; Taidi et al., 2023).

### 4.2 Relationship of User Satisfaction to Net Benefits

User satisfaction plays a pivotal role in the evaluation and development of information systems. It provides a subjective measure of system quality, focusing on user perceptions rather than purely technical aspects. Criteria for assessing user satisfaction include adequacy, effectiveness, efficiency, overall satisfaction, enjoyment, information satisfaction, and system satisfaction (Achmadi & Siregar, 2021; Ithnin et al., 2023; Li et al., 2021; Salam & Farooq, 2020).

The univariate analysis indicates that most users (68%) were satisfied with the SIMRS at Madani Palu Hospital, suggesting that the system has generally met user expectations in supporting their tasks. However, 32% of respondents expressed dissatisfaction, highlighting areas where the system fell short, such as technical performance, ease of use, or service quality. Dissatisfied users likely encountered challenges such as difficulties accessing certain features, insufficient training, technical malfunctions, or unstable system performance. These obstacles may hinder work efficiency and erode trust in the system.

The bivariate analysis, as shown in Table 4, reveals that among 172 respondents, 93 individuals (84.3%) with high user satisfaction also reported positive net benefits. Conversely, 24 respondents (15.3%) with low satisfaction experienced suboptimal net benefits. The chi-square test produced a p-value of 0.003 ( $p < 0.05$ ), indicating a statistically significant relationship between user satisfaction and net benefits.

These findings suggest that user satisfaction is a critical determinant of the effective utilization of SIMRS. When users find the system easy to navigate, efficient, and well-supported technically, they are more inclined to use it effectively, leading to greater net benefits. Conversely, low satisfaction can demotivate users, reducing the system's overall utility and benefits.

This study aligns with previous research that underscores the relationship between user satisfaction and net benefits in SIMRS usage. For instance, Setiorini et al. (2021) found a statistically significant relationship between user satisfaction and SIMRS net benefits, with a chi-square test result of  $p=0.001$  ( $p = 0.001$ ) ( $p=0.001$ ) ( $<0.05$ ) and  $X^2$  Count = 15.331 >  $X^2$ Table 3.841. This evidence supports the assertion that higher user satisfaction correlates with better outcomes from SIMRS.

### 4.3 The Relationship of Information Quality to Net Benefits

Information quality assesses the value of information produced by an information system and its effectiveness in meeting user needs. High-quality information is essential for increasing the intention to use and rely on technology (Aggelidis & Chatzoglou, 2012; Yagci & Das, 2018; Zhang et al., 2023).



The univariate analysis reveals that most users (75.6%) rated the information quality of the SIMRS as adequate, accurate, and relevant to their operational tasks. However, 24.4% of respondents reported dissatisfaction with the information quality, indicating shortcomings such as inaccuracies, outdated data, incomplete details, or difficulties in accessing information. These limitations hinder the system's ability to meet user expectations and support efficient work processes. Users facing such issues encounter challenges in obtaining timely and relevant information, which affects their decision-making and operational efficiency.

The bivariate analysis, as presented in **Table 5**, demonstrates that among 172 respondents, 102 (93.7%) who perceived the information quality as good also reported significant net benefits. Conversely, 20 respondents (11.7%) who rated information quality as poor experienced suboptimal net benefits. A chi-square test yielded a p-value of 0.002 ( $p < 0.05$ ), confirming a statistically significant relationship between information quality and net benefits.

These findings suggest that high-quality information, characterized by accuracy, completeness, relevance, and ease of access, enables users to make informed decisions, enhance operational efficiency, and optimize patient care services. Improved information quality directly contributes to increased net benefits, including time efficiency, better service quality, and more effective hospital management.

This research aligns with prior studies, which found that high information quality positively impacts SIMRS net benefits in hospital settings. For example, studies by Farras and Hustinawati (2022), Ferdianti et al. (2022), Hardiyanti et al. (2024), Melgis et al. (2024), Musawir et al. (2024), and Windarti (2023) demonstrated a significant influence of information quality on net benefits using path coefficient and p-value tests. Reliable and valid information facilitates smoother data recording and reporting processes, reduces errors, and improves work performance, thereby enhancing the overall benefits perceived by users.

#### **4.4 Relationship of Service Quality to Net Benefits**

Service quality is a critical measure of the overall support provided by a service provider, system, or technology. It is assessed through factors such as response speed, assurance, empathy, and follow-up services (Ladhari, 2010; Martínez & Martínez, 2010; Ramya, 2019). Central to service quality is the focus on meeting the needs and expectations of users. A system that ensures a sense of security for users, especially when accessing and transmitting data, contributes significantly to user satisfaction. Additionally, the responsiveness of the service provider plays a pivotal role in determining user contentment (Ladhari, 2010; Martínez & Martínez, 2010; Ramya, 2019).

In the context of the hospital information management system (SIMRS), univariate analysis results reveal that the majority of users

(66.9%) are satisfied with the service quality, indicating that SIMRS generally meets the operational needs of hospitals. However, the 33.1% of respondents who reported dissatisfaction highlight that there are still significant challenges in certain service aspects, such as technical support, response time, and system maintenance. These users likely encountered issues that affected their experience, including insufficient technical support, frequent system downtimes, or inadequate maintenance, all of which compromise the stability of the system. Users facing these problems may struggle to complete tasks efficiently, which, in turn, diminishes their overall satisfaction with the system.

Bivariate analysis (Table 6) reveals that of the 172 respondents, 91 (82.9%) who rated the service quality positively also reported good net benefits. Conversely, 24 respondents (15.9%) who rated the service quality poorly also reported poor net benefits. The chi-square test yielded a p-value of 0.006 ( $p < 0.05$ ), indicating a statistically significant relationship between service quality and net benefits. This suggests that factors such as reliability, responsiveness, technical support, and the system's ability to meet user needs promptly are critical in enhancing user satisfaction. High service quality leads to greater user satisfaction, which directly impacts net benefits, including improved work efficiency, increased productivity, and better data-driven decision-making.

These findings are consistent with previous studies that demonstrated a significant relationship between service quality and net benefits. Na et al. (2020), Obaid et al. (2019), and Sarowar & Zihang (2023) reported similar results, with t-values exceeding the critical value ( $2.939 > 1.664$ ) and p-values below 0.05 ( $p = 0.003$ ), thus supporting the hypothesis that service quality significantly influences net benefits. Based on these findings, this study accepts H2 and rejects H0, confirming that service quality has a significant effect on net benefits. Customer satisfaction, therefore, reflects users' perceptions of the system's performance relative to their expectations. When users perceive that SIMRS meets or exceeds their expectations, satisfaction increases, thereby reinforcing the system's value and its utilization.

#### **4.5 Perspective**

This study highlights the significant benefits of utilizing the Health Management Information System (HMIS) at Madani Regional General Hospital in Palu, focusing on the substantial improvements in both the efficiency and effectiveness of hospital services. The study identifies system usage as the most dominant factor influencing HMIS utilization, followed by user satisfaction, information quality, and service quality. To ensure continued improvement, it is recommended that ongoing training for hospital staff be prioritized to enhance system usage.

#### **4.6 Improved Health Service Delivery:**

The effective utilization of HMIS plays a pivotal role in enhancing the overall efficiency and quality of healthcare services. A well-

**Table 1.** Frequency Distribution of Respondents Based on Characteristics

Characteristics of Respondents	Number (n)	Percentage (%)
<b>Gender</b>	62	
Man		36.0
Woman	110	64.0
<b>Age</b>		
17 – 25 years	7	4.1
26 – 35 years	83	48.3
36 – 45 years	64	37.2
46 – 55 years	14	11.7
56 – 65 years	4	2.3
<b>Last Education</b>		
SMA	3	1.7
D1	1	0.6
D3	104	60.5
D4	1	0.6
S1	43	25.0
S2	6	3.5
Nurse Profession	14	8.1
<b>Length of SIMRS</b>		
<5 Months	2	1.2
>5 Months	20	11.6
1 Year	42	24.4
2 Years	108	62.8
<b>Total</b>	<b>172</b>	<b>100,0</b>

**Table 2.** Frequency Distribution of Respondents Based on Research Variables

Research Variables	Number (n)	Percentage (%)
<b>System Usage</b>		
Bad	36	20.9
Good	136	79.1
<b>Use Satisfaction</b>		
Bad	55	32.0
Good	117	68.0
<b>Quality Information</b>		
Bad	42	24.4
Good	130	75.6
<b>Quality of Service</b>		
Bad	57	33.1
Good	115	66.9

**Table 3.** Distribution of Respondents Based on System Usage in Net Benefits for the Year

System Usage	Net Benefits				Total	P Value
	Not Good		Good			
	n	%	n	%		
Not Good	17	10,0	19	26,0	36	0,007
Good	31	38,0	105	98,0	136	
Total	48	48,0	124	124,0	172	

**Table 4.** Distribution of Respondents Based on User Satisfaction on Net Benefits

User Satisfaction	Net Benefits				Total	P Value
	Not Good		Good			
	n	%	n	%		
Not Good	24	15,3	31	39,7	55	0,003
Good	24	32,7	93	84,3	117	
Total	48	48,0	124	124,0	172	

**Table 5.** Distribution of Respondents Based on Quality of Information on Net Benefits

Quality of Information	Net Benefits				Total	P Value
	Not Good		Good			
	n	%	n	%		
Not Good	20	11,7	22	30,3	42	0,002
Good	28	36,3	102	93,7	130	
Total	48	48,0	124	124,0	172	

**Table 6.** Distribution of Respondents Based on Quality of Service on Net Benefits

Quality of Service	Net Benefits				Total	P Value
	Not Good		Good			
	n	%	n	%		
Not Good	24	15,9	33	41,1	57	0,006
Good	24	32,1	91	82,9	115	
Total	48	48,0	124	124,0	172	

**Table 7.** Results of Multivariate Test Analysis

Independent Variable	Sig. (Hosmer and Lemeshow Test)	Sig.	Exp (B)	Negelkerke R Square	Overall Percentage (%)
System Usage	0,270	0,006	3.242	0,212	79,7
User Satisfaction		0,030	2.500		
Quality of Information		0,173	1.829		
Quality of Service		0,013	2.581		

integrated HMIS provides fast access to patient data, reduces waiting times, and facilitates better coordination among different hospital departments. This streamlined workflow is essential for providing timely and accurate care to patients, ultimately benefiting the broader community.

#### **4.7 Data-Driven Decision-Making:**

HMIS empowers healthcare management with accurate, real-time data, enabling informed decision-making in areas such as policy development and service improvements. This data-driven approach enhances resource allocation, supports targeted patient care strategies, and helps identify areas requiring further attention, thereby fostering better hospital performance and improving public health outcomes.

#### **4.8 Enhanced Patient Experience and Satisfaction:**

By improving the service delivery processes, HMIS reduces the administrative burdens on both hospital staff and patients, leading to more patient-centered care. As a result, patients experience better service, leading to increased satisfaction and trust in the healthcare system—critical factors that influence public health outcomes and community well-being.

#### **4.9 Efficient Management of Hospital Resources:**

HMIS offers precise tracking and reporting of hospital resources, such as medical supplies, staff availability, and facility usage. This facilitates efficient resource management, reduces operational costs, and ensures that resources are allocated optimally to meet the needs of the community, ensuring that services remain effective and responsive to demand.

#### **4.10 Facilitates Health Information Exchange:**

The integration of HMIS with other healthcare platforms and stakeholders, such as BPJS and primary healthcare facilities, ensures seamless information exchange. This connectivity strengthens the continuity of care, making patient information accessible across different health settings. This not only contributes to more comprehensive care but also minimizes redundancies, leading to greater efficiency within the public health system.

#### **4.11 Identification of Areas for System Improvement:**

The evaluation of HMIS reveals areas requiring enhancement, such as user satisfaction, data backup, and system integration. Addressing these deficiencies is crucial for improving system functionality and ensuring it meets the evolving needs of both hospital staff and patients. By continually refining the system, the hospital can ensure it remains an effective tool for service delivery.

#### **4.12 Training and Capacity Building for Health Workers:**

The study identifies significant gaps in system usage among staff, particularly across different age groups. To address this, targeted training programs must be developed to enhance healthcare workers' proficiency in using the HMIS. This will foster greater system adoption, improve user satisfaction, and ultimately contribute to more efficient service delivery.

#### **4.13 Policy Development for Healthcare Quality:**

The insights from this evaluation can guide hospital management and public health policymakers in formulating policies that support the continuous improvement of healthcare quality. By aligning technological advancements with public health goals, these policies can help drive sustainable improvements in healthcare services, ensuring better health outcomes for the community.

### **5. Conclusion**

In conclusion, the effective implementation and utilization of HMIS at Madani Regional General Hospital offer substantial benefits, from improving service delivery and resource management to enhancing patient satisfaction and enabling data-driven decision-making. However, ongoing improvements, including targeted training and addressing system limitations, are essential to fully realizing the potential of HMIS in transforming hospital services and public health outcomes.

#### **Author contributions**

M.R. was responsible for conceptualization, data curation, methodology, and drafting the original manuscript. A.R. provided supervision, validation, and formal analysis. D.D. contributed to investigation, resource management, and project administration. I.I. handled data analysis, software development, and visualization. Finally, A.R. worked on reviewing and editing the manuscript, securing funding, and giving the final approval for submission.

#### **Acknowledgment**

The authors were grateful to their department.

#### **Competing financial interests**

The authors have no conflict of interest.

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