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SEEING IS UNDERSTANDING: EVALUATING THE ROLE OF PATIENT DAILY BOARD IN IMPROVING COMMUNICATION AND SATISFACTION IN HOSPITAL WARDS

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ABSTRACT
Although hospitals have provided various information exchange tools, inpatient patient satisfaction remains suboptimal. This study aims to evaluate the role of communication and patient daily boards in improving patient satisfaction and to map service improvement priorities using Importance–Performance Map Analysis (IPMA). This study employed a quantitative design with a survey approach involving 200 inpatients. Data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) to examine structural relationships between variables, and IPMA to identify areas of performance and strategic importance. The inner model results showed that patient daily boards significantly influenced information exchange ($\beta = 0.784$; $p < 0.001$) and patient understanding ($\beta = 0.160$; $p = 0.003$). Information exchange also had a significant and strong influence on patient understanding ($\beta = 0.738$; $p < 0.001$). However, neither information exchange ($\beta = 0.078$; $p = 0.614$) nor patient daily boards ($\beta = –0.028$; $p = 0.856$) showed a significant effect on patient satisfaction. Mediation analysis confirmed that information exchange significantly mediated the relationship between patient daily boards and patient understanding ($\beta = 0.579$; $p < 0.001$), but not patient satisfaction. The R-squared value indicated high explanatory power for communication ($R^2 = 0.615$) and patient understanding ($R^2 = 0.756$), but very low for patient satisfaction ($R^2 = 0.004$). IPMA results position communication as a construct with high importance and performance that needs to be maintained, while patient daily boards require optimization strategies to make a more meaningful contribution to the overall patient experience.

KEYWORDS: patient satisfaction, communication, patient daily boards, IPMA, PLS-SEM.

INTRODUCTION

Effective communication between patients and healthcare providers is a fundamental foundation for high-quality hospital care. In inpatient settings, patients' ability to understand their treatment plan, medical condition, and daily care routines plays a crucial role in shaping their satisfaction and perceptions of service quality. However, numerous studies show that patients often experience difficulty obtaining clear and consistent information during hospitalization. Patients often do not know the healthcare professional responsible for their care or do not fully understand the clinical goals and procedures being undertaken (Singh et al., 2011; Dunbar & Fletcher, 2020). This communication gap contributes to increased confusion, anxiety, dissatisfaction, and decreased trust in the healthcare system.

In the context of hospitals in Indonesia, communication challenges are further complicated by the high workload of healthcare workers, varying levels of patient health literacy, and limited use of standardized visual communication media. Critical information regarding treatment plans, procedure schedules, and healthcare professionals' identities is still predominantly conveyed verbally, making them vulnerable to miscommunication and information loss. This situation results in poor patient understanding of the ongoing care process, even though hospitals provide

various communication tools. Therefore, a more structured, transparent, and patient-centered communication approach is needed to bridge the information gap and improve the inpatient care experience.

This board provides important, real-time information about the patient's care plan, medical team, treatment schedule, and discharge goals, thus facilitating a shared understanding between patients, families, and healthcare providers. Gómez Barriga et al. (2023) found that implementing a daily bedside whiteboard in cardiology units across four hospitals significantly improved communication and patient understanding of their care processes. Similarly, Goyal et al. (2020) showed that daily whiteboards improved information flow and strengthened trust between nurses and patients by providing a clear reference point for ongoing care discussions. These findings suggest that the Patient Daily Board serves not only as a passive information board but also as an interactive platform that supports transparency and encourages active engagement in the patient's recovery process.

Despite these promising results, communication challenges in hospital wards remain prevalent, particularly in general inpatient units where diverse patient needs and staff workloads can complicate information delivery. Singh et al. (2011) reported that patients often feel disconnected from their care team due to inadequate communication about daily plans and responsibilities. Dunbar and Fletcher (2020) emphasized that unstructured verbal communication contributes to misunderstandings about medical information, especially among patients with limited health literacy. When visual communication tools such as whiteboards are not used effectively, patients may perceive the healthcare process as opaque and disorganized, thus reducing their satisfaction and trust. In this regard, Patient Daily Boards offer an opportunity to standardize communication practices and ensure that patients receive accurate, understandable, and up-to-date information about their care.

Previous research has confirmed the effectiveness of whiteboards in specific clinical contexts, such as intensive care units (Sidhu et al., 2024) or specialized departments like cardiology (Gómez Barriga et al., 2023). However, there is a lack of empirical research exploring the implementation and impact of Patient Daily Boards in hospital wards, especially in developing countries like Indonesia. Most existing research focuses on the direct effects of whiteboard use on patient satisfaction, often overlooking the potential mediating role of communication in explaining how these tools improve understanding and satisfaction. For example, while Sidhu et al. (2024) highlighted improved patient satisfaction among ICU patients on mechanical ventilators using a communication board, the study did not address how enhanced communication processes contributed to this outcome. Similarly, Al-Nafea et al. (2022) found that whiteboards improved patient and family satisfaction in a Saudi hospital, but did not examine communication as a mediating mechanism.

Therefore, this study seeks to address a crucial research gap by investigating the direct and indirect relationships between Patient Daily Board use, communication, patient understanding, and patient satisfaction in general inpatient wards. Specifically, this study aims to examine whether communication acts as a mediating variable bridging the relationship between whiteboard use and patient-related outcomes. In doing so, this study provides a more comprehensive understanding of how visual communication tools function as part of a broader patient-centered care strategy.

Although empirical evidence suggests that Patient Daily Boards contribute to improved information flow and patient satisfaction, most previous research has focused on the technical and operational benefits of using these boards, such as information clarity, communication efficiency, or direct satisfaction (Singh et al., 2011; Al-Nafea et al., 2022; Sidhu et al., 2024). Meanwhile, the psychological and communicative mechanisms explaining how Patient Daily Boards affect patient outcomes remain relatively underexplored. In other words, while prior studies investigated the technical or operational benefits of bedside boards, few examined their psychological or communicative mediating mechanisms in patient satisfaction, particularly the role of communication as a mediating process that bridges information provision and the holistic patient experience. Some studies report increased satisfaction after implementing daily boards (Marshall et al., 2023; Al-Nafea et al., 2022), but none empirically explore how the communication

interactions facilitated by these boards shape patients' understanding, trust, and perceptions of care quality.

From a theoretical perspective, this gap can be explained through the Patient-Centered Communication Model, which emphasizes that communication quality, including clarity of information, empathy, and patient engagement, is the primary determinant of patient understanding and satisfaction, rather than simply the availability of the communication tool itself (Dunbar & Fletcher, 2020). Within this framework, the Patient Daily Board is viewed as a structural enabler that will only have optimal impact if it facilitates meaningful two-way communication between patients and healthcare professionals. Furthermore, Social Exchange Theory provides a conceptual foundation that patient satisfaction is formed through perceived fair and valuable social exchanges, where information transparency and active patient engagement enhance perceived benefits and trust in service providers (Goyal et al., 2020; Gregg et al., 2025). Without an effective communication process, the information board has the potential to become a symbolic instrument that lacks meaning for the patient experience.

The novelty of this study lies in the empirical integration of these four constructs Patient Daily Board, Communication, Patient Understanding, and Patient Satisfaction into a unified model. While previous studies (e.g., Sidhu et al., 2024; Gómez Barriga et al., 2023) primarily analyzed whiteboards as tools for enhancing satisfaction or conveying information, this study conceptualizes them as instruments that facilitate communication processes that lead to improved cognitive and emotional outcomes for patients. By adopting a quantitative approach, this study contributes to the theoretical development of communication models in healthcare and provides practical insights for hospital administrators seeking to improve the patient experience through simple yet impactful innovations.

The urgency of this research is further strengthened by the global movement toward patient-centered care, which emphasizes the importance of transparency, communication, and active patient engagement in healthcare delivery. As observed by Marshall et al. (2023), digital or physical whiteboards can significantly improve satisfaction and safety when used to support two-way communication between patients and the medical team. In the Indonesian healthcare context, where communication barriers and hierarchical doctor-patient dynamics often hinder patient engagement, implementing a Patient Daily Board could be a low-cost yet highly effective intervention. Gregg et al. (2025) also argue that whiteboards serve multiple functions beyond communication, including enhancing patient safety, education, and empowerment. These benefits align with the current push for hospital quality improvement initiatives that prioritize information clarity and patient participation in care decision-making.

In summary, this study proposes the following hypotheses: (1) Patient Daily Boards have a positive effect on patient understanding; (2) Patient Daily Boards have a positive effect on communication; (3) Patient Daily Board has a positive effect on Patient Satisfaction; (4) Communication mediates the positive effect of Patient Daily Board on Patient Understanding; and (5) Communication mediates the positive effect of Patient Daily Board on Patient Satisfaction. By testing these hypotheses, this study aims to contribute, both theoretically and practically, by explaining the communication mechanisms that mediate the relationship between whiteboard use and patient outcomes. Ultimately, these findings are expected to guide hospital policy in designing effective communication strategies that promote better understanding, satisfaction, and engagement among patients during hospitalization (Singh et al., 2011; Dunbar & Fletcher, 2020; Gómez Barriga et al., 2023; Sidhu et al., 2024; Marshall et al., 2023; Gregg et al., 2025).

CONCEPTUAL FRAMEWORK

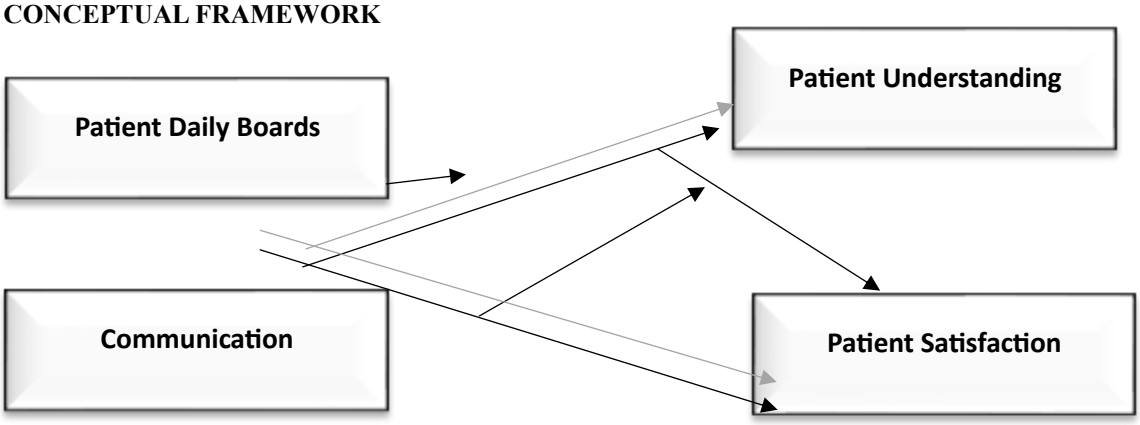

Figure 1. Conceptual Framework

Notes:

: Direct Effect

: Indirect Effect (Mediation by Communication)

This research framework was modified from various studies highlighting the effectiveness of using a patient daily board or communication board in improving understanding, communication, and patient satisfaction during hospital care. Generally, a patient daily board serves as a visual medium that displays important information regarding the patient's condition, scheduled medical procedures, and members of the care team, enabling patients and their families to better understand the care process and communicate more effectively with healthcare providers.

Research conducted by Singh et al. (2011) showed that the use of a daily board significantly improved patient satisfaction with communication with healthcare providers in the inpatient ward. Patients found it easier to understand who was caring for them, the medical procedures to be performed, and the goals of daily care. This suggests that the daily board serves as a communication tool that strengthens the relationship between patients and healthcare providers through information transparency and clear medical instructions. Therefore, the patient daily board variable is assumed to have a positive influence on communication and patient satisfaction, as reflected in hypotheses H2 and H3.

Furthermore, Dunbar and Fletcher (2020) emphasized that the daily board not only improves communication but also plays a crucial role in strengthening patient understanding of their care plan. Through written, readily accessible information, patients become more aware of the care process, including medication schedules, medical procedures, and who is responsible for their condition. This strengthens the theoretical basis for hypothesis H1, which states that the Patient Daily Board positively impacts patient understanding.

Research by Sidhu et al. (2024) further demonstrates that the effectiveness of the Communication Board has been shown to increase patient satisfaction, particularly in the context of intensive care in the ICU. Patients who are physically limited in their ability to speak can still understand and communicate their needs through the Communication Board, ultimately increasing satisfaction levels because patients feel more cared for and involved in medical decision-making. In the context of general inpatient wards, the same principle applies: Clear visual communication increases patients' sense of engagement and their perception of service quality, strengthening the relationship between communication and patient satisfaction.

Meanwhile, a study by Gómez Barriga et al. (2023) provides the latest empirical evidence that integrating Daily Boards in cardiology inpatient wards across four hospitals successfully improved patient communication and information flow between patients and medical staff. This study found that the daily board is an effective means of ensuring that information provided is consistent, easy to understand, and accessible to all parties, including patients' families. This suggests a mediating

role for communication between the daily board and other outcomes such as understanding and satisfaction.

Based on a synthesis of these four studies, this research's conceptual framework proposes that the implementation of the patient daily board directly improves patient understanding (H1), communication (H2), and patient satisfaction (H3). Furthermore, communication is suspected to be a mediating variable that strengthens the positive influence of the daily board on patient understanding (H4) and patient satisfaction (H5). This means that increased understanding and patient satisfaction occur largely through increased communication effectiveness facilitated by the patient daily board.

Therefore, this research model positions the patient daily board as a primary factor driving effective communication interactions in the inpatient ward, which then extends its positive effect on patient understanding of the care process and their overall satisfaction level. This framework builds on empirical findings across studies demonstrating that information transparency, consistent visual communication, and patient engagement are key to improving the patient experience in modern hospitals.

Hypothesis Development

Patient Daily Board dan Patient Understanding

Patient understanding refers to the extent to which patients understand information about their medical condition, treatment plan, and the care process during their hospitalization. Inadequate understanding often results from inconsistent or unstructured communication between healthcare providers and patients. Singh et al. (2011) emphasized that many patients are unclear about their treating physician or the procedures planned for them, leading to uncertainty and confusion. To address this, hospitals have introduced Patient Daily Boards as a visual tool to convey important information such as treatment plans, treatment schedules, and healthcare provider names in real time.

Studies have shown that visual communication can significantly improve patient understanding. Gómez Barriga et al. (2023) reported that after implementing bedside whiteboards in a cardiology unit, patients demonstrated a better understanding of their care journey and felt more informed about their treatment goals. Similarly, Dunbar and Fletcher (2020) argued that visual displays help bridge the communication gap caused by complex medical terminology, enabling patients to understand information more easily than through verbal communication alone. Therefore, by providing structured and easily accessible information, the Patient Daily Board is expected to improve patients' cognitive understanding of their care process.

H1: The Patient Daily Board has a positive effect on patient understanding.

Patient Daily Board and Communication

Effective communication between healthcare professionals and patients is a fundamental component of patient-centered care. However, communication breakdowns are still common in hospital settings, often due to heavy workloads, multiple healthcare providers, and inconsistent messaging. The use of a Patient Daily Board can serve as a shared visual communication interface that facilitates dialogue, ensures message consistency, and increases information transparency.

Goyal et al. (2020) found that bedside whiteboards improved communication between nurses and patients by providing a clear reference for daily updates, reducing misunderstandings, and creating opportunities for interaction. Similarly, Gregg et al. (2025) concluded in their scoping review that whiteboards enhance communication effectiveness by encouraging direct information exchange and strengthening shared accountability between staff and patients. These findings suggest that whiteboards act not only as passive information tools but also as active mediators of two-way communication.

Furthermore, Sidhu et al. (2024) demonstrated in their ICU study that communication boards significantly improved patient satisfaction in patients on mechanical ventilators and unable to speak, confirming the importance of visual communication aids in overcoming communication barriers. Applying these findings to the general inpatient setting, it stands to reason that patient

daily boards would foster more structured, ongoing, and transparent communication between patients, families, and the healthcare team.
H2: Patient Daily Boards Have a Positive Effect on Communication.

Patient Daily Whiteboards and Patient Satisfaction
Patient satisfaction is a multidimensional construct influenced by factors such as quality of care, communication, and emotional well-being. When patients receive clear and consistent information about their care and healthcare providers, their sense of security and trust in the healthcare system increases, which in turn increases their satisfaction. Whiteboards have been recognized as a tool that can improve satisfaction levels by increasing communication transparency and reducing uncertainty.
According to Al-Nafea et al. (2022), patients and their families reported higher levels of satisfaction after hospitals introduced bedside whiteboards, as these tools provided continuous updates and helped them stay informed about care decisions. Similarly, Marshall et al. (2023) found that even digital whiteboards in the emergency department improved patient satisfaction by providing timely and accurate information during stressful waiting periods. These studies demonstrate that satisfaction stems not only from clinical outcomes, but also from the quality of communication and accessibility of information during hospitalization.
Therefore, by allowing patients to clearly see who is responsible for their care, what procedures are planned, and when they will be performed, Patient Daily Boards contribute to greater transparency and a stronger sense of engagement—two key drivers of satisfaction in patient-centered care.
H3: Patient Daily Boards have a positive effect on Patient Satisfaction.

Communication and Patient Understanding
Effective communication between healthcare professionals and patients is believed to play a significant role in improving patient understanding of their condition, treatment plan, and the ongoing treatment process. Several studies have shown that communication tools such as Daily Boards can help reduce miscommunication and increase the clarity of information. Dunbar & Fletcher (2020) emphasized that Daily Boards are an important tool in improving patient understanding during hospitalization, while research by Gómez Barriga et al. (2023) demonstrated that the use of information boards in ward rooms can improve patient access to relevant information. Goyal et al. (2020) and Gregg et al. (2025) also confirmed that structured communication features can facilitate dialogue between patients and nurses more effectively, enabling patients to understand medical instructions more accurately. Consistent with these findings, Al-Nafea et al. (2022) noted that family involvement in Daily Board-based communication helped improve their understanding of the treatment plan. These findings indicate that the better the communication between healthcare professionals, the higher the patient's level of understanding during treatment.
H4: Communication has a positive and significant effect on patient understanding.

Communication and Patient Satisfaction
Good communication between healthcare providers and patients has long been identified as a key factor influencing patient satisfaction. Various studies have shown that clear, transparent, and responsive communication allows patients to feel valued and have greater trust in the services provided. Singh et al. (2011) found that the use of Daily Boards increased patient satisfaction with communication with healthcare professionals, while Marshall et al. (2023) demonstrated that Digital Daily Boards can improve the patient experience in the emergency department by making information more accessible and understandable. Al-Nafea et al. (2022) also reported that patients and families felt more satisfied when communication regarding care plans was systematically delivered through daily boards. Research by Sidhu et al. (2024) added that communication aids such as communication boards can reduce anxiety and increase comfort, thereby increasing patient satisfaction, especially for those with limited mobility. These findings suggest that good

communication quality leads to increased positive perceptions of healthcare services. Therefore, the following hypothesis can be proposed:
H5: Communication has a positive and significant effect on patient satisfaction.

The Mediating Role of Communication in the Relationship between Patient Daily Boards and Patient Understanding

Although whiteboards provide visible and structured information, their impact on patient understanding depends largely on the quality of the communication they facilitate. In other words, communication acts as a mediating mechanism through which whiteboards enhance understanding. Whiteboards encourage healthcare providers to regularly update and discuss information, transforming static data into interactive communication moments.
Dunbar and Fletcher (2020) noted that communication becomes more effective when supported by visual aids that simplify complex medical language and enable patients to ask informed questions. Similarly, Gregg et al. (2025) highlighted that whiteboards enhance understanding not only by displaying information but also by stimulating dialogue between patients and providers. Through ongoing communication, patients can clarify ambiguities, affirm their care goals, and develop a deeper understanding of their health status.
Therefore, the positive effect of whiteboards on patient understanding is not only direct; it is strengthened through effective communication processes that transform information into shared meaning.
H6: Communication mediates the positive effect of Patient Daily Boards on patient understanding.

The Mediating Role of Communication in the Relationship between Patient Daily Boards and Patient Satisfaction

Communication quality is one of the strongest predictors of patient satisfaction. When patients perceive that their healthcare providers communicate openly, clearly, and empathetically, their satisfaction with hospital services increases substantially. Patient Daily Boards provide an ideal platform to foster such communication by ensuring that important information is always visible and up-to-date.
Sidhu et al. (2024) confirmed that better communication through visual boards results in higher patient satisfaction, especially in high-stress environments like the ICU. Similarly, Al-Nafea et al. (2022) found that clarity of communication mediated the relationship between whiteboard use and patient satisfaction, suggesting that satisfaction stems not only from the accessibility of information but also from patients' perceptions that they are heard and valued.
In this context, communication serves as a psychological bridge that transforms the informational benefits of whiteboards into emotional satisfaction. By facilitating dialogue and transparency, whiteboards allow patients to feel more in control of their care experience, reduce anxiety, and increase a sense of community with their healthcare team (Marshall et al., 2023; Gómez Barriga et al., 2023). Therefore, communication is expected to play a significant mediating role in the relationship between patient daily board use and overall patient satisfaction.
H7: Communication mediates the positive effect of the patient daily board on patient satisfaction.

METHODS

Research Design

This study adopted a quantitative approach using Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the direct and indirect relationships between Patient Daily Boards, Communication, Patient Understanding, and Patient Satisfaction in general inpatient wards at a private hospital. The PLS-SEM approach was chosen because it allows for simultaneous testing of complex causal relationships between multiple latent constructs and their indicators and remains robust when the assumption of a normal distribution is not fully met (Hair, Hult, Ringle, & Sarstedt, 2021). Furthermore, PLS-SEM is well-suited for predictive and exploratory research, particularly in testing mediation effects and explaining variance in endogenous constructs. This research conceptual model consists of one exogenous latent variable (Patient Daily Board), one mediating variable (Communication), and two endogenous latent variables (Patient Understanding

and Patient Satisfaction). This study design used a cross-sectional approach, where data were collected at a single point in time through a structured questionnaire administered to inpatients.

Population and Sample

The study population included adult inpatients treated in the general wards of a private hospital. General wards were chosen because they represent a heterogeneous patient population in terms of diagnosis, length of stay, and intensity of interaction with healthcare professionals. Unlike intensive care units, patients in general wards are generally fully conscious and able to evaluate their communication experiences, understanding, and satisfaction during care.

The sampling technique used was purposive sampling with the following inclusion criteria: (1) patients aged ≥18 years, (2) hospitalized for at least two days, (3) able to read and understand the questionnaire, and (4) exposed to the Patient Daily Board during their treatment period. Patients with cognitive impairments or language barriers were excluded to maintain the reliability of self-reported data.

Sample size justification was performed using power analysis using G*Power 3.1 software. By setting a moderate effect size ($f^2 = 0.15$), a significance level of 0.05, and a minimum statistical power of 0.80, the analysis indicated that the minimum sample size required was approximately 107 respondents for a model with three maximum predictors on one endogenous construct. To improve the stability of the estimates and the predictive power of the PLS-SEM model, this study included 200 respondents, exceeding the recommended minimum threshold (Hair et al., 2021).

Data Collection Procedures

Data were collected using a structured questionnaire self-administered by respondents and distributed with the assistance of hospital staff. The questionnaire consisted of two sections. The first section covered respondents' demographic characteristics, such as age, gender, education level, and length of hospital stay. The second section measured the study constructs using items adapted from previously validated instruments, specifically those from Goyal et al. (2020) and Gómez Barriga et al. (2023) for Patient Daily Board and Communication, and those from Singh et al. (2011) and Al-Nafea et al. (2022) for Patient Understanding and Patient Satisfaction. All items were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Data Analysis

Data were analyzed using SmartPLS 4 software following the two-stage analysis procedure proposed by Hair et al. (2021): (1) measurement model evaluation (outer model) and (2) structural model evaluation (inner model).

1.Measurement Model Evaluation

The measurement model aims to assess construct reliability and validity. Internal consistency reliability was tested using Cronbach's alpha and Composite Reliability (CR), with an acceptable threshold above 0.70. Convergent validity was evaluated using the Average Variance Extracted (AVE), which must exceed 0.50 for each construct. Indicator reliability was checked by ensuring that all standardized loadings were above 0.70, although loadings above 0.60 are considered acceptable for exploratory research (Hair et al., 2021).

To test discriminant validity, two criteria were applied: the Fornell–Larcker criterion, where the square root of the AVE of each construct must exceed its correlation with other constructs, and the Heterotrait–Monotrait Ratio (HTMT), which must be below 0.85.

2.Structural Model Evaluation

After establishing measurement validity, the structural model was evaluated to test the proposed hypotheses. The analysis focused on the path coefficients (β), significance levels (standardized path coefficient), and explained variance (R^2) of the endogenous constructs. Bootstrapping with 5,000 resamples was performed to assess the significance of direct and indirect effects. Following Hair et al. (2021), the predictive relevance of the model was examined using Q^2 (Stone–Geisser criterion), with values greater than zero indicating good predictive relevance. Effect sizes (f^2) were

also calculated to determine the strength of the impact of each exogenous variable, which were classified as small (0.02), medium (0.15), or large (0.35).

3.Mediation Analysis

The mediating role of Communication was tested using the bootstrapping method, which provides bias-corrected confidence intervals for the indirect effect. Mediation was confirmed when both the indirect path (Daily Board → Communication → Outcome) and the total effect were significant, consistent with the mediation testing guidelines of Hair et al. (2021).

Ethical Criteria

This study has obtained ethical approval from the Health Research Ethics Committee of isi nama rumah sakit Hospital, with ethical approval code: isi. All participants provided written consent after receiving a full explanation of the research objectives, data confidentiality, and the right to withdraw at any time without consequence. Data is stored anonymously and used exclusively for academic purposes.

RESULT

Descriptive Analysis

Table 1. Descriptive Analysis

	Mean	Median	Observed min	Observed max	Standard deviation
CA1	4,100	4,000	1,000	5,000	0,883
CA2	4,175	4,000	1,000	5,000	0,935
CA3	4,065	4,000	1,000	5,000	0,928
CA4	4,220	4,000	1,000	5,000	0,944
CA5	3,975	4,000	1,000	5,000	1,022
CA6	3,870	4,000	1,000	5,000	0,902
PDW1	3,650	4,000	1,000	5,000	1,157
PDW2	3,690	4,000	1,000	5,000	1,031
PDW3	3,755	4,000	1,000	5,000	0,992
PDW4	3,975	4,000	1,000	5,000	1,002
PDW5	3,905	4,000	1,000	5,000	0,962
PDW6	4,040	4,000	1,000	5,000	0,984
PDW7	3,965	4,000	1,000	5,000	0,945
PS1	3,915	4,000	1,000	5,000	0,968
PS2	3,940	4,000	1,000	5,000	1,071
PS3	3,525	4,000	1,000	5,000	0,974
PS4	3,800	4,000	1,000	5,000	0,964
PS5	3,770	4,000	1,000	5,000	0,983
PS6	3,710	4,000	1,000	5,000	1,018
PU1	3,955	4,000	1,000	5,000	0,966
PU2	3,875	4,000	1,000	5,000	0,943
PU3	3,865	4,000	1,000	5,000	0,947
PU4	4,015	4,000	1,000	5,000	0,908
PU5	4,130	4,000	1,000	5,000	0,924
PU6	4,170	4,000	1,000	5,000	0,917

The descriptive analysis results show that all indicators in the Communication, Patient Daily Boards, Patient Satisfaction, and Patient Understanding variables have a mean value in the range of 3.5–4.2. This indicates that respondents' perceptions tend to be positive towards all measured constructs. The median for all indicators is 4, indicating that the majority of respondents gave an "agree" rating. Although there is a minimum value of 1 for all items, the standard deviation ranging from 0.88–1.15 indicates that the variation in responses is still in the moderate category, so the

data is relatively stable and does not show extreme deviations. In general, the indicators show good perceptions and consistency of responses among respondents.

Outer Model

Table 2. Outer Loadings

	Outer loadings
CA1 <- Communication	0,906
CA2 <- Communication	0,836
CA3 <- Communication	0,858
CA4 <- Communication	0,850
CA5 <- Communication	0,777
CA6 <- Communication	0,788
PDW1 <- Patient Daily Boards	0,854
PDW2 <- Patient Daily Boards	0,858
PDW3 <- Patient Daily Boards	0,859
PDW4 <- Patient Daily Boards	0,885
PDW5 <- Patient Daily Boards	0,830
PDW6 <- Patient Daily Boards	0,752
PDW7 <- Patient Daily Boards	0,756
PS1 <- Patient Satisfaction	0,820
PS2 <- Patient Satisfaction	0,847
PS3 <- Patient Satisfaction	0,884
PS4 <- Patient Satisfaction	0,896
PS5 <- Patient Satisfaction	0,843
PS6 <- Patient Satisfaction	0,828
PU1 <- Patient Understanding	0,824
PU2 <- Patient Understanding	0,853
PU3 <- Patient Understanding	0,851
PU4 <- Patient Understanding	0,848
PU5 <- Patient Understanding	0,835
PU6 <- Patient Understanding	0,857

The outer loadings of all indicators were above 0.75, thus meeting the convergent validity criteria. For the Communication variable, all indicators had values ranging from 0.777 to 0.906, indicating that each item was able to represent the construct strongly. Similarly, for Patient Daily Boards, the values ranged from 0.752 to 0.885, indicating a solid indicator contribution, although PDW6 and PDW7 were at the lower limit but still considered adequate. The Patient Satisfaction variable had very high loadings of 0.820 to 0.896, demonstrating excellent measurement strength. Meanwhile, Patient Understanding also demonstrated strong convergent validity with a range of 0.824 to 0.857. Overall, all constructs met the convergent validity requirements.

Table 3. HTMT

	Communication	Patient Daily Boards	Patient Satisfaction	Patient Understanding
Communication				
Patient Daily Boards	0,827			
Patient Satisfaction	0,073	0,046		
Patient Understanding	0,941	0,777	0,048	

The HTMT results show that most of the relationships between variables are below the 0.90 threshold, indicating that discriminant validity is generally met. The relationship between Communication and Patient Daily Boards (0.827) and Patient Daily Boards and Patient Understanding (0.777) indicates that the two variables are quite interrelated but still distinguishable. The relationship between Communication and Patient Understanding has a value of 0.941, slightly exceeding the 0.90 threshold, indicating potential overlap between the two constructs. Meanwhile, the relationship between variables involving Patient Satisfaction is very low (0.046–0.073), confirming that this construct truly stands alone and is not mixed with other variables. In general, discriminant validity is good, although special attention needs to be paid to the Communication–Patient Understanding relationship.

Table 4. VIF

	VIF
CA1	4,325
CA2	2,795
CA3	3,002
CA4	3,707
CA5	3,339
CA6	3,108
PDW1	4,113
PDW2	3,661
PDW3	3,939
PDW4	4,306
PDW5	2,881
PDW6	1,950
PDW7	1,932
PS1	4,234
PS2	4,850
PS3	2,657
PS4	4,537
PS5	4,539
PS6	2,212
PU1	2,599
PU2	2,648

PU3	2,727
PU4	2,587
PU5	3,648
PU6	4,093

The Variance Inflation Factor (VIF) test results indicated that all indicators had VIF values below the critical threshold of 5, indicating that there were generally no serious multicollinearity issues in the measurement model. For the Communication construct, two indicators (CA1 = 4.325 and CA4 = 3.707) exhibited relatively higher VIF values than the other indicators, indicating a potential moderate collinearity concern. However, because these values were still below the conservative threshold of 5, this condition was considered acceptable and not strong enough to distort the path coefficient estimates. A similar pattern was also observed for several Patient Daily Board indicators (e.g., PDW1 and PDW4) and Patient Satisfaction, reflecting conceptual interconnectedness between items within the same construct, rather than problematic measurement redundancy.

Furthermore, to anticipate potential common method bias due to the use of self-report questionnaires, collinearity evaluation in the inner model was also considered. Referring to the full collinearity VIF approach, VIF values below the threshold of 3.3–5.0 indicate that common method variance does not pose a serious threat to model validity. This finding aligns with the assumption that the variation explained by the indicators better reflects the theoretical construct being measured rather than biases from the data collection method. Therefore, neither multicollinearity between indicators nor potential common method bias are expected to significantly affect the PLS-SEM estimation results in this study.

Table 5. Validity and Reability

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Communication	0,914	0,917	0,933	0,700
Patient Daily Boards	0,924	0,927	0,939	0,687
Patient Satisfaction	0,934	0,960	0,941	0,728
Patient Understanding	0,920	0,921	0,937	0,714

All variables in the study showed an excellent level of reliability, evidenced by a Cronbach's alpha value above 0.90. The Communication variable had an alpha of 0.914 and a composite reliability of 0.933, indicating strong internal consistency. The Patient Daily Boards variable also showed high reliability with an alpha of 0.924 and an AVE of 0.687, which met the criteria for convergent validity. The Patient Satisfaction variable had the highest AVE of 0.728, indicating that the indicator was able to explain most of the construct's variance. Meanwhile, Patient Understanding was also highly reliable with a composite reliability of 0.937 and an AVE of 0.714. Overall, all constructs met the reliability and validity requirements, making them suitable for use in further structural analysis. Based on the explanation above, the results of the outer model are visualized as follows:

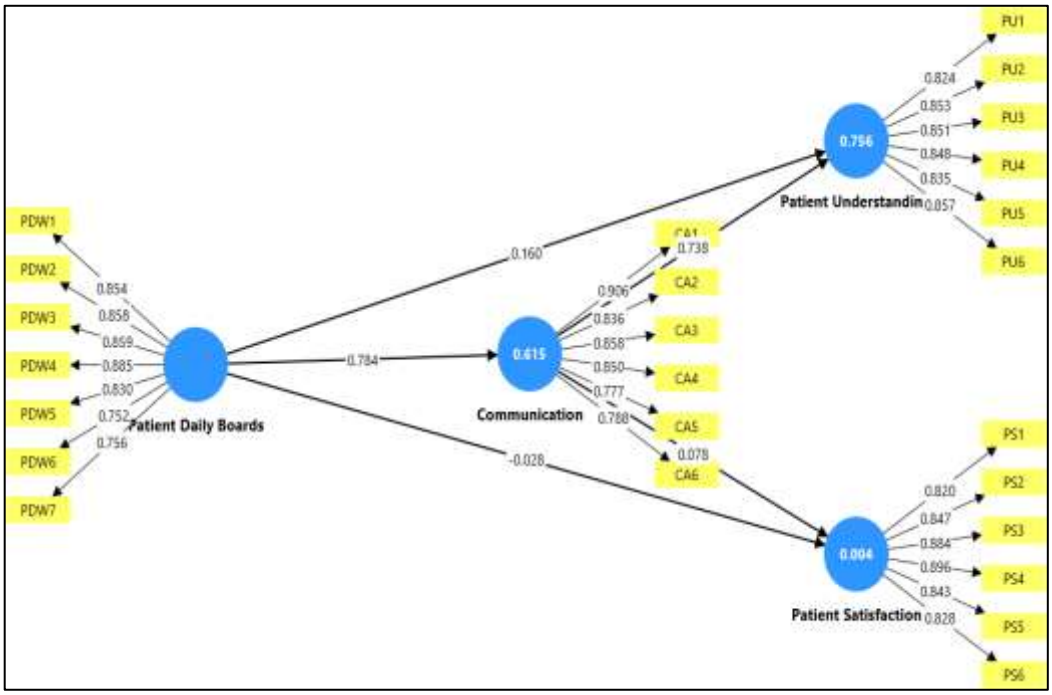

Figure 2. Outer Model

Inner Model

1. Table 6. R-Square

	R-square	R-square adjusted
Communication	0,615	0,613
Patient Satisfaction	0,004	-0,007
Patient Understanding	0,756	0,754

The R-square value reflects the model's ability to explain variation in each endogenous variable. The Communication construct had an R^2 value of 0.615 (adjusted R^2 = 0.613), indicating that the Patient Daily Board was able to explain approximately 61.5% of the variation in communication. According to Hair et al.'s (2021) criteria, an R^2 value above 0.50 indicates strong and substantial explanatory power, indicating that the model has adequate explanatory power for the Communication construct.

Conversely, Patient Satisfaction showed a very low R^2 value of 0.004 (adjusted R^2 = –0.007). This value indicates that the predictor variables in the model have almost no explanatory power for variation in patient satisfaction. Based on Hair et al.'s (2021) classification, an R^2 value below 0.10 reflects weak explanatory power, indicating that patient satisfaction is likely influenced by factors other than the constructs tested in this study.

Meanwhile, Patient Understanding has an R^2 value of 0.756 (adjusted R^2 = 0.754), meaning that 75.6% of the variation in patient understanding can be explained by Communication and the Patient Daily Board. This value indicates very strong (substantial) explanatory power according to the guidelines of Hair et al. (2021). Overall, these findings confirm that the model has high explanatory power for Communication and Patient Understanding, but is inadequate to explain Patient Satisfaction in the context of this study.

Table 7. F-Square

	f-square
Communication -> Patient Satisfaction	0,002
Communication -> Patient Understanding	0,861
Patient Daily Boards -> Communication	1,595
Patient Daily Boards -> Patient Satisfaction	0,000
Patient Daily Boards -> Patient Understanding	0,040

The f-square value indicates the magnitude of the contribution effect of each predictor variable to the endogenous variable. The relationship between Patient Daily Boards → Communication has a very large effect with a value of 1.595, indicating that its influence on improving Communication is very strong and substantively significant. Communication also has a large effect on Patient Understanding with an f-square of 0.861, indicating a very strong predictive contribution. Conversely, the effect of Communication → Patient Satisfaction is 0.002 and Patient Daily Boards → Patient Satisfaction is 0.000, indicating that both barely contribute to the level of patient satisfaction. Meanwhile, Patient Daily Boards → Patient Understanding has a small effect (0.040), indicating that its role is present, but not dominant. In general, the largest effects are seen in the pathways leading to Communication and Patient Understanding, while Patient Satisfaction is not significantly influenced by other variables in the model.

Table 8 Q-Square

	Q^2predict
Communication	0,614
Patient Satisfaction	-0,024
Patient Understanding	0,546

The Q^2predict value measures the model's predictive ability to produce relevant out-of-sample values. The Communication variable has a Q^2 value of 0.614, indicating that the model has excellent predictive relevance for this variable. Similarly, Patient Understanding has a Q^2 of 0.546, indicating that the model is able to accurately predict the value of this variable and has high predictive relevance. However, Patient Satisfaction has a negative Q^2 value (–0.024), indicating that the model has no predictive ability for this variable; in fact, its prediction is worse than using a simple average. Overall, the model has strong predictive relevance for Communication and Patient Understanding, but fails to predict Patient Satisfaction.

Table 9. Hypothesis Testing

No	Hypothesis	Original Sample (O)	T-Statistics	Standardized path coefficient	Decision
1	Patient Daily Boards → Patient Understanding	0,160	2,996	0,003	Accepted (Significant)
2	Patient Daily Boards → Communication	0,784	18,806	0,000	Accepted (Significant)

3	Patient Daily Boards → Patient Satisfaction	–0,028	0,181	0,856	Rejected (Not Significant)
4	Communication → Patient Understanding	0,738	12,631	0,000	Accepted (Significant)
5	Communication → Patient Satisfaction	0,078	0,504	0,614	Rejected (Not Significant)
6	Patient Daily Boards → Communication → Patient Understanding (Mediasi)	0,579	9,964	0,000	Accepted (Significant Mediation)
7	Patient Daily Boards → Communication → Patient Satisfaction (Mediasi)	0,061	0,500	0,617	Rejected (Not Significant Mediation)

1. Patient Daily Boards → Patient Understanding

The results show that Patient Daily Boards significantly impact Patient Understanding, with a standardized path coefficient of 0.160 and a standardized path coefficient of 0.003 in the original sample. This means that increasing the use or quality of Patient Daily Boards significantly improves patient understanding of the information provided during care. The effect is positive and significant, indicating that the patient daily information board-based intervention has proven effective in strengthening patient understanding.

2. Patient Daily Boards → Communication

This relationship has a very strong effect, indicated by a standardized path coefficient of 0.784 in the original sample and a t-statistic of 18.806. With a standardized path coefficient of 0.000, it can be concluded that Patient Daily Boards significantly improve communication between healthcare professionals and patients. These results confirm that the use of daily information boards plays a significant role in improving communication flow, resulting in clearer and more structured messages.

3. Patient Daily Boards → Patient Satisfaction

The results indicate no significant effect of Patient Daily Boards on Patient Satisfaction (standardized path coefficient 0.856). The negative coefficient (-0.028) and t-statistic of 0.181 indicate that the presence of daily information boards does not directly contribute to patient satisfaction levels. Therefore, although Patient Daily Boards aid in understanding and communication, their influence is not directly reflected in patient satisfaction.

4. Communication → Patient Understanding

This relationship shows a very strong and significant effect, with an original sample value of 0.738 and a standardized path coefficient of 0.000. This means that communication quality is a major factor in improving patient understanding. The better the communication between healthcare professionals and patients, the greater the patient's understanding of the condition, procedure, and treatment plan.

5. Communication → Patient Satisfaction

The results show that communication does not have a significant effect on patient satisfaction, as evidenced by a standardized path coefficient of 0.614. Although the coefficient is positive (0.078), it is not strong enough to statistically influence patient satisfaction. This indicates that satisfaction factors may be more influenced by aspects other than communication, such as the quality of medical services, the physical environment, or emotional aspects.

6. Patient Daily Boards → Communication → Patient Understanding (Mediation)

The mediation results show that communication significantly mediates the effect of patient daily boards on patient understanding, with a t-statistic of 9.964 and a standardized path coefficient of 0.000. The mediation effect of 0.579 indicates that the majority of the information boards' influence on patient understanding occurs through improved communication. This means that patient daily boards help improve communication, and this good communication then improves patient understanding.

7. Patient Daily Boards → Communication → Patient Satisfaction (Mediation)

This mediation pathway shows no significant effect (standardized path coefficient 0.617). Although patient daily boards can improve communication, and communication has a positive effect, this mediation pathway is not strong enough to increase patient satisfaction. This confirms that patient satisfaction is not directly or indirectly influenced by patient daily boards through communication.

The results of the inner model are further presented in the following inner model visualization:

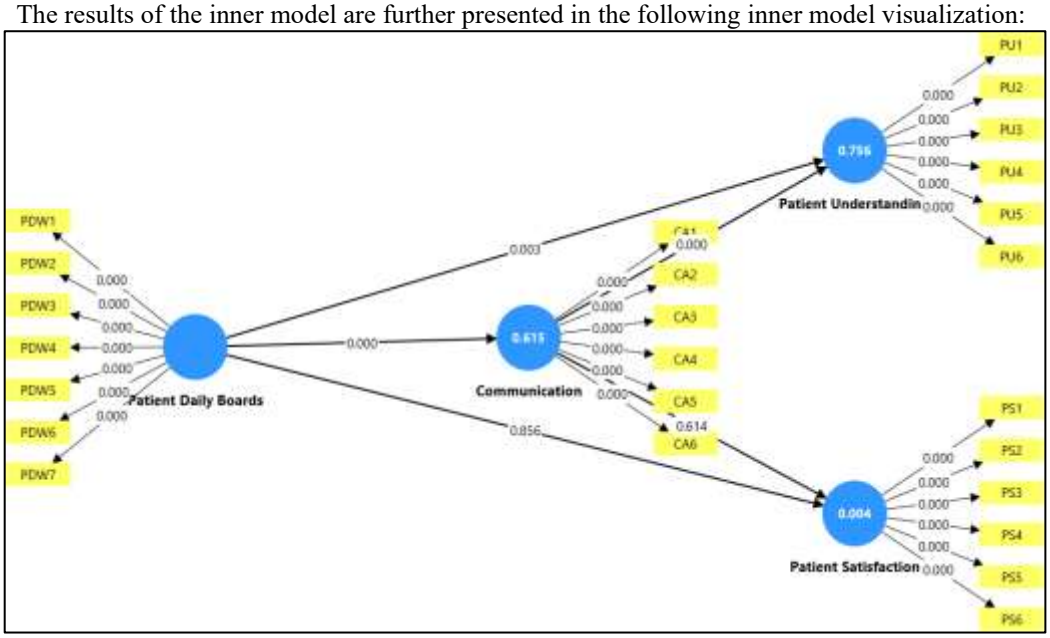

Figure 3. Inner Model

IPMA

Figure 4. IPMA Konstruk – Patient Satisfaction

The Importance–Performance Map Analysis (IPMA) results indicate that the Communication construct has a higher level of importance to Patient Satisfaction than Patient Daily Boards. This is evident from the total effects value of 0.078 for Communication, which, although small and insignificant in the hypothesis test, still reflects a greater relative contribution compared to the total effects of 0.034 for Patient Daily Boards. In other words, if an organization wants to improve Patient Satisfaction, improving communication aspects still has a more promising impact than increasing the use or quality of Patient Daily Boards.

In terms of performance, Communication also showed a higher performance score, at 76.768, indicating that current communication is functioning quite well according to respondents' perceptions. Patient Daily Boards performed lower at 71.882, indicating that although its contribution to satisfaction is not significant, this aspect has greater room for improvement. Overall, the IPMA analysis suggests that efforts to improve patient satisfaction should continue to prioritize strengthening communication, while also considering optimizing Patient Daily Boards as a supporting element whose performance can be improved.

DISCUSSION

The study results showed that Patient Daily Boards significantly impacted communication and patient understanding, but not directly on patient satisfaction. This finding aligns with the literature stating that daily information boards primarily serve as a tool to improve communication and enhance patient understanding of the care plan, rather than as a primary determinant of satisfaction (Dunbar & Fletcher, 2020; Gregg et al., 2025). Therefore, the core function of daily boards emphasizes information transparency and improving patient literacy during hospitalization.

The strong influence of patient daily boards on communication is strongly supported by previous research. Goyal et al. (2020) and Gómez Barriga et al. (2023) explain that bedside information boards can provide a two-way communication tool, making it easier for patients to identify medical personnel, the daily plan, and clinical instructions. This helps reduce confusion and expedite the process of clarifying information. Al-Nafea et al. (2022) even emphasized that patients' families benefit from these boards because they can understand the progress of their care more systematically. The consistency between the findings of this study and previous studies indicates that daily information boards play a significant role in strengthening communication during hospitalization.

Furthermore, the results indicate that communication has a very strong influence on patient understanding. This finding aligns with the conceptual understanding that effective communication is a key factor in shaping patient understanding regarding diagnoses, procedures, and treatment plans. Gregg et al. (2025) emphasized that clear and structured communication increases patients' sense of control over the care process. Furthermore, Dunbar and Fletcher (2020) stated that daily boards serve as a supporting tool that helps healthcare professionals convey information consistently, so that good communication can significantly strengthen patient understanding. The findings of this study emphasize that communication plays a crucial mediator between information tools and improved patient literacy.

Despite their influence on understanding, patient daily boards and communication were not shown to improve patient satisfaction. These results are consistent with several studies showing that patient satisfaction is significantly influenced by other aspects such as the quality of clinical care, waiting times, facility comfort, and interpersonal interactions that are emotional not just informational in nature (Marshall et al., 2023; Sidhu et al., 2024). Although Daily Boards help patients better understand their situation, this aspect is not sufficient to improve overall satisfaction. According to Singh et al. (2011), increased satisfaction through information boards usually occurs when the intervention is combined with improvements in the quality of interpersonal communication from healthcare professionals. In other words, information boards alone are not sufficient to boost satisfaction without a humanistic touch.

The lack of a significant effect on patient satisfaction indicates that satisfaction is a multidimensional construct that goes beyond informational aspects. Studies in various contexts have shown that satisfaction is strongly influenced by the quality of emotional interactions,

empathy, environmental comfort, and perceived clinical quality (Marshall et al., 2023; Sidhu et al., 2024). Interestingly, a study in Saudi Arabia by Al-Nafea et al. (2022) reported a stronger relationship between Daily Board use and patient and family satisfaction. This difference suggests the influence of cultural context and the healthcare system, where family roles, patient expectations, and healthcare professionals' communication styles can moderate the impact of information boards on satisfaction. Compared to that context, in Indonesia, the Daily Board seems to function more as an educational and clarifying tool than as a source of emotional satisfaction.

The IPMA analysis provided deeper insights. The IPMA results showed that Communication was more important than Patient Daily Boards in influencing Patient Satisfaction, although the effect was not significant in the structural test. This finding indicates that communication remains a crucial aspect of the healthcare journey. However, the high performance of Communication indicates that the hospital has implemented this aspect quite well. On the other hand, Patient Daily Boards performed lower, leaving room for improvement, although their impact on satisfaction was relatively small. Therefore, in practice, Daily Boards can be optimized as part of a communication strategy, but improving satisfaction requires a more comprehensive approach encompassing empathy, emotional experiences, and the quality of patient-patient interactions.

From a managerial perspective, these findings imply that hospitals should not rely on Patient Daily Boards as the sole solution to improving patient satisfaction. Instead, daily boards need to be integrated into a broader communication strategy, including empathetic communication training for healthcare professionals and standardizing the use of boards as part of the bedside communication routine. Hospital policy should emphasize that daily boards are an effective support tool for increasing patient understanding and engagement, while improving satisfaction requires investment in the quality of interpersonal interactions and the patient's emotional experience.

Overall, the findings of this study support previous literature confirming that Daily Boards are a highly effective tool for improving patient communication and understanding (Goyal et al., 2020; Dunbar & Fletcher, 2020; Gregg et al., 2025). However, the effect on patient satisfaction remains dependent on broader factors within healthcare. Thus, information boards serve as an important supporting component, but not the primary determinant of patient satisfaction experiences.

CONCLUSION

This study confirms that Patient Daily Boards function effectively as a communication support tool and enhance patient understanding during hospitalization. Through more structured and transparent communication, patients are better able to understand their clinical condition and treatment plan. However, the findings also indicate that this increased communication and understanding is not sufficient to directly boost patient satisfaction, indicating that satisfaction is a more complex construct influenced by other service dimensions beyond informational aspects.

Hospitals are advised to implement standardized update protocols for Patient Daily Boards, including clarity on who is responsible for updating and the frequency of information submission. Furthermore, Daily Boards need to be integrated with digital communication dashboards to maintain information consistency and support interprofessional coordination. Empathetic communication training for healthcare workers remains crucial to ensure that information conveyed through the boards is supported by quality interpersonal interactions.

This study is limited by the use of perceptual data, a single institutional context, and an incomplete set of satisfaction variables. Future research is recommended to adopt mixed methods, include emotional variables and clinical service quality, and expand the institutional context to increase the generalizability of the findings.

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