

Research Article

# Relationship Between Online Reservation Quality Through the Mangusada Mobile Application and Outpatient Satisfaction at Mangusada Regional Hospital, Badung Regency

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## KEYWORDS

Patient satisfaction, online reservation, EUCS, outpatient services, hospital information systems.



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## ABSTRACT

**Introduction:** The online reservation system implemented through the Mangusada Mobile application aims to enhance efficiency and improve patient satisfaction in outpatient care; however, system quality and user-related challenges may influence patient experience. This study examined system quality using the End User Computing Satisfaction (EUCS) model, levels of outpatient satisfaction, user constraints, and the relationship between system quality and outpatient satisfaction.

**Materials and Methods:** A quantitative correlational survey was conducted among users of the Mangusada Mobile application.

**Results and Discussion:** Findings showed that all EUCS dimensions scored above 80% and were categorized as “very satisfactory,” with the highest score in content (86.02%) and the lowest in timeliness (80.25%). Most patients reported high satisfaction with outpatient services, particularly in tangibles, reliability, responsiveness, empathy, and assurance. The most frequent constraints were internet connectivity issues (48.27%), user-related difficulties (30.94%), and technical problems (20.79%), which affected perceptions of timeliness. A significant association was found between online reservation quality and outpatient satisfaction ( $p < 0.001$ ), with patients who perceived good system quality being 7.277 times more likely to be satisfied.

**Conclusion:** These findings highlight that online reservation system quality is a critical determinant of outpatient satisfaction.

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## INTRODUCTION

Patient satisfaction is an important indicator in assessing the quality of health services in hospitals because it reflects the extent to which the services provided are able to meet user expectations. Quality service tends to produce high levels of satisfaction, while less than optimal service can cause dissatisfaction and reduce public trust in health facilities.<sup>1</sup> In Indonesia, various studies show that the level of patient satisfaction in several hospitals has not yet reached the standards set by the Ministry of Health of the Republic of Indonesia. The patient satisfaction standard set by the Ministry of Health RI is more than 90%, but achievements in the field are still below that figure, thus emphasizing the need for continuous quality improvement efforts.<sup>2</sup> Developments in information technology encourage hospitals to adopt digital innovations to increase service efficiency and accessibility, especially in outpatient services. One innovation that is widely implemented is an online reservation and registration system that allows patients to register without having to come directly to the hospital. This system is expected to reduce waiting times, improve service flow, and enhance the patient experience. However, the implementation of online reservations does not automatically increase patient satisfaction if the quality of the system used is not yet able to meet the needs and expectations of users.<sup>3</sup> In addition, negative user experiences have the potential to affect the hospital's image, especially in the digital era when online reviews are a main reference for the community in choosing a health facility.<sup>4</sup> The problem of waiting time is still a major challenge in outpatient services, especially at the registration stage, which is often characterized by long queues and complex procedures. As an effort to increase the efficiency of public services, Mangusada Regional General Hospital (RSD

Mangusada) developed an online registration system as part of the e-Government implementation. This system allows patients to register and reserve doctor quotas virtually through the Mangusada Mobile application, so that patients can estimate service time and reduce waiting time at the hospital.<sup>5</sup> Nonetheless, the implementation of this system still faces constraints, such as network connection disruptions, integration obstacles with the BPJS Health system, and limited digital literacy in certain patient groups, particularly elderly patients.<sup>4</sup> To ensure that technological innovation truly provides added value, an evaluation of end-user satisfaction is required. The End User Computing Satisfaction (EUCS) method is an approach widely used to assess user satisfaction with information systems based on five main dimensions: content, accuracy, format, ease of use, and timeliness. By linking the EUCS dimensions with the dimensions of health service quality, this study aims to provide an objective overview of the effectiveness of implementing the online reservation system through the Mangusada Mobile application in supporting sustainable outpatient satisfaction.<sup>6,7</sup>

## MATERIALS & METHODS

This study used a correlational analytical design with a quantitative approach to analyze the relationship between the quality of the online reservation system and outpatient satisfaction at RSD Mangusada, Badung Regency. A survey method was applied through a structured questionnaire to patients using the online registration system. The research was carried out at the Outpatient Installation of RSD Mangusada from October to December 2025. The number of samples was determined using the Krejcie–Morgan formula, obtaining 365 respondents, and was increased by 10% to anticipate invalid data, resulting in a total sample of 402 respondents.

The quality of the online reservation system was measured using the End User Computing Satisfaction (EUCS) method, which includes dimensions of content, accuracy, format, ease of use, and timeliness. Patient satisfaction was measured using the SERVQUAL dimensions, including tangibles, reliability, responsiveness, assurance, and empathy. All questionnaire items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Scores for each dimension were obtained by summing the responses to the corresponding items, and the total score was calculated by summing all questionnaire items. Satisfaction for each dimension was further expressed as a satisfaction index calculated using the formula (obtained score/maximum possible score)  $\times$  100%. The satisfaction index was interpreted as very satisfied (81–100%), satisfied (61–80%), moderately satisfied (41–60%), and dissatisfied (21–40%). For the bivariate analysis, the total scores were categorized using the median as the cut-off point. Online reservation quality was classified as poor ( $<56$ ) or good ( $\geq 56$ ), while patient satisfaction was classified as dissatisfied ( $<60$ ) or satisfied ( $\geq 60$ ). Univariate and bivariate analyses were performed using SPSS version 28, with statistical significance set at  $p < 0.05$  ( $\alpha = 0.05$ ). Ethical approval for this study was obtained from the Health Research Ethics Committee of the Faculty of Medicine, Udayana University (No. 2849/UN14.2.2.VII.14/LT/2025). Participation was voluntary, and the confidentiality of respondents' information was maintained throughout the study

## RESULTS AND DISCUSSION

This study involved 404 respondents, exceeding the minimum sample size of patients who had

visited the Outpatient Department of RSD Mangusada and were users of Mangusada Mobile.

Table 1. Respondent characteristics

| Respondent characteristics                               | n (%)      |
|----------------------------------------------------------|------------|
| Gender                                                   |            |
| Male                                                     | 160 (39.6) |
| Female                                                   | 244 (60.4) |
| Age                                                      |            |
| Late adolescence (17–25 years)                           | 25 (6.2)   |
| Early adulthood (26–35 years)                            | 205 (50.7) |
| Late adulthood (36–45 years)                             | 78 (19.3)  |
| Early elderly (46–55 years)                              | 79 (19.6)  |
| Late elderly (56–65 years)                               | 15 (3.7)   |
| Elderly ( $>65$ years)                                   | 2 (0.5)    |
| Education                                                |            |
| Low (elementary school/junior high school or equivalent) | 6 (1.5)    |
| Moderate (senior high school or equivalent)              | 46 (11.4)  |
| High (bachelor's and postgraduate)                       | 352 (87.1) |
| Employment status                                        |            |
| Unemployed                                               | 27 (6.7)   |
| Employed                                                 | 377 (93.3) |
| Place of residence                                       |            |
| Badung Regency                                           | 300 (74.3) |
| Bangli Regency                                           | 1 (0.2)    |
| Denpasar City                                            | 44 (10.9)  |
| Gianyar Regency                                          | 21 (5.2)   |
| Klungkung Regency                                        | 2 (0.5)    |
| Tabanan Regency                                          | 36 (8.9)   |
| Clinic visited                                           |            |
| Non-surgical clinic                                      | 291 (72.0) |
| Surgical clinic                                          | 113 (28.0) |
| Income                                                   |            |
| $\leq$ IDR 3,534,338                                     | 114 (28.2) |
| $>$ IDR 3,534,338                                        | 290 (71.8) |

Based on Table 1, the dominant characteristics of the research respondents showed that the users of online reservation services at RSD Mangusada were mostly female, as many as 244 people (60.4%), with the largest age group being early adults, namely 26–35 years old, with 205 people (50.7%). The majority of respondents had higher education, namely 352 people (87.1%), and most were employed, namely 377 people (93.3%). In terms of residence, the most respondents came from Badung Regency, namely 300 people (74.3%), with the majority having an income above IDR 3,534,338, as many as 290 people (71.8%). Additionally, the most polyclinic visits occurred at the

non-surgical polyclinic, namely 291 people (71.0%). The dominance of female respondents reflects the pattern of health service utilization, where women tend to be more active in searching for information and using digital services.<sup>8,9</sup> Higher education levels contribute to the ability to understand information and navigate the application independently, consistent with the study by Ouajdouni et al. (2024), which shows the influence of digital literacy on perceived ease of use. Socio-economic status of middle-to-upper class supports access to digital devices and internet networks, thus enabling optimal use of online reservations.<sup>10,11,12</sup>

Based on the analysis using the EUCS method, the quality of RSD Mangusada's online reservation service was rated as very satisfied across all dimensions, with satisfaction indices ranging from 80.25% to 86.02%. This value meets RSD Mangusada's internal standards regarding patient satisfaction. These results are presented more clearly in Table 2.

Table 2. User satisfaction with online reservation quality based on the EUCS method

| Dimension   | Total score (%) | Category       |
|-------------|-----------------|----------------|
| Content     | 5,213 (86.02)   | Very satisfied |
| Accuracy    | 5,104 (84.22)   | Very satisfied |
| Format      | 5,039 (83.15)   | Very satisfied |
| Ease of use | 5,059 (83.48)   | Very satisfied |
| Timeliness  | 3,242 (80.25)   | Very satisfied |

User satisfaction with Online Reservation Quality Based on the EUCS Method. The highest respondent agreement level was dominated by the Format dimension, especially regarding the clear and non-confusing application display (total 91.83%), application color combinations (91.09%), and clarity of reservation information (96.29%). This means patients show high appreciation for visual design and interface aspects.<sup>13,14,15</sup> Nevertheless, a small number of respondents still provided negative answers, particularly in the

Timeliness dimension regarding changes in doctor schedules (total 2.23%), as well as minor indicators in Accuracy, Content, and Ease of Use (≤1.5%), indicating the need for attention to information accuracy and application navigation.<sup>16,17,18</sup> Overall, RSD Mangusada's online reservation service has met internal satisfaction standards and is consistent with previous research findings regarding the use of digital health systems to increase patient satisfaction.<sup>10,19,20,21</sup>

Patient satisfaction at RSD Mangusada based on service quality dimensions, namely tangibles, reliability, responsiveness, empathy, and assurance, showed index values of 80.25% - 86.02%. This value has met the internal standards for patient satisfaction at RSD Mangusada. The full distribution of patient satisfaction is in Table 3.

Table 3. Outpatient satisfaction scores

| Dimension      | Total score (%) | Category       |
|----------------|-----------------|----------------|
| Tangible       | 5,071 (83.68)   | Very satisfied |
| Reliability    | 5,005 (82.57)   | Very satisfied |
| Responsiveness | 5,087 (83.94)   | Very satisfied |
| Empathy        | 4,992 (82.38)   | Very satisfied |
| Assurance      | 5,006 (82.61)   | Very satisfied |

User Satisfaction with Outpatient Services at RSD Mangusada. Based on Table 3, the highest respondent agreement was found in the Reliability and Responsiveness dimensions. In the Reliability dimension, the indicator for correct recording of identity data and reservations reached 62.13% agree and 34.16% strongly agree (total 96.29%). Meanwhile, in the Responsiveness dimension, the indicator for fast reservation processing obtained 63.37% agree and 32.43% strongly agree (total 95.80%), and acceleration of the check-in process by 68.32% agree and 27.23% strongly agree (total 95.55%). However, a small number of respondents gave negative answers. The highest dissatisfaction value was in the Reliability dimension regarding the suitability of the service schedule with the actual

time at 1.98% (0.25% strongly disagree and 1.73% disagree), and in the Responsiveness dimension regarding staff response when constraints occurred at 1.49% disagree. Other indicators recorded negative figures below 1%, so overall the level of dissatisfaction was very low. These findings are consistent with previous studies showing that service reliability and staff responsiveness contribute significantly to outpatient satisfaction.<sup>1,20,22,23</sup>

The distribution of constraints experienced by users includes network, user, and technical application issues as displayed in Table 4.

Table 4. Distribution of online reservation constraints experienced by respondents.

| Type of constraint    | f (%)       |
|-----------------------|-------------|
| Network constraints   | 195 (48.27) |
| User constraints      | 125 (30.94) |
| Technical constraints | 84 (20.79)  |

The distribution showed that network constraints dominated at 48.27%, followed by user constraints at 30.94% and application technical constraints at 20.79%. High network constraints are in line with dissatisfaction findings in the Timeliness dimension, where 2.23% of patients stated that information on doctor schedule changes was not delivered on time. Additionally, several respondents gave negative answers in the Reliability dimension regarding schedule suitability (1.98%)

and in the Responsiveness dimension regarding staff response when constraints occurred (1.49%). These findings indicated that network, user, and technical constraints not only affect patient perceptions of service speed and accuracy but also impact the overall experience in using the online reservation system. This indicates the need for attention to information accuracy, service quality, and application navigation.<sup>16,17,18</sup> Improvement efforts in schedule coordination, staff response, application stability, and digital literacy education are expected to increase user experience consistency and patient satisfaction.<sup>17,24</sup>

The majority of respondents rated the online reservation quality as good (71.8%), and most patients stated they were satisfied with outpatient services at RSD Mangusada (60.1%). These findings show that the majority of patients evaluate the online reservation experience and outpatient services positively. Chi-square test results showed a significant relationship between online reservation quality and patient satisfaction ( $p = 0.001$ ), while the Odds Ratio of 7.277 (95% CI: 4.470–11.848) indicates that patients who rate online reservation as good have a more than sevenfold chance of feeling satisfied compared to patients who rate the reservation as less than good. These results are presented in Table 5.

Table 5. Association between online reservation quality and patient satisfaction

| Online reservation quality | Less satisfied, n (%) | Satisfied, n (%) | Total, n (%) | OR (95% CI)          | p-value |
|----------------------------|-----------------------|------------------|--------------|----------------------|---------|
| Less good                  | 83 (72.8)             | 31 (27.2)        | 114 (100)    | 7.277 (4.470–11.848) | 0.001   |
| Good                       | 78 (26.9)             | 212 (73.1)       | 290 (100)    | Reference            | —       |

Note: OR = odds ratio; CI = confidence interval. The "Good" category was used as the reference category.

Quality Distribution of Mangusada Mobile for Online Reservation. Patients who are satisfied with digital reservation services are more likely to feel satisfied with the care services visited.<sup>25,26</sup> These findings confirm that the quality of the online

reservation system is a major determinant in patient experience and service quality improvement.<sup>13,15,17</sup> The findings of this study indicate that although the majority of patients are satisfied, special attention must still be given to aspects of

schedule suitability, staff response, and information delivery. Appropriate appointment scheduling and reduced waiting times are essential to improve patient's experiences with online reservation systems.<sup>27</sup> Likewise, prompt staff responses and effective communication contribute to greater patient confidence and satisfaction.<sup>28</sup> In addition, clear, accurate, and timely information enables patients to navigate the online reservation system more efficiently and strengthens their trust in the service.<sup>16,29</sup>

Patient satisfaction is a multidimensional construct influenced by several factors, including the accuracy and timeliness of information, ease of accessing health services, waiting time, staff communication skills, responsiveness to patient needs, and the extent to which healthcare services meet patients' expectations.<sup>30,31</sup> These factors are consistent with the SERVQUAL dimensions, particularly reliability, responsiveness, assurance, empathy, and tangibles, which collectively reflect patients' perceptions of service quality.<sup>32</sup> In the context of online appointment systems, satisfaction is also influenced by system usability, reliability, accessibility, and users' confidence in the accuracy of the information displayed.<sup>30,31</sup> When these aspects perform well, patients are more likely to perceive the service as efficient, convenient, and trustworthy.<sup>27, 29</sup>

## CONCLUSION

The majority of patients who rated the quality of online reservation as good also stated they were satisfied with outpatient services, with 73.1% of respondents stating they were satisfied. There is a significant relationship between the quality of online reservation and patient satisfaction ( $p = 0.001$ ). Patients who rated the system quality as good were approximately seven times more likely

to be satisfied than those who rated it as less good ( $OR = 7.277$ ). The main constraints to using online reservation are the internet network (48.27%), user constraints (30.94%), and technical constraints (20.79%). These constraints are related to technological infrastructure factors, information quality, user digital literacy, and service operational readiness, which affect the accuracy of schedule information, ease of use of the application, and the patient's service experience.

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