

Patient Experience After Cardiac Surgery: Association with Fast-Track Recovery Indicators

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ABSTRACT

Background

Contemporary approaches to healthcare quality assessment emphasize not only traditional clinical outcomes but also patient experience, which reflects patients' perceptions of the treatment process and their interactions with healthcare professionals. Despite growing interest in the use of Patient-Reported Experience Measures (PREMs) in cardiac surgery, evidence regarding the relationship between patient experience and accelerated postoperative recovery indicators remains limited.

Objective

To assess patient experience following cardiac surgery using a study-specific Patient-Reported Experience Measure (PREM) questionnaire and to determine its association with Fast-Track Recovery Indicators.

Materials and Methods

A single-center prospective observational study was conducted and included 93 patients who underwent elective cardiac surgery. Patient experience was assessed using a study-specific Patient-Reported Experience Measure (PREM) questionnaire comprising 21 items grouped into eight thematic domains.

Results

Patients generally reported positive experiences across various aspects of care following cardiac surgery. The highest proportions of positive responses were observed in the domains of discharge preparation (48.7%), early mobilization and recovery (48.7%), and overall evaluation of care (47.6%). Higher total PREM scores were associated with shorter extubation time ($r = -0.261$; $p = 0.012$) and a greater likelihood of achieving successful Fast-Track Recovery ($r = 0.324$; $p = 0.002$).

Conclusion

The findings of this study support the potential value of PREM instruments as an additional component of comprehensive healthcare quality assessment and highlight the need for further multicenter studies using validated patient experience measurement tools in cardiac surgery.

Keywords

Patient-Reported Experience Measures (PREM); cardiac surgery; Fast-Track Recovery; healthcare quality; patient-centered care.

INTRODUCTION

Cardiovascular diseases remain the leading cause of mortality and disability worldwide, and cardiac surgery is one of the most effective treatment options for patients with severe cardiovascular disease^{1,2}. Despite substantial advances in surgical techniques, anesthetic management, and postoperative care, the assessment of quality in cardiac surgery is increasingly extending beyond traditional clinical outcomes to include patients' perceptions of the healthcare they receive³.

In recent years, considerable attention has been directed toward strategies aimed at accelerating postoperative recovery following cardiac surgery. Contemporary perioperative care pathways include multimodal analgesia, early extubation, early mobilization, nutritional optimization, and reductions in both intensive care unit and hospital length of stay. The implementation of these measures has been associated with improved clinical outcomes, reduced postoperative complications, and more efficient use of healthcare resources. However, the effectiveness of modern approaches to cardiac surgical care is determined not only by clinical outcomes but also by patients' perceptions of the

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treatment and recovery process^{4,6}.

The contemporary concept of patient-centered healthcare emphasizes the importance of incorporating patients' experiences and perspectives as key indicators of healthcare quality. Previous studies have shown that positive patient experiences are associated with better treatment adherence, greater engagement in the recovery process, increased trust in healthcare professionals, and a higher likelihood of recommending healthcare services to others^{7,8}.

Despite the widespread implementation of Fast-Track Recovery strategies in cardiac surgery, most studies evaluating their effectiveness have focused on clinical and organizational outcomes, including duration of mechanical ventilation, length of stay in the intensive care unit, hospital length of stay, and the incidence of postoperative complications. At the same time, patient experience, as an important component of healthcare quality assessment, remains insufficiently studied. Despite growing interest in the use of Patient-Reported Experience Measures (PREMs), the number of studies evaluating patient experience following cardiac surgery and its association with accelerated postoperative recovery indicators remains limited. This highlights a persistent gap in patient-centered assessments of the effectiveness of contemporary perioperative care pathways in cardiac surgery^{9,10}.

Furthermore, there is a lack of standardized instruments specifically adapted to the context of cardiac surgical care and capable of capturing key aspects of accelerated recovery pathways¹². This issue is particularly relevant in Kazakhstan, where patient-centered healthcare principles are being actively implemented and objective assessment of the quality of specialized cardiac surgical care is increasingly needed.

Therefore, the evaluation of patient experience following cardiac surgery represents an important scientific and practical area of research that may contribute to the advancement of patient-centered healthcare, improvement of healthcare quality, and optimization of outcomes among cardiac surgical patients.

Objective. To assess patient experience following cardiac surgery using a study-specific Patient-Reported Experience Measure (PREM) questionnaire and to determine its association with Fast-Track Recovery Indicators.

MATERIALS AND METHODS

Study Design

A single-center prospective observational study was conducted involving patients who underwent elective cardiac surgical procedures between 2024 and 2025. The study aimed to assess patient experience using a study-specific Patient-Reported Experience Measure (PREM) questionnaire and to investigate the association between patient experience measures and Fast-Track Recovery Indicators.

Study Setting and Population

The study was conducted at the «Scientific and Clinical Center for Cardiac Surgery and Transplantation LLP» (Taraz, Kazakhstan) and included patients who underwent elective cardiac surgical procedures.

Inclusion Criteria

- Age ≥ 18 years;
- Undergoing elective cardiac surgery, including coronary artery bypass grafting (CABG) and heart valve surgery;
- Clinical stability at the time of questionnaire administration;
- Provision of written informed consent for participation in the study.

Exclusion Criteria

- Emergency cardiac surgical procedures;
- Severe cognitive impairment;
- Psychiatric disorders interfering with questionnaire completion;
- Refusal to participate in the study;
- More than 20% missing responses in the questionnaire.

Assessment of Patient Experience (PREM)

Patient experience was assessed using a study-specific Patient-Reported Experience Measure (PREM) questionnaire consisting of 21 items (Q1–Q21). The questionnaire was developed based on key domains of the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey and adapted for patients undergoing cardiac surgery. Additional items were included to evaluate emotional support provided to patients during hospitalization.

The questionnaire covered the following domains:

- Physician communication;
- Nurse communication;
- Pain management;
- Patient information and education;
- Early mobilization and recovery;
- Discharge preparation;
- Emotional support;
- Overall evaluation of care.

Each item was rated on a five-point Likert scale, where 1 indicated strong disagreement and 5 indicated strong agreement with the statement. A total PREM score was calculated by summing responses to all items, yielding a possible range from 21 to 105 points. Higher scores reflected a more positive patient experience during hospitalization.

Prior to study initiation, the questionnaire content was reviewed by an expert panel comprising specialists in cardiac surgery, anesthesiology, nursing, and public health to assess the relevance, clarity, and comprehensibility of the items. The questionnaire was used exclusively for research purposes and did not undergo formal psychometric validation.

Data Collection

All participants were informed about the aims and objectives of the study and provided written informed consent prior to enrollment. Data were collected through anonymous questionnaires administered to patients following cardiac surgery during hospitalization before discharge. No personal identifiers were recorded, ensuring the confidentiality of the collected information and preventing identification of individual respondents. The data were used exclusively for research purposes and analyzed in an aggregated form. Access to the data was restricted to members of the research team involved in study conduct and data analysis. Clinical and demographic information was obtained from medical records.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics version 27.0. Continuous variables are presented as mean $\pm$ standard deviation ($M \pm SD$), while categorical variables are presented as frequencies and percentages ($n, \%$). The normality of continuous

variables was assessed using the Shapiro–Wilk test. Spearman’s rank correlation analysis was used to evaluate the association between the total PREM score and Fast-Track Recovery indicators, including extubation time, length of stay in the intensive care unit, hospital length of stay, and successful Fast-Track Recovery. Statistical significance was defined as $p < 0.05$.

Ethical Considerations

The study was conducted in accordance with the principles of the Declaration of Helsinki and the principles of Good Clinical Practice (GCP). The study protocol was approved by the local institutional ethics committee. All participants provided written informed consent for participation in the study and for the processing of their personal data prior to enrollment.

RESULTS

A total of 93 patients who underwent elective cardiac surgical procedures were included in the study. The mean age of the participants was 57.0 ± 9.3 years, and 63.4% were male. Detailed characteristics of the study population, including demographic variables, comorbidities, type of surgical procedure, operative risk, and heart failure functional class, are presented in Table 1.

Table 1. Clinical and demographic characteristics of patients ($n = 93$)

Variables	n (%) / Mean $\pm$ SD
Age, years	57.0 $\pm$ 9.3
Body mass index, kg/m ²	28.5 $\pm$ 5.6
Sex:	
Male	59 (63.4%)
Female	34 (36.6%)
Comorbidities:	
Arterial hypertension	61 (65.6%)
Diabetes mellitus	20 (21.5%)
Dyslipidemia	73 (78.5%)
Smoker	18 (19.4%)
Type of surgery:	
Coronary artery bypass grafting (CABG)	52 (55.9%)
Valve surgery	41 (44.1%)

Variables	n (%) / Mean $\pm$ SD
<i>EuroSCORE II risk category</i>	
Low risk	68 (73.1%)
Intermediate risk	21 (22.6%)
High risk	4 (4.3%)
<i>Heart failure functional class (NYHA):</i>	
Class II	3 (3.2%)
Class III	78 (83.9%)
Class IV	12 (12.9%)

Note. Data are presented as mean $\pm$ standard deviation (SD) or n (%). BMI, body mass index; CABG, coronary artery bypass grafting; EuroSCORE II, European System for Cardiac Operative Risk Evaluation II; NYHA, New York Heart Association functional class.

Figure 1 presents the distribution of patient responses related to communication with physicians and nurses. Overall, patients reported predominantly positive experiences regarding interactions with healthcare professionals. The proportion of positive responses (“Agree” and “Strongly Agree”) was 43.0% for the clarity of explanations regarding the purpose and course of surgery (Q1), 46.2% for information provided about treatment risks and expected outcomes (Q2), and 50.5% for the quality of physicians’ responses to patient questions (Q3). Positive evaluations of communication with nurses reached 45.2% for responsiveness to patient requests (Q4) and 47.3% for explanations of procedures and nursing care (Q5). However, the proportion of neutral responses remained relatively high, ranging from 31.2% to 38.7%, suggesting potential opportunities for further improvement in communication between patients and healthcare professionals.

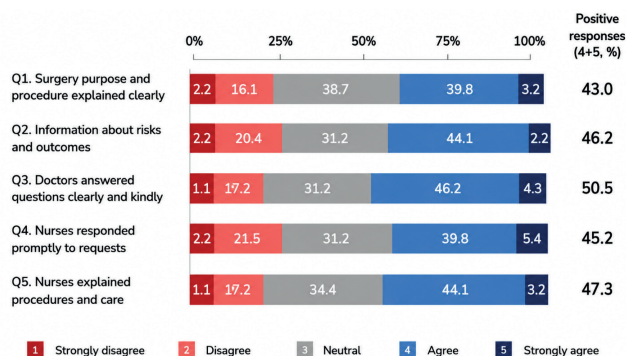


Figure 1. Distribution of responses related to communication with healthcare professionals.

Figure 2 presents the distribution of patient responses related to pain management and early postoperative recovery. Within this domain, the proportion of positive responses (“Agree” and “Strongly Agree”) ranged from 43.0% to 50.5%. Effective postoperative pain control was positively evaluated by 43.0% of patients (Q6), whereas 48.4% reported that healthcare professionals responded promptly to complaints related to pain and discomfort (Q7). Items related to early mobilization received some of the highest ratings: 50.5% of patients indicated that the importance of early postoperative mobilization had been explained to them (Q8), and 49.5% reported receiving adequate assistance during their initial attempts to stand and walk after surgery (Q9). Additionally, 46.2% of participants stated that healthcare professionals encouraged them to take an active role in the recovery process (Q10). The proportion of neutral responses ranged from 31.2% to 38.7%, suggesting variability in patients’ perceptions of specific aspects of postoperative care and recovery support.

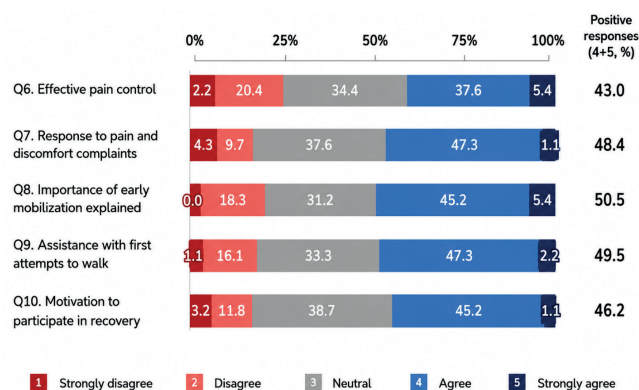


Figure 2. Distribution of patient responses in the domains of pain management and early postoperative recovery.

Indicators related to patient information and discharge preparation were also rated positively. Positive responses were reported by 46.2% of patients regarding explanations of postoperative recovery stages (Q11), by 47.3% regarding involvement in treatment decision-making (Q12), and by 47.3% concerning the provision of clear discharge recommendations (Q13). The highest proportion of positive responses was observed for information regarding warning signs of potential complications requiring medical attention (Q14),

where 57.0% of patients provided positive ratings. However, only 41.9% of patients reported feeling prepared for recovery at home (Q15), while this item also demonstrated the highest proportion of neutral responses (44.1%) (Figure 3).

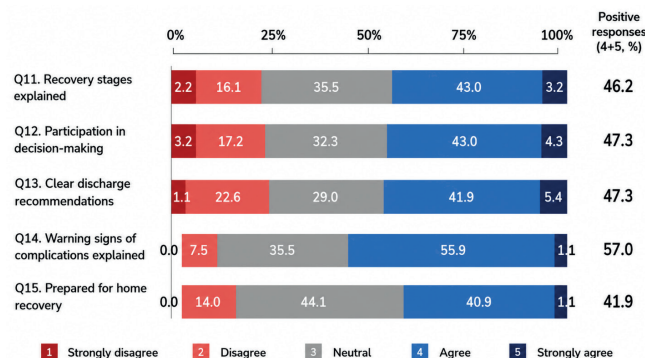


Figure 3. Distribution of responses related to patient information and discharge readiness.

Within the domains of emotional support and overall evaluation of care, positive response rates ranged from 39.8% to 50.5%. Positive evaluations of healthcare professionals' attention to emotional well-being were reported by 46.2% of patients (Q16), while 46.2% also indicated feeling supported by healthcare staff during hospitalization (Q17). Overall satisfaction with the quality of care was reported by 39.8% of respondents (Q18), representing the lowest positive response rate within this domain. Conversely, 50.5% of patients indicated that the organization of treatment and care met their expectations (Q19), and an equal proportion reported willingness to return to the cardiac surgery center if future care were needed (Q20). Furthermore, 49.5% stated that they would recommend the center to relatives and friends (Q21), reflecting generally positive perceptions of the care provided (Figure 4).

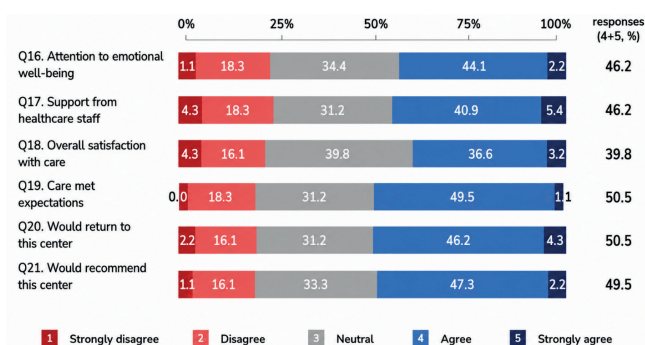


Figure 4. Distribution of responses related to emotional support and overall evaluation of care.

Overall, response patterns indicated predominantly moderately positive evaluations across all assessed domains. The proportion of positive responses ranged from 39.8% to 57.0% across individual items. The highest positive response rate was observed for information regarding warning signs of postoperative complications (57.0%), whereas items related to physician communication, early mobilization, and organization of care demonstrated positive response rates of approximately 50%.

Table 4. Spearman correlations between total PREM score and Fast-Track Recovery indicators among patients undergoing cardiac surgery.

Variable	r (Spearman)	p
Extubation time	-0.261	0.012*
ICU length of stay	-0.201	0.053
Hospital length of stay	-0.203	0.051
Successful Fast-Track Recovery	0.324	0.002*

Note. ICU = intensive care unit. *r* denotes Spearman's rank correlation coefficient. Statistically significant correlations are marked with an asterisk ($p < 0.05$).

Correlation analysis revealed statistically significant associations between the total PREM score and selected Fast-Track Recovery indicators. Higher PREM scores were associated with shorter extubation time ($r = -0.261$; $p = 0.012$), indicating more rapid postoperative recovery. A significant positive correlation was also observed between the total PREM score and successful achievement of Fast-Track Recovery criteria ($r = 0.324$; $p = 0.002$). Correlations between PREM scores and intensive care unit length of stay ($r = -0.201$; $p = 0.053$), as well as hospital length of stay ($r = -0.203$; $p = 0.051$), did not reach statistical significance; however, both demonstrated a trend toward an inverse association.

DISCUSSION

The present study demonstrated that higher levels of patient experience following cardiac surgery were associated with selected favorable indicators of accelerated postoperative recovery. Specifically, patients with higher total PREM scores exhibited shorter extubation times and a greater likelihood of

successfully achieving Fast-Track Recovery criteria.

These findings suggest that the quality of interactions between patients and healthcare professionals, as well as the level of patient information and engagement, may influence the course of the early postoperative period. Effective communication facilitates a better understanding of treatment goals, improves adherence to medical recommendations, and reduces anxiety. In the context of cardiac surgery, these factors may promote more active participation in the recovery process and contribute to the achievement of targeted Fast-Track Recovery outcomes.

Particular attention should be given to the findings obtained in the domains of physician and nurse communication, which received some of the highest ratings among all questionnaire components. Similar findings were reported by Kemp et al., who demonstrated that communication quality, timely provision of information, coordination of care, and patient involvement in the treatment process are key determinants of positive patient experience following cardiac surgery¹³. Notably, these aspects were identified by patients themselves as the most important characteristics of high-quality cardiac surgical care. The findings of the present study are consistent with previous research and further emphasize the important role of effective communication between patients and healthcare professionals as a central component of patient-centered healthcare delivery¹⁴.

Relatively high ratings were also observed in the domain of discharge preparation. Most patients reported receiving clear recommendations regarding further treatment and recovery, as well as information about potential postoperative complications. This finding is particularly important, as a substantial portion of the recovery process following cardiac surgery occurs after hospital discharge. In a study by Mani et al., patients' expectations regarding the postoperative period and their level of understanding were found to be closely associated with perceived quality of care and treatment satisfaction¹⁵. Although the authors did not directly evaluate Fast-Track Recovery outcomes, their findings support the importance of providing patients with clear and comprehensive information throughout the continuum of care.

According to Pompili et al., patient experience measures represent an important component of the value-based healthcare framework and enable the assessment of

aspects of care that are not captured by traditional clinical outcomes. The authors emphasize that PREMs serve as effective tools for obtaining patient feedback, identifying areas for quality improvement, and promoting patient-centered care. Furthermore, previous studies have demonstrated positive associations between patient experience measures and both the clinical effectiveness and safety of healthcare delivery¹⁶. The findings of the present study are consistent with this concept and further support the value of PREMs as complementary instruments for the comprehensive assessment of quality in cardiac surgical care.

The present findings are also consistent with the conclusions of the systematic review by Darwish et al., which identified communication quality, patient information, care coordination, and postoperative support as key components of positive patient experience¹⁷. The authors emphasized that most existing PREM instruments are generic in nature and may not adequately capture the specific characteristics of individual clinical specialties. Consequently, the development of specialized instruments tailored to specific patient populations has been recognized as a promising direction in the advancement of patient-centered healthcare¹⁸. The findings of the present study suggest the potential value of a cardiac surgery-specific PREM questionnaire for assessing patient experience and exploring its relationship with postoperative recovery outcomes.

Available evidence regarding the association between patient experience measures and Fast-Track Recovery indicators following cardiac surgery remains limited. Therefore, the present findings contribute to the existing literature by providing additional insights into the role of patient experience in the comprehensive evaluation of quality of care in cardiac surgery.

No statistically significant associations were observed between total PREM scores and either intensive care unit length of stay or overall hospital length of stay. These outcomes are likely influenced to a greater extent by factors such as baseline patient condition, surgical complexity, comorbidities, and postoperative complications. Nevertheless, the direction of the observed correlations was consistent with that of other recovery indicators, suggesting a potential relationship that warrants further investigation in studies with larger sample sizes.

This study has several limitations. First, it was conducted

at a single center and included a relatively small sample of patients, which may limit the generalizability of the findings to broader cardiac surgical populations. Second, the PREM questionnaire used in this study was developed specifically for research purposes and did not undergo formal psychometric validation. Although its structure was based on contemporary concepts of patient experience and incorporated key aspects of cardiac surgical care, further evaluation of its psychometric properties is warranted. Third, the observational design of the study precludes conclusions regarding causal relationships between patient experience and clinical outcomes. Finally, patient experience was assessed only during hospitalization and did not include evaluation of long-term outcomes after discharge.

Despite these limitations, the findings suggest that patient experience may represent an important complementary component of quality assessment in cardiac surgical care. Higher PREM scores were associated with shorter extubation time and a greater likelihood of successful achievement of Fast-Track Recovery criteria, highlighting the potential value of patient-centered measures in the evaluation of postoperative recovery. The present findings also support the need for further development and validation of specialized PREM instruments for patients undergoing cardiac surgery.

CONCLUSION

Patients undergoing cardiac surgery reported generally positive experiences across all domains of the PREM questionnaire. Higher patient experience scores were

associated with shorter extubation time and a greater likelihood of successful achievement of Fast-Track Recovery criteria. These findings support the potential value of PREM instruments as an additional component of comprehensive quality assessment in cardiac surgical care and highlight the need for further multicenter studies using validated patient experience measurement tools.

Acknowledgements

The authors would like to thank all patients who participated in this study, as well as the healthcare professionals involved in patient care and data collection.

Funding

The authors declare that no financial support was received for the conduct of this study.

Author Contributions

1 -(Conceptualization, Methodology, Writing—original draft, Writing—review & editing), (Methodology, Writing—original draft, Writing—review & editing), (Methodology, Writing—review & editing), (Conceptualization, Supervision, Writing—review & editing), (Conceptualization, Methodology, Resources, Supervision, Writing—review & editing), and (Methodology, Resources, Supervision, Writing—review & editing)

Conflicts of Interest

The authors declare no conflict of interest.

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