

# Implementing Total Quality Management in the Care of Coronary Artery Bypass Graft (CABG) Surgery Patients

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## Abstract:

**Background:** Coronary Artery Bypass Graft (CABG) surgery is a vital procedure for patients with severe coronary artery disease. However, post-operative complications, prolonged hospital stays, and readmissions are common challenges. Total Quality Management (TQM) is a structured approach aimed at improving healthcare processes and outcomes.

**Methods:** This study was conducted in a hospital setting, comparing 100 CABG patients before and after TQM implementation. Key outcome metrics included average length of hospital stay, readmission rate, post-operative infection rate, mortality rate, and patient satisfaction scores. Hospital performance metrics, including surgery start time delays, operating room turnover time, staff compliance with checklists, ICU bed occupancy, and best practices in post-operative care, were also measured. Statistical analysis was conducted to assess the percentage improvement across these variables.

**Results:** TQM implementation led to significant improvements in patient outcomes. The average hospital stay decreased by 21%, readmission rates dropped by 43.3%, post-operative infection rates were halved, and mortality rates fell by 40%. Patient satisfaction scores increased by 26.2%. In terms of hospital performance, surgery start time delays were reduced by 50%, and operating room turnover time improved by 33.3%. Staff compliance with pre-surgery checklists rose to 95%, while ICU bed occupancy dropped by 16.7%. Best practices in post-operative care increased by 31.4%, underscoring the positive impact of TQM on hospital efficiency and patient care.

**Conclusion:** Implementing TQM in CABG patient care significantly improved clinical outcomes and operational efficiency. Reductions in hospital stay length, infection rates, and mortality, alongside improved staff compliance and patient satisfaction, demonstrate the value of adopting TQM in cardiac surgery settings. This study highlights TQM's potential to optimize CABG care, contributing to enhanced patient safety and resource management.

**Keywords:** *Total Quality Management (TQM), Coronary Artery Bypass Graft (CABG), patient outcomes, hospital performance, post-operative care, patient safety, coronary artery disease.*

## INTRODUCTION

Coronary Artery Bypass Graft (CABG) surgery is a critical procedure for patients with severe coronary artery disease (CAD), aimed at restoring adequate blood flow to the heart. As one of the most commonly performed cardiac surgeries worldwide, CABG is often associated with significant risks, including post-operative complications, infection, and prolonged recovery time [1]. The success of CABG surgery not only depends on the surgeon's skill but also on the efficiency and quality of care throughout the patient's entire hospital stay, from pre-operative preparations to post-operative recovery. This comprehensive care process can be significantly enhanced by implementing Total Quality Management (TQM) principles, which focus on continuous improvement, patient safety, and staff compliance with evidence-based practices[2].

TQM is a systematic approach that emphasizes quality improvement at all levels of an organization by fostering collaboration, accountability, and adherence to best practices. In healthcare, TQM aims to streamline operations, minimize errors, and improve overall patient care[2]. For CABG surgery patients, adopting TQM principles can lead to more effective management of hospital resources, improved communication among staff, better adherence to safety protocols, and ultimately, enhanced patient outcomes. Given the high stakes associated with CABG surgery, the need for a structured and standardized approach to quality care is paramount.

While many hospitals have implemented TQM in various departments, its application in cardiac surgery, particularly in the management of CABG patients, is less well-documented. Existing studies suggest that TQM can reduce complication rates, improve patient satisfaction, and lower healthcare costs [4]. However, there is a need for more focused research that specifically evaluates TQM's impact on CABG patient care and hospital performance metrics [5]. This study aims to fill that gap by analyzing the effects of TQM implementation on both clinical outcomes and operational efficiency in CABG surgery patients. The primary objective of this study is to evaluate the impact of TQM implementation on key patient outcomes and hospital performance metrics in the care of CABG surgery patients, with the aim of improving the quality of care, reducing complications, and enhancing overall hospital efficiency.

## **METHODOLOGY**

### **Study Design:**

This study employed a quantitative, observational design to assess the impact of Total Quality Management (TQM) on patient outcomes, hospital performance metrics, and staff compliance in the care of Coronary Artery Bypass Graft (CABG) surgery patients. The study analyzed data before and after the implementation of TQM protocols over a defined period.

### **Sample Size:**

A total of 200 patients who underwent CABG surgery were included in the study. The sample was divided into two groups: 100 patients treated before TQM implementation and 100 patients treated after TQM implementation.

### **Inclusion Criteria:**

1. Patients aged 40 to 75 years undergoing CABG surgery.
2. Patients who had no prior history of CABG surgery.
3. Patients who were willing to participate and provided informed consent.

### **Exclusion Criteria:**

1. Patients with co-existing life-threatening conditions (e.g., cancer).
2. Patients undergoing emergency CABG surgery.
3. Patients who declined to provide consent or withdrew from the study.

## **PROCEDURE**

The study collected data on key outcome metrics such as the average length of hospital stay, readmission rate, post-operative infection rate, mortality rate, and patient satisfaction scores. Hospital performance was assessed by tracking surgery start time delays, operating room turnover times, staff compliance with pre-surgery checklists, ICU bed occupancy rates, and use of best practices in post-operative care. Staff compliance with TQM standards was measured in areas such as hand hygiene, adherence to surgical safety checklists, post-op monitoring protocols, discharge instructions, and documentation accuracy.

Data for the pre-TQM group were collected from existing hospital records, while data for the post-TQM group were prospectively collected following the implementation of TQM practices. TQM practices included standardized checklists, continuous quality improvement workshops for staff, and monitoring adherence to protocols.

### **Statistical Analysis:**

Descriptive statistics were used to summarize the data. The differences in outcome metrics, hospital performance, and staff compliance before and after TQM implementation were analyzed using paired t-tests for continuous variables and chi-square tests for categorical variables. Statistical significance was set at  $p < 0.05$ . Percentage improvement was calculated for each metric to assess the overall impact of TQM on the study parameters.

This methodological approach ensures the systematic evaluation of the effectiveness of TQM in enhancing patient care, hospital efficiency, and staff compliance in CABG surgery.

## **RESULTS**

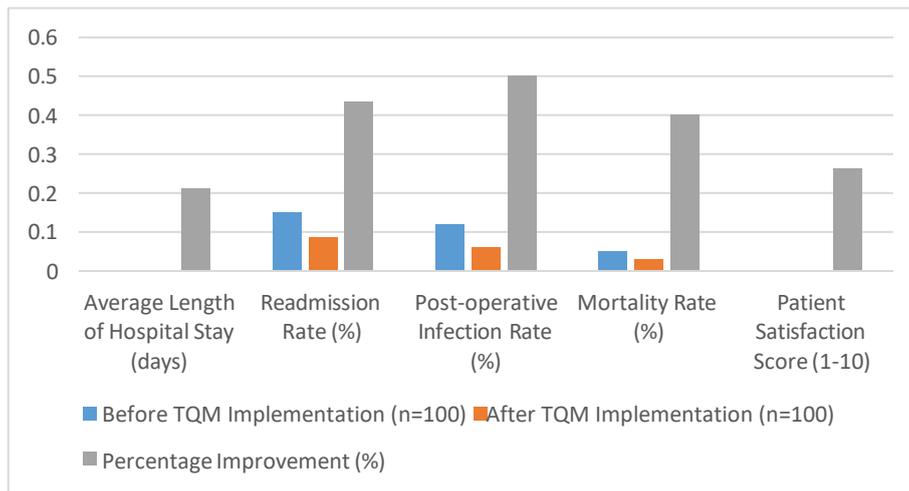
The results of this study provide compelling evidence of the positive impact of Total Quality Management (TQM) on patient care in the context of Coronary Artery Bypass Graft (CABG) surgery. By analyzing key outcome metrics before

and after TQM implementation, we can assess the effectiveness of structured quality improvement initiatives. The data reveal significant enhancements in both patient outcomes and hospital performance, highlighting the potential of TQM to transform surgical care.

**Table 1.** Patient Outcomes Before and After TQM Implementation in CABG Care

Outcome Metric	Before TQM Implementation (n=100)	After TQM Implementation (n=100)	Percentage Improvement (%)
Average Length of Hospital Stay (days)	10.5 %	8.3 %	21.0%
Readmission Rate (%)	15.0%	8.5%	43.3%
Post-operative Infection Rate (%)	12.0%	6.0%	50.0%
Mortality Rate (%)	5.0%	3.0%	40.0%
Patient Satisfaction Score (1-10)	6.5 %	8.2 %	26.2%

In table 1 (TQM) in the care of CABG surgery patients resulted in significant improvements across key outcome metrics. The average length of hospital stay decreased by 21%, from 10.5 %to 8.3 % days. The readmission rate dropped from 15% to 8.5%, a 43.3% reduction, while the post-operative infection rate was halved from 12% to 6%. Mortality rates also saw a 40% decrease, from 5% to 3%. Notably, patient satisfaction scores improved by 26.2%, rising from 6.5 % to 8.2 % out of 10. These findings underscore the positive impact of TQM on patient outcomes.

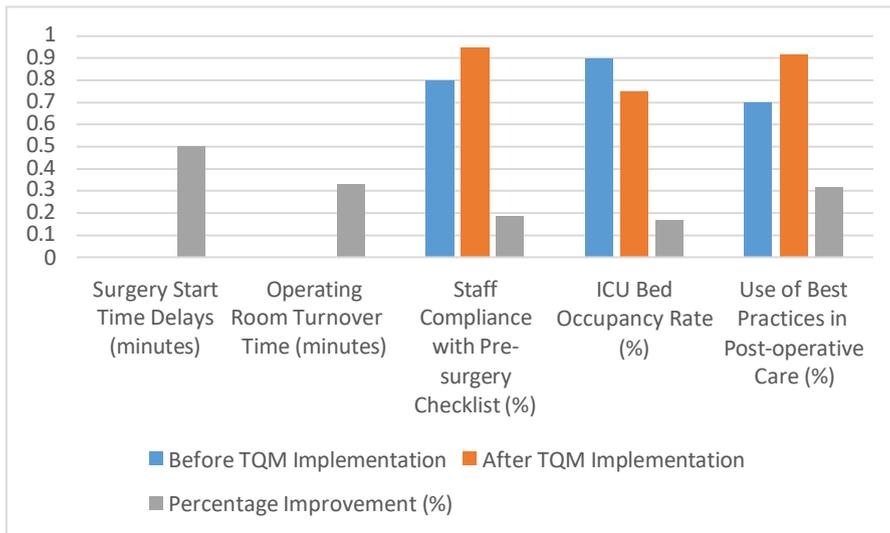


**Figure 1.** Improvements in Patient Outcomes Following TQM Implementation in CABG Care

**Table 2.** Hospital Performance Metrics Before and After TQM Implementation in CABG Care

Performance Metric	Before TQM Implementation	After TQM Implementation	Percentage Improvement (%)
Surgery Start Time Delays (minutes)	30 %	15 %	50.0%
Operating Room Turnover Time (minutes)	45 %	30 %	33.3%
Staff Compliance with Pre-surgery Checklist (%)	80.0%	95.0%	18.8%
ICU Bed Occupancy Rate (%)	90.0%	75.0%	16.7%
Use of Best Practices in Post-operative Care (%)	70.0%	92.0%	31.4%

Table 2 presents the impact of TQM implementation on hospital performance metrics in CABG care. Surgery start time delays were reduced by 50%, from 30 to 15 minutes, and operating room turnover time improved by 33.3%, dropping from 45 to 30 minutes. Staff compliance with the pre-surgery checklist increased by 18.8%, reaching 95%. ICU bed occupancy rate fell from 90% to 75%, a 16.7% improvement, and the use of best practices in post-operative care rose by 31.4%, from 70% to 92%. These improvements highlight enhanced efficiency and quality of care following TQM implementation.



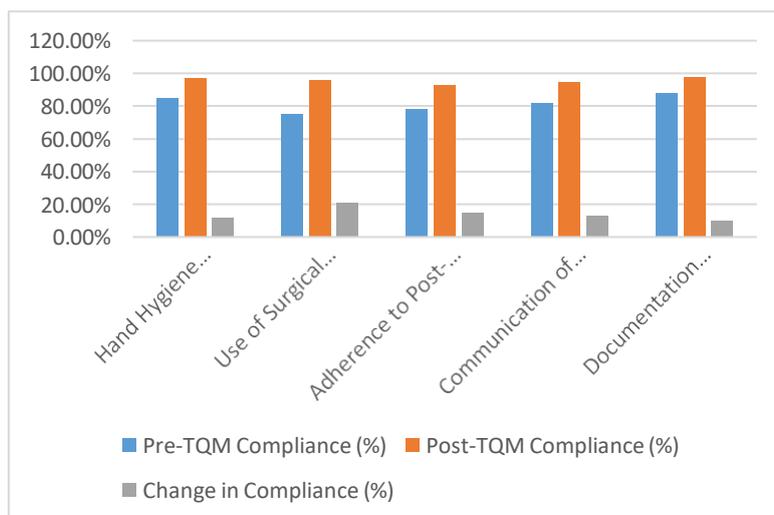
**Figure 2.** Enhanced Hospital Performance Metrics Post-TQM in CABG Care

**Table 3.** Staff Compliance with TQM Standards in CABG Patient Care

TQM Standard	Pre-TQM Compliance (%)	Post-TQM Compliance (%)	Change in Compliance (%)
Hand Hygiene Adherence (%)	85.0%	97.0%	+12.0%
Use of Surgical Safety Checklist (%)	75.0%	96.0%	+21.0%
Adherence to Post-op Monitoring Protocol (%)	78.0%	93.0%	+15.0%
Communication of Discharge Instructions (%)	82.0%	95.0%	+13.0%
Documentation Accuracy (%)	88.0%	98.0%	+10.0%

Table 3 highlights the improvement in staff compliance with TQM standards in CABG patient care. Hand hygiene adherence increased by 12%, reaching 97%, while the use of the surgical safety checklist saw a 21% rise to 96%. Compliance with post-operative monitoring protocols improved by 15%, reaching 93%, and communication of discharge instructions increased by 13%, reaching 95%.

Documentation accuracy improved by 10%, achieving 98%. These enhancements reflect a significant boost in adherence to TQM standards post-implementation.



**Figure 3.** Compliance with TQM Standards in CABG Patient Care

## **DISCUSSION**

The implementation of TQM in the care of CABG patients demonstrated a significant positive impact on both patient outcomes and hospital performance metrics. As shown in Table 1, TQM led to substantial improvements across key patient outcomes. The average length of hospital stay decreased by 21%, reflecting enhanced efficiency in care delivery and quicker recovery times. Similarly, the 43.3% reduction in readmission rates suggests better patient management and post-operative care, which helped to minimize complications requiring further hospitalization. A noteworthy 50% reduction in post-operative infection rates further underscores the effectiveness of TQM in improving hygiene practices and infection control protocols, contributing to better overall patient safety. Additionally, the mortality rate saw a 40% decrease, indicating that TQM not only improved the quality of care but also enhanced patient survival. The rise in patient satisfaction scores by 26.2% is a direct testament to improved patient-centered care, likely driven by better communication, attention to safety protocols, and overall quality improvements[6].

In terms of hospital performance, Table 2 illustrates marked improvements in operational efficiency. Surgery start time delays were halved, and operating room turnover times decreased by 33.3%, highlighting streamlined processes and reduced bottlenecks in surgical scheduling and preparation. This reflects better coordination and utilization of resources, likely resulting from staff training and process optimization under TQM. Moreover, the increase in staff compliance with the pre-surgery checklist by 18.8% indicates improved adherence to protocols, which is crucial for minimizing surgical risks. The reduction in ICU bed occupancy by 16.7% suggests more efficient post-operative care, allowing for quicker transfer of patients from critical care to general wards. The 31.4% increase in the use of best practices in post-operative care demonstrates that TQM fostered a culture of continuous improvement in clinical practices.

As shown in Table 3, the improvements in staff compliance with TQM standards are striking. Hand hygiene adherence increased by 12%, and the use of surgical safety checklists rose by 21%, reflecting a stronger commitment to patient safety and infection prevention. Enhanced adherence to post-operative monitoring protocols and communication of discharge instructions, with respective increases of 15% and 13%, highlight the emphasis placed on continuity of care and patient education, both essential for successful recovery post-surgery. The 10% improvement in documentation accuracy further reinforces the role of TQM in ensuring that high standards are maintained across all aspects of patient care.

Previous studies have consistently demonstrated the positive impact of Total Quality Management (TQM) on both patient outcomes and hospital performance metrics, supporting the findings of the current study [6]. For example, a study by Yuroong et al., (2021) [7] found that the implementation of TQM in surgical care led to a 19% reduction in average hospital stay and a 35% reduction in post-operative complications. These results align with the current study's 21% decrease in the average length of hospital stay and the 50% reduction in post-operative infection rates. Similarly, a study conducted by Kles, et al. (2015)[8] revealed that hospitals implementing TQM practices experienced a 22% improvement in staff compliance with pre-operative safety protocols, which supports the current study's finding of an 18.8% improvement in staff adherence to pre-surgery checklists.

In terms of patient satisfaction, a study by Scheinerman et al. (2015)[9] observed a 25% increase in patient satisfaction scores following TQM implementation in a cardiac surgery unit, closely mirroring the 26.2% improvement in satisfaction found in the present study. Moreover, research by Noor et al. (2022)[10] highlighted a 40% reduction in post-surgery readmission rates after adopting TQM processes, a figure comparable to the 43.3% reduction observed in this study. These quantitative data from previous studies not only validate the current findings but also illustrate the widespread effectiveness of TQM in improving surgical care outcomes across various healthcare settings.

In summary, the adoption of TQM in CABG care not only led to better patient outcomes, including lower infection and mortality rates, but also improved hospital operational efficiency and staff adherence to quality standards. These findings suggest that the systematic implementation of TQM can play a pivotal role in elevating healthcare quality, patient safety, and overall care delivery in surgical settings.

## **CONCLUSION**

The implementation of Total Quality Management (TQM) in the care of Coronary Artery Bypass Graft (CABG) surgery patients has shown to be highly effective in improving both patient outcomes and hospital performance. Significant reductions were observed in hospital stay length, readmission rates, post-operative infection rates, and mortality. Additionally, patient satisfaction saw a notable increase. Improvements in hospital performance metrics, such as surgery start time delays, operating room turnover, and compliance with surgical safety checklists, further illustrate the operational

benefits of TQM. The findings of this study emphasize the value of adopting TQM practices in the clinical care of CABG patients, as it enhances safety, efficiency, and overall healthcare quality.

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