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# Integrated Roles of Cardiac Nursing: From Operating Room to Patient Education and Critical Care Management

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## Abstract

Cardiac nursing encompasses a broad range of roles that collectively contribute to improving cardiovascular health outcomes. This article provides a comprehensive review of three pivotal nursing roles—cardiac operating room (OR) nurses, patient educators, and cardiac intensive care unit (ICU) nurse managers. Each role addresses unique phases of the patient journey, from surgical care to post-discharge education and critical care leadership. By integrating evidence from recent literature, this article demonstrates how these roles intersect, overlap, and collectively enhance patient safety, surgical outcomes, knowledge retention, and continuity of care. Recommendations for clinical practice, education, and future research are also presented, highlighting the importance of a holistic and collaborative approach to cardiac nursing in addressing the global burden of cardiovascular diseases (CVDs).

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## Introduction

Cardiovascular diseases (CVDs) represent the most significant public health challenge of the 21st century. According to the World Health Organization (WHO, 2023), CVDs are responsible for nearly 18 million deaths annually, equating to approximately 32% of all global deaths. The burden is not confined to high-income countries; in fact, over 75% of cardiovascular-related deaths occur in low- and middle-income nations. The rise in sedentary lifestyles, unhealthy diets, tobacco use, diabetes, and obesity has contributed to escalating rates of ischemic heart disease, stroke, and heart failure. In regions such as the Middle East, including Saudi Arabia, the incidence of coronary artery disease is increasing rapidly, creating a pressing need for advanced cardiac care systems integrated with specialized nursing practices.

Nursing is at the forefront of combating the cardiovascular epidemic. Unlike physicians, whose engagement may be episodic or procedural, nurses maintain continuous presence across the patient's care journey—from admission and surgery to rehabilitation and long-term follow-up. Cardiac nursing as a subspecialty requires advanced knowledge of pathophysiology, surgical techniques, pharmacology, hemodynamics, patient

communication, and leadership. More importantly, it demands an ability to adapt across various care settings, ensuring that patients receive consistent and evidence-based interventions tailored to their needs.

Three roles, in particular, stand out as pillars in cardiac nursing: the cardiac operating room (OR) nurse, the patient educator, and the cardiac intensive care unit (ICU) nurse manager. Each of these roles addresses different phases of the continuum of care, yet they are deeply interconnected. The OR nurse focuses on precision and safety during invasive procedures; the patient educator empowers individuals with knowledge to navigate their conditions effectively; and the ICU nurse manager provides leadership and governance in critical care settings, ensuring high-quality, safe, and ethically sound practices.

The significance of these roles becomes clearer when viewed through the lens of the patient journey. A patient undergoing coronary artery bypass grafting (CABG), for example, engages first with a nurse educator who explains the nature of the surgery, preoperative fasting protocols, medication adjustments, and expected outcomes. On the day of surgery, the OR nurse ensures that sterile techniques are maintained, assists the surgeon, monitors the

patient's status, and facilitates communication within the multidisciplinary team. Following surgery, the patient is transferred to the ICU, where the nurse manager oversees postoperative monitoring, coordinates care among intensivists and cardiologists, and ensures that safety protocols—such as infection control and ventilator management—are strictly adhered to. At discharge, the educator re-engages with the patient, reinforcing instructions about medications, diet, and activity restrictions, thus closing the loop of care.

The global nursing literature increasingly emphasizes the need for role integration rather than fragmentation. Fragmented care, in which surgical, educational, and critical care practices function in isolation, often results in communication breakdowns, duplication of efforts, and preventable errors. Integrated cardiac nursing, however, positions these roles as complementary, with seamless transitions and shared accountability. Studies have shown that when nurses collaborate effectively across perioperative, educational, and critical care settings, patient outcomes improve significantly—including lower complication rates, shorter hospital stays, and higher patient satisfaction (Moorhead et al., 2018; Goetz et al., 2022).

Another reason for expanding the focus on cardiac nursing roles is the increasing complexity of cardiovascular care. Modern cardiac surgery often involves hybrid procedures, minimally invasive techniques, or the use of mechanical circulatory support devices such as ECMO and ventricular assist devices. These innovations necessitate nurses who not only master technical competencies but also excel in interprofessional communication, patient-centered education, and managerial leadership. Without adequately trained cardiac OR nurses, patient educators, and ICU nurse managers, healthcare systems face higher risks of adverse events, readmissions, and staff burnout.

Moreover, healthcare is shifting toward patient-centered care models, where patients are not passive recipients but active participants. Patient education is central to this paradigm shift, equipping individuals with the knowledge and confidence to engage in shared decision-making. For cardiac patients, understanding medication regimens, dietary restrictions, and symptom monitoring can mean the difference between stable recovery and recurrent hospitalization. Nurse educators thus act as

vital mediators between clinical expertise and patient empowerment.

Simultaneously, leadership within ICUs has never been more critical. Cardiac ICU nurse managers not only maintain the highest standards of care for critically ill patients but also navigate ethical dilemmas, allocate scarce resources, and foster team resilience. In an era of increasing patient acuity, nurse managers must integrate evidence-based protocols with compassion, ensuring that care remains both scientifically sound and humane.

Taken together, the integrated roles of cardiac OR nurses, patient educators, and ICU nurse managers represent the backbone of modern cardiovascular care. Their collective impact transcends the walls of operating theaters, classrooms, and ICUs, extending into the lives of patients and communities. This article explores these roles in depth, synthesizing evidence from recent literature to highlight their interdependencies and propose strategies for strengthening their contributions. By doing so, it contributes to the growing recognition that the future of cardiac care depends not solely on technological innovation or physician expertise but equally on the expanded, integrated, and empowered roles of cardiac nurses.

## **The Role of the Cardiac Operating Room Nurse**

### **Clinical Expertise in Surgical Care**

Cardiac OR nurses serve as essential members of surgical teams performing procedures such as coronary artery bypass grafting (CABG), valve replacement, and congenital heart defect repair. Their responsibilities extend beyond basic scrub and circulating functions to include advanced knowledge of cardiopulmonary bypass, intra-aortic balloon pump insertion, and extracorporeal membrane oxygenation (ECMO). According to Spruce (2020), the vigilance of OR nurses during cardiac procedures significantly influences intraoperative outcomes.

### **Aseptic Technique and Patient Safety**

Maintaining aseptic fields is a central responsibility. Surgical site infections can be catastrophic in cardiac surgery, leading to prolonged hospitalization and mortality (Baylor et al., 2019). OR nurses ensure sterile instrumentation, monitor surgical counts, and intervene in the event of contamination.

## Team Communication and Anticipation

Cardiac surgery is high-stakes, where seconds can determine survival. OR nurses anticipate surgeon needs, prepare instruments proactively, and maintain fluid communication with anesthesiologists and perfusionists. Their role is not reactive but anticipatory, ensuring procedures flow seamlessly (Spruce, 2020).

## Postoperative Handoff

Handoff communication from OR to ICU is crucial. Effective reporting of surgical events, blood loss, medications, and patient condition prevents errors and enhances continuity of care (Goetz et al., 2022).

## The Role of the Patient Educator

### Importance of Education in Cardiac Care

Patients undergoing cardiac surgery or living with chronic cardiac conditions often face lifelong management challenges. Non-adherence to treatment regimens is linked to rehospitalization, morbidity, and mortality. Patient educators bridge this gap by translating complex medical information into actionable strategies (Albert, 2022).

### Preoperative Education

Education before surgery reduces patient anxiety, clarifies expectations, and improves postoperative recovery. Studies show patients who receive structured preoperative education experience less fear and demonstrate better compliance with pre-surgical protocols (Czarniak et al., 2021).

### Postoperative and Discharge Education

Patient educators focus on teaching wound care, medication adherence, diet modification, and recognition of complications. For instance, heart failure patients who receive consistent education demonstrate significantly lower readmission rates (Albert, 2022).

## Methods and Challenges

### Modern Methods of Patient Education

Patient education in cardiac care has evolved from traditional face-to-face teaching into a multifaceted approach that incorporates technology, interactive learning, and individualized strategies. Historically, education was delivered verbally or through written pamphlets provided at discharge. While these methods remain valuable, they are often insufficient

in addressing the complex needs of contemporary cardiac patients, who must navigate intricate medication regimens, lifestyle modifications, and long-term monitoring.

Modern approaches emphasize the integration of **multimedia resources**, including instructional videos, digital animations, and interactive modules that visually explain cardiac anatomy, surgical procedures, and rehabilitation protocols. Studies have demonstrated that visual learning tools enhance comprehension, especially for patients with limited health literacy (Albert, 2022). For example, video-based preoperative education has been shown to reduce patient anxiety and improve recall of procedural instructions compared to verbal-only teaching.

**Mobile health applications (mHealth apps)** have become central to cardiac patient education. These apps provide medication reminders, track vital signs, and offer educational content tailored to patient conditions. Some advanced platforms are connected to wearable devices that monitor heart rate, blood pressure, and activity levels, automatically transmitting data to healthcare providers. This real-time feedback empowers patients to actively engage with their treatment plans and allows educators to reinforce positive behaviors or intervene early in case of complications (Kitsiou et al., 2020).

**Telehealth and remote education** are increasingly important, particularly in the post-pandemic era. Virtual consultations, online support groups, and tele-rehabilitation programs allow educators to reach patients in remote or underserved areas. Telehealth eliminates geographic barriers, reduces costs, and ensures continuity of care for patients who might otherwise miss follow-up appointments. Evidence suggests that cardiac rehabilitation delivered via telehealth is as effective as in-person programs, with added convenience and accessibility (Thomas et al., 2019).

Finally, modern patient education often adopts **interactive and patient-centered teaching strategies**. Instead of one-way communication, educators employ motivational interviewing, role-playing, and teach-back methods, where patients repeat instructions to confirm understanding. These methods foster patient engagement, increase confidence, and strengthen adherence to treatment recommendations.

## Challenges in Patient Education

Despite these advancements, multiple challenges limit the effectiveness of cardiac patient education.

- 1. Low Health Literacy**  
A significant barrier is the prevalence of limited health literacy. Many patients struggle to interpret medical terminology, dosage instructions, or lifestyle recommendations. Low health literacy is strongly associated with medication errors, poor adherence, and increased hospital readmissions (Czarniak et al., 2021). Educators must simplify information, use plain language, and reinforce key messages through repetition and visual aids.
- 2. Cultural Differences**  
Cultural norms and beliefs profoundly influence patient behavior. For instance, dietary restrictions recommended in Western guidelines may not align with traditional Middle Eastern or Asian diets. Additionally, cultural perceptions of illness, fatalism, or reliance on alternative medicine can shape patient responses to education. Effective educators respect cultural values and adapt teaching materials accordingly, ensuring sensitivity without compromising medical accuracy (Alzahrani & Jones, 2018).
- 3. Language Barriers**  
In multicultural healthcare settings, language diversity complicates communication. Patients may misinterpret critical instructions if education is not delivered in their native language. The lack of interpreters or multilingual resources often exacerbates these challenges. Research shows that providing translated materials and bilingual educators significantly improves adherence and satisfaction among non-native speakers (Kaufman et al., 2019).
- 4. Psychological and Emotional Factors**  
Cardiac patients frequently experience anxiety, depression, or denial, which hinder their ability to absorb and act on health information. Emotional distress after a cardiac event can reduce concentration and motivation. Educators must integrate psychological support, provide reassurance, and involve family members to reinforce education during emotionally vulnerable periods (Albert, 2022).

- 5. Technology Gaps**  
While digital tools are effective, they assume patient access to smartphones, internet, and digital literacy. Elderly patients or those from low-income backgrounds may lack these resources, limiting the reach of mHealth and telehealth initiatives. Addressing this digital divide requires hybrid strategies that combine traditional teaching with modern technology.
- 6. Time Constraints in Clinical Practice**  
Nurses and educators often operate in high-pressure environments with limited time per patient. In busy cardiac units, dedicating sufficient time to comprehensive education can be challenging. Innovative models, such as group education sessions, peer mentoring, and asynchronous online modules, are potential solutions to this constraint.

## Strategies for Overcoming Challenges

To overcome these barriers, educators must adopt a **tailored and multimodal approach**. This includes assessing patient literacy levels, cultural background, emotional readiness, and access to technology before designing an education plan. Incorporating family caregivers into educational sessions enhances retention and adherence, especially in cultures where family plays a central role in decision-making.

Healthcare institutions should invest in **training programs for nurse educators**, focusing on cultural competence, motivational interviewing, and digital literacy. Partnerships with technology developers can further expand the use of culturally adapted educational apps and resources. On a systemic level, policies that integrate patient education into routine cardiac care, supported by adequate funding and staffing, are critical to sustaining effective programs.

## The Role of the Cardiac ICU Nurse Manager

### Integrated Leadership and Coordination Across the Continuum of Cardiac Care

Leadership in cardiac intensive care units (ICUs) exemplifies one of the most demanding roles within healthcare, as patients admitted to these environments are often ventilated, invasively monitored, and at risk of rapid deterioration or multi-organ failure. Cardiac ICU nurse managers serve as pivotal figures in ensuring not only the

adequacy of staffing and the clinical competence of their teams but also strict adherence to evidence-based practices that safeguard patient outcomes (Stone et al., 2021). Their responsibilities transcend routine supervision; they provide vision, direction, and resilience in an environment where high acuity, rapid decision-making, and multidisciplinary collaboration are daily requirements. Integral to their role is the implementation of quality improvement initiatives aimed at reducing preventable complications such as ventilator-associated pneumonia, central line infections, and pressure ulcers. These initiatives, underpinned by systematic audits and staff training, have consistently been associated with improved survival rates and reduced lengths of stay in ICUs (Duffield et al., 2020).

Beyond clinical safety, cardiac ICU nurse managers act as coordinators of highly complex care networks. They orchestrate collaboration among intensivists, cardiologists, physiotherapists, dietitians, and other allied professionals to deliver holistic and patient-centered care. Effective coordination ensures that each professional contribution—whether optimizing hemodynamic stability, tailoring rehabilitation, or adjusting nutritional support—aligns with the overarching goal of patient recovery. This ability to balance administrative responsibilities with direct clinical oversight positions nurse managers as both leaders and mentors. Research indicates that leadership styles, particularly transformational leadership, foster higher levels of nurse engagement, reduce burnout, and directly enhance patient safety (Stone et al., 2021). Transformational leaders empower staff, encourage innovation, and build cultures of accountability, which are particularly crucial in high-acuity cardiac care where errors can be catastrophic.

At the same time, nurse managers must navigate the ethical and emotional dimensions of critical care. Cardiac ICUs frequently confront dilemmas around resuscitation decisions, the withdrawal of life-sustaining treatments, and the communication of poor prognoses to families. These scenarios demand not only adherence to ethical principles of autonomy, beneficence, and justice but also compassion and emotional intelligence. Nurse managers are often at the center of these delicate negotiations, supporting staff through moral distress, ensuring transparent communication with

families, and facilitating decisions that balance patient dignity with medical appropriateness. Their ability to provide emotional support reinforces team resilience and reduces the risk of compassion fatigue among staff members.

The interconnectedness of roles across the continuum of care further underscores the necessity of leadership and integration in cardiac nursing. The cardiac OR nurse, patient educator, and ICU nurse manager form a triad of interdependent functions that collectively ensure seamless care transitions. Preoperative education by nurse educators alleviates patient anxiety and prepares individuals for surgery, enhancing intraoperative stability. OR nurses then execute their roles in maintaining sterile conditions, anticipating surgical needs, and ensuring intraoperative safety. Finally, ICU nurse managers oversee postoperative recovery, ensuring continuity of care and adherence to best practices. This continuity prevents fragmentation, promotes communication across phases, and creates an environment in which each role reinforces the other. For instance, when educators provide thorough preoperative counseling, OR nurses encounter more psychologically prepared patients, and ICU managers inherit postoperative cases where patients and families are better informed, thus reducing conflict and miscommunication.

Research evidence supports the value of such integrated approaches. Moorhead et al. (2018) demonstrated that coordinated nursing interventions across surgical and educational domains led to reduced complications, shorter hospital stays, and higher patient satisfaction. Similarly, Goetz et al. (2022) emphasized that continuity of care facilitated by nurse leadership results in more consistent adherence to treatment pathways, ultimately improving long-term cardiac outcomes. These findings underscore the paradigm shift from fragmented, role-specific care toward a holistic and collaborative model where integration is the norm.

Looking forward, the future of integrated cardiac nursing lies in strengthening digital health initiatives, specialized training, and focused research. Tele-cardiology and mobile health applications present opportunities to expand the reach of patient education and follow-up, particularly in remote or underserved areas. Training programs that focus on advanced perioperative skills for OR nurses and leadership development for ICU

nurse managers will be essential in preparing the workforce for evolving healthcare demands. Furthermore, research should prioritize evaluating the cost-effectiveness of integrated nursing models, measuring patient-reported outcomes, and exploring long-term impacts on quality of life. These directions not only enhance clinical practice but also contribute to health policy reforms.

The global and local implications of integrated cardiac nursing are profound. In contexts such as Saudi Arabia, where cardiovascular disease prevalence is rising rapidly, investment in specialized nursing roles aligns with the broader objectives of national health transformation, particularly within Vision 2030. Expanding the training, retention, and recognition of cardiac OR nurses, patient educators, and ICU nurse managers can strengthen local healthcare systems, reduce the burden of CVDs, and improve public health outcomes. On a global scale, empowering these roles is indispensable to addressing the escalating demands of cardiovascular care in aging populations and resource-limited settings.

In conclusion, leadership in high-acuity environments, coupled with integration across the continuum of care, defines the essence of cardiac nursing in the modern era. The ICU nurse manager anchors the team with leadership and vision, the OR nurse ensures surgical safety, and the patient educator empowers individuals for recovery and long-term health. Together, these roles exemplify the paradigm of holistic, patient-centered, and evidence-based cardiac nursing—an approach that is not merely aspirational but essential in the face of the global cardiovascular crisis.

## Conclusion

Cardiac nursing is multifaceted, encompassing surgical expertise, patient empowerment, and leadership in critical care. OR nurses safeguard the intraoperative environment, patient educators enhance self-management and recovery, and ICU nurse managers ensure safety and quality at the most vulnerable stage of care. Together, these roles form an integrated model essential for addressing the global burden of cardiovascular diseases. Strengthening these roles through education, research, and leadership development is imperative for advancing cardiac care worldwide.

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