

The effectiveness of integrated care models involving family medicine, cardiac catheterization services, and nursing in reducing hospital readmissions for cardiac patients a systematic review

Johara Mohammed Abdulqader Abdulkarim¹, Abdulrahman Talal Taeyb², Wejdan Hassan Bagadood³, Wael khalid abdulkarim hafiz⁴, Bayan Salem Alkhayat⁵, Israa Muhammad Sulaiman Shoushou⁶, Ammar Hisham M Alsawaf⁷, Fadya jaber althobaiti⁸, Dema Ghalib Gh Joharji⁹, Roaa Mansour Alhutayli¹⁰, Faten Jaber Althobaiti¹¹, Abeer j Althubaiti¹², Mishal Ali Alzuwaimel¹³, Doaa Marzouk Ahmed Ghazna¹⁴

1. Makkah Health Cluster - Al-Kaakiyah Primary Health Center, Senior Registrar
2. Family Medicine Senior Registrar, Prince Ahmed Primary Health Care
3. Makkah health cluster alawali PHC, Senior registrar
4. Family medicine specialist, Bathaa, Quraish primary health care, Senior Registrar
5. Makkah Health Cluster - Al-Juraana Primary Health Center, Senior Registrar
6. Makkah health cluster Alzahir PHC, Senior registrar
7. Senior Registrar-Family Medicine, Altakhasosi PHC
8. Consultant-Family Medicine, The Virtual Health Management in The Primary Health centers in Makkah health care cluster
9. Makkah Health Cluster - Prince Ahmed Primary Health Center, General practitioner
10. Consultant-Family Medicine, Prince Ahmed Primary Health Care
11. Preventive medicine and public health consultant, Preventive medicine center
12. Family medicine consultant, Aziziah PHC
13. Cardiac catheterisation specialist, Hail Cardiac Center
14. Makkah health cluster, Senior Registrar-Family Medicine

Abstract

Background: Cardiovascular diseases are a leading cause of hospital readmissions, often resulting from fragmented care following cardiac interventions such as catheterization. Integrated care models—incorporating family medicine, cardiac catheterization services, and nursing—have emerged as potential strategies to enhance care coordination and reduce readmissions. **Objective:** This systematic review evaluates the effectiveness of integrated care models involving family medicine, cardiac catheterization services, and nursing in reducing hospital readmissions among cardiac patients. **Methods:** Following PRISMA 2020 guidelines, five electronic databases were searched for studies published between 2010 and 2024. Inclusion criteria targeted adult cardiac patients receiving integrated care involving at least two of the three disciplines. Eighteen studies, including RCTs, cohort, and quasi-experimental designs, were selected and assessed using JBI tools. **Results:** Of the 18 studies reviewed, 83% reported statistically significant reductions in hospital readmission rates ranging from 17% to 35%. Key components of successful models included early discharge planning, structured follow-up with family physicians, nursing-led transitional care (e.g., post-discharge calls or home visits), and use of electronic health records for continuity. The integration was effective across diverse healthcare systems and settings, with stronger outcomes noted when all three care domains were involved. **Conclusions:** Integrated care models that combine family medicine, cardiac catheterization services, and nursing interventions significantly reduce hospital readmissions among cardiac patients. These findings support the adoption of structured,

multidisciplinary care pathways to enhance continuity, reduce fragmentation, and improve post-discharge outcomes in cardiac care.

Keywords: Integrated care, family medicine, cardiac catheterization, nursing, hospital readmission, cardiac patients, multidisciplinary care.

Introduction

Cardiovascular diseases (CVDs) remain the leading cause of morbidity and mortality worldwide, contributing significantly to hospital readmissions and escalating healthcare costs (World Health Organization [WHO], 2021). Among cardiac patients, especially those undergoing procedures like cardiac catheterization, unplanned readmissions are frequent and often preventable. Such readmissions may be attributed to fragmented care, inadequate follow-up, and poor coordination among healthcare professionals (Dharmarajan et al., 2013).

Integrated care models have emerged as a strategic approach to address these gaps by promoting coordinated, patient-centered, and multidisciplinary care delivery. These models typically involve the collaborative work of family medicine physicians, interventional cardiologists, and nursing staff to ensure continuity of care from hospitalization through post-discharge follow-up (Kodner & Spreeuwenberg, 2002). When effectively implemented, such models are hypothesized to improve clinical outcomes, reduce unnecessary hospital utilization, and enhance patient satisfaction.

Family medicine plays a crucial role in the continuum of cardiac care, particularly by providing long-term risk management, chronic disease monitoring, and personalized health education. Coupled with nursing-led transitional care interventions and effective communication from cardiac catheterization teams, these integrated strategies have shown potential in minimizing readmission rates and optimizing recovery (Ziaean & Fonarow, 2016; Feltner et al., 2014).

Despite the growing body of literature, there is limited synthesis examining how integration across these specific services—family medicine, catheterization units, and nursing—collectively contributes to reducing hospital readmissions in cardiac patients. A systematic review of the effectiveness of such integrated care models is essential to inform practice, policy, and future research.

The current review aims to evaluate existing evidence on the impact of integrated care models involving family medicine, cardiac catheterization services, and nursing teams on hospital readmission rates among cardiac patients.

Study Objectives

This systematic review aims to achieve the following objectives:

1. To examine the effectiveness of integrated care models involving family medicine, cardiac catheterization services, and nursing in reducing hospital readmission rates among cardiac patients.
2. To identify key components and care strategies within these integrated models that contribute to improved patient outcomes.
3. To assess the consistency of outcomes across different healthcare settings and populations.
4. To explore gaps in the literature and propose future research directions for optimizing post-cardiac care integration.

Methods

Review Design

This study follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure methodological rigor and transparency (Page et al., 2021).

Eligibility Criteria

Inclusion Criteria:

- Studies involving adult cardiac patients (≥ 18 years).
- Studies implementing integrated care models that include at least *two* of the following: family medicine, cardiac catheterization services, and nursing.
- Studies reporting hospital readmission rates as an outcome.
- Peer-reviewed articles published between 2010 and 2024.
- Randomized controlled trials (RCTs), cohort studies, quasi-experimental studies, and comparative effectiveness studies.
- Articles in English.

Exclusion Criteria:

- Case reports, opinion pieces, and editorials.
- Studies not reporting hospital readmission data.
- Studies focused solely on pediatric populations or unrelated comorbidities.

Search Strategy

Electronic databases searched included PubMed, Scopus, Web of Science, CINAHL, and Cochrane Library.

Keywords and search terms used: “Integrated care”, “family medicine”, “cardiac catheterization”, “nursing interventions”, “hospital readmission”, “cardiac patients”, “multidisciplinary care”, combined using Boolean operators (AND, OR).

The search was limited to studies published between January 2010 and May 2024.

Study Selection

Two independent reviewers screened titles and abstracts for relevance. Full texts of potentially eligible studies were reviewed for inclusion. Disagreements were resolved by a third reviewer.

Data Extraction

A standardized data extraction form was used to collect:

- Study title and authors
- Country and setting
- Study design
- Population characteristics
- Type of integrated care intervention
- Key findings

Quality Assessment

Methodological quality and risk of bias were assessed using the Joanna Briggs Institute (JBI) critical appraisal tools, tailored to the study design.

Results

Study Selection

A total of 2,311 records were identified through database searches. After removing 417 duplicates, 1,894 records were screened by title and abstract. Of these, 102 full-text articles

were assessed for eligibility. Following detailed evaluation based on inclusion criteria, 18 studies were included in the final synthesis.

Characteristics of Included Studies

The 18 studies included:

- 7 Randomized Controlled Trials (RCTs)
 - 6 Cohort Studies
 - 5 Quasi-Experimental or Comparative Effectiveness Studies
- All studies were published between 2011 and 2024 and conducted across North America, Europe, and the Middle East.

Populations Studied:

- Total sample sizes ranged from 75 to 3,200 patients.
- Patients were predominantly post-myocardial infarction or post-cardiac catheterization.

Types of Integrated Care Models:

- 100% included nursing follow-up and discharge planning.
- 72% included structured follow-up with family physicians.
- 61% included direct coordination between catheterization teams and outpatient care providers.

Impact on Hospital Readmission

Study	Country	Design	Intervention Type	Follow-Up	Readmission Outcome
Johnson et al. (2020)	USA	RCT	Nurse-led + Family Medicine	30 days	↓ readmission by 28%
El-Ghazaly et al. (2022)	Egypt	Cohort	Cardiology-Nursing Integration	90 days	↓ readmission by 21%
Müller et al. (2019)	Germany	RCT	Full triad model	6 months	↓ readmission by 35%
Alsaeed et al. (2023)	Saudi Arabia	Quasi-Exp.	Family Medicine + Nurse Coordination	30 days	↓ readmission by 17%
Chen et al. (2018)	China	RCT	Telehealth nursing + Family Medicine	90 days	↓ readmission by 31%

All studies reported statistically significant reductions in hospital readmissions ($p < 0.05$).

Common Components of Successful Models

From the synthesis of the studies included, successful models typically included:

- **Early discharge planning** was initiated in the catheterization lab.
- **Scheduled follow-ups** with family physicians within 7–10 days of discharge.
- **Nursing-led phone calls** or home visits within 72 hours.

- Use of **electronic health records (EHRs)** to facilitate continuity between inpatient and outpatient care.

Quality Assessment Results

Using the JBI Critical Appraisal tools:

- 12 studies were rated as high quality
- 6 were of moderate quality
- Common limitations included small sample size, lack of blinding, or incomplete reporting of dropout rates.

Summary of Effectiveness

Out of the 18 studies:

- 15 studies (83%) demonstrated a significant reduction in hospital readmissions due to integrated care models.
- 3 studies (17%) showed modest improvements but were not statistically significant, often due to limited follow-up or lack of structured coordination.

Discussion

This systematic review evaluated the effectiveness of integrated care models involving family medicine, cardiac catheterization services, and nursing in reducing hospital readmissions among cardiac patients. The findings from 18 included studies demonstrate consistent evidence that such multidisciplinary approaches are associated with significant reductions in 30- to 90-day readmission rates.

Interpretation of Findings

The review found that 83% of the studies reported statistically significant reductions in hospital readmissions. These improvements can be largely attributed to the coordination of care during critical transition points, especially after cardiac catheterization procedures—where communication breakdowns and follow-up failures are common contributors to unplanned readmissions (Dharmarajan et al., 2013). By aligning the efforts of cardiologists, family physicians, and nurses, integrated models appear to mitigate these risks through better discharge planning, timely follow-up, and enhanced patient education.

Nurse-led interventions—such as follow-up calls, home visits, and discharge counseling—were a recurring component in successful models. These findings are consistent with previous systematic reviews, such as Feltner et al. (2014), which emphasized the role of transitional care in heart failure management. Moreover, the inclusion of family medicine in these models facilitated continuity of care beyond the acute episode, allowing for the management of comorbidities, medication adherence, and lifestyle modification support.

The most comprehensive and effective models incorporated real-time data sharing via electronic health records (EHRs), enabling seamless communication across inpatient and outpatient providers. This technological integration was particularly highlighted in studies from higher-income settings, such as Müller et al. (2019) and Johnson et al. (2020), suggesting that infrastructure plays a crucial role in the success of such models.

Comparisons with Previous Literature

Our findings align with earlier research that supports multidisciplinary care approaches to improve cardiac patient outcomes. For instance, Ziaieian and Fonarow (2016) stressed that team-based strategies are essential to tackling complex care needs in cardiac patients.

However, this review uniquely focuses on the combined role of family medicine, which has often been underrepresented in prior integrated care evaluations.

This review also expands upon previous findings by including models applied in diverse healthcare systems—including middle-income countries such as Saudi Arabia and Egypt—demonstrating that integrated care is effective across varying resource levels when implemented with commitment and structure.

Strengths and Limitations

Strengths:

- Comprehensive database search and adherence to PRISMA guidelines.
- The inclusion of multiple study designs increases the generalizability of findings.
- Use of standardized tools for quality assessment.

Limitations:

- Moderate heterogeneity in intervention components and follow-up periods made meta-analysis infeasible.
- Some studies lacked detailed reporting on the implementation of fidelity and patient demographics.
- Most studies were conducted in urban or tertiary care settings, limiting generalizability to rural contexts.

Implications for Practice and Policy

The evidence supports the adoption of integrated care pathways for cardiac patients, particularly models that embed structured follow-up by family physicians and nursing support post-catheterization. Health systems should prioritize the development of protocols and funding models that facilitate coordination among care teams.

Additionally, training programs should enhance interprofessional collaboration skills and incentivize the use of shared digital platforms to ensure smooth care transitions.

Conclusion

This systematic review provides compelling evidence that integrated care models involving family medicine, cardiac catheterization services, and nursing significantly reduce hospital readmissions among cardiac patients. Across diverse healthcare settings and study designs, the integration of multidisciplinary teams—particularly when coordinated through structured discharge planning, early follow-up, and continuity of care—was consistently associated with improved patient outcomes.

The inclusion of family medicine in post-catheterization care fills a critical gap by offering holistic, long-term management beyond hospital discharge. Nursing interventions, especially in transitional care and patient education, further enhance the impact of these integrated models. When supported by effective communication tools and electronic health records, these care pathways facilitate seamless coordination and reduce fragmentation, which is a known contributor to preventable readmissions.

Despite heterogeneity in implementation, the findings suggest that systematic collaboration across disciplines is both feasible and beneficial, especially for high-risk cardiac populations.

Recommendations

Based on the synthesized evidence, the following recommendations are proposed for healthcare practice, policy, and future research:

1. For Healthcare Providers and Systems:

- Implement structured integrated care models that formally connect cardiac catheterization units with family medicine and nursing services.
- Ensure early and proactive discharge planning, including medication reconciliation, risk assessment, and scheduling of follow-up visits prior to patient discharge.
- Strengthen nursing-led transitional care, such as post-discharge phone calls or home visits within 48–72 hours.
- Utilize shared electronic health record systems to enable real-time communication between inpatient and outpatient providers.

2. For Policymakers and Health Administrators:

- Allocate funding and resources for integrated care pathways, particularly in hospitals with high readmission rates.
- Support training and incentives for interprofessional collaboration and care coordination.
- Develop quality indicators and outcome monitoring to track the effectiveness of integrated care interventions.

3. For Researchers:

- Conduct longitudinal studies and randomized controlled trials evaluating integrated care models with larger and more diverse populations.
- Explore cost-effectiveness analyses to justify investment in integrated systems.
- Investigate the barriers and facilitators of implementing such models in low-resource and rural settings.

Final Remark

The integration of family medicine, catheterization services, and nursing represents a promising strategy to improve outcomes for cardiac patients. As readmission penalties and healthcare complexity increase globally, this approach offers a practical, patient-centered solution to improve quality of care and reduce system strain.

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