

REVIEWS

Development of a post-acute coronary syndrome care model integrating cardiac-psychological care: Focus on psychological resilience-building in clinical nursing

Qian Tao, Zhimin Fan*, Meiyuan Liu

Department of Psycho-cardiology, Beijing Anzhen Hospital Affiliated to Capital Medical University, Beijing, China

Received: February 18, 2026

Accepted: March 10, 2026

Online Published: March 16, 2026

DOI: 10.63564/jnep.v16n3p24

URL: <https://doi.org/10.63564/jnep.v16n3p24>

ABSTRACT

Objective: To develop a specialized cardiac-psychological integrated care model for patients with Acute Coronary Syndrome (ACS) and explore the core components, implementation strategies, and clinical nursing value of integrating psychological resilience-building into routine cardiac care for ACS patients.

Methods: A structured literature search adhering to PRISMA guidelines was conducted across PubMed, Web of Science, and the Cochrane Library for studies published from January 2016 to December 2025. Eligible studies focused on ACS cardiac-psychological integrated care, psychological resilience interventions, and clinical nursing practice. A total of 33 peer-reviewed studies, clinical consensus statements, and systematic reviews were included for synthesis, and based on the evidence, a structured ACS cardiac-psychological integrated care model with psychological resilience-building as the core was constructed.

Results: This study clarifies the multi-dimensional protective role of psychological resilience in ACS patients (biological, psychological, and social), defines the key structural components of the integrated care model (early screening, family-centered assessment, social support mapping, and digital integration), and identifies the clinical nurse's core role as a "Resilience Architect" with specific intervention strategies. A nurse-led resilience discharge checklist for inpatient ACS care is proposed, and the main implementation challenges of the model (time/resource constraints, stigma, nurse training gaps, and organizational culture barriers) are also summarized.

Conclusions: Psychological resilience-building integrated into routine cardiac care is a pivotal factor in breaking the vicious cycle of physical and mental deterioration in ACS patients. The developed cardiac-psychological integrated care model provides a structured clinical roadmap for ACS management, which is conducive to improving long-term patient prognosis and quality of life in clinical nursing practice.

Key Words: Acute coronary syndrome, Clinical nursing, Integrated care model, Psycho-cardiology, Psychological resilience

1. INTRODUCTION

Acute Coronary Syndrome (ACS) remains a leading global cause of cardiovascular morbidity and mortality, with an estimated 15 million new cases diagnosed annually worldwide and post-ACS patients facing a 20% risk of recurrent cardiac events within one year of the initial episode.^[1] Beyond the well-documented physiological sequelae, up to 40% of ACS

patients develop significant psychological distress, including depression, anxiety, and fear of disease progression, in the post-cardiac event period, and these psychological comorbidities independently increase the risk of poor cardiovascular outcomes, including rehospitalization and mortality.^[2] Despite advances in revascularization and pharmacological management, conventional ACS care has long overlooked

*Correspondence: Zhimin Fan; Email: fzm_paper@126.com; Address: Department of Psycho-cardiology, Beijing Anzhen Hospital Affiliated to Capital Medical University, Beijing, China.

the bidirectional brain-heart axis, leaving this critical gap in holistic patient support unaddressed.^[3] Therefore, we aim to develop a structured, nurse-led cardiac-psychological integrated care model centered on psychological resilience-building for ACS patients, and to systematically explore the core structural components, evidence-based implementation strategies, and clinical nursing value of integrating resilience assessment and intervention into routine cardiac care throughout the ACS care continuum. This study further seeks to provide a feasible, standardized clinical roadmap for holistic ACS management, addressing the aforementioned unmet clinical needs and filling the gap in standardized resilience-focused care for ACS patients in current clinical practice.

Psychological resilience, a dynamic modifiable factor that enables individuals to adapt and recover from adverse events such as life-threatening ACS episodes, has emerged as a key protective construct for mitigating the impact of psychological distress on cardiac health in ACS patients.^[4] It is not an inherent personality trait but a capacity that can be fostered and strengthened through targeted clinical interventions, making it a viable and valuable focus for integrated cardiac care. However, routine cardiac care for ACS currently lacks standardized, systematic approaches to assess patients' baseline resilience levels, build this adaptive capacity through evidence-based interventions, or leverage family and social support systems to sustain long-term resilience gains. This critical deficiency creates an urgent clinical need for structured, integrated care models that explicitly bridge cardiac physiological management and psychological resilience-building for ACS patients.

The management of ACS has traditionally focused on rapid revascularization and pharmacological stabilization. However, the "post-cardiac event" period is often characterized by significant psychological trauma that exacerbates physical recovery challenges.^[5] Clinical nurses, positioned at the frontline of patient care across the entire ACS care continuum (from acute inpatient management to post-discharge rehabilitation and long-term follow-up), are uniquely positioned to lead an integrated cardiac-psychological care initiative. They are the first to identify psychological distress in patients, maintain consistent, longitudinal contact with patients and their families, and possess the clinical expertise to translate complex cardiac and psychological concepts into actionable, patient-centered care. This frontline role makes nurses the ideal "Resilience Architects" for ACS care, with the ability to embed resilience assessment and building into routine nursing workflows, address both individual and family-level psychological needs, and connect patients to social support resources. However, this potential remains underutilized in current clinical practice.

The emerging field of psycho-cardiology emphasizes that integrated care models-addressing both physiological and psychological needs-are essential for long-term recovery.^[6,7] A growing body of empirical research and clinical consensus has solidly validated the efficacy of nurse-led interventions in cardiac care, with such programs consistently shown to reduce post-ACS rehospitalization rates, enhance medication adherence, and alleviate psychological distress in cardiac patient cohorts.^[8,9] These key unmet needs regarding nurse-led, resilience-focused integrated cardiac psychological care form the core theoretical foundation of this project. Accordingly, a systematic literature search was conducted to identify peer-reviewed studies, clinical consensus statements, and systematic reviews related to integrated cardiac psychological care models and psychological resilience in ACS management. This provides an evidence base for the development and validation of this specialized care model.

2. METHODOLOGICAL DETAILS FOR COMPREHENSIVE REVIEW

This comprehensive review adhered to the PRISMA guidelines for systematic reviews to ensure methodological rigor in the selection and synthesis of the literature. A structured literature search was conducted across the following core electronic databases: PubMed, Web of Science, and the Cochrane Library. The search time frame was set from January 2016 to December 2025, to capture the most recent and relevant evidence on cardiac-psychological care, psychological resilience, and ACS management. Search terms were developed using a combination of MeSH terms and free-text keywords, including: "Acute Coronary Syndrome", "Psycho-Cardiology", "Integrated Care", "Psychological Resilience", and "Clinical Nursing".

Title and abstract screening were conducted independently by two authors to exclude irrelevant studies. Full-text screening was subsequently performed for the remaining articles to assess eligibility based on pre-defined inclusion criteria: (1) original research, systematic reviews, or clinical consensus statements focused on ACS patients; (2) studies investigating integrated cardiac-psychological care models or resilience-building interventions; (3) research involving clinical nursing practice in ACS management; (4) publications in English with full-text availability. Reference lists of included landmark studies and systematic reviews were hand-searched to identify additional eligible literature, ensuring comprehensive coverage of the research field. A total of 33 studies and clinical documents were ultimately included in this review, forming the empirical foundation for the analysis of integrated care model structure, nursing interventions, implementation challenges, and future research directions.

3. RESILIENCE: THE PROTECTIVE BUFFER IN ACS

Psychological resilience is defined as the dynamic ability to adapt and bounce back from significant adversity, such as a life-threatening ACS event. Research indicates that resilience is not merely a personality trait but a modifiable factor that nurses can influence.^[7] A contemporary review of psychosocial resilience in heart failure identifies key protective factors, including optimism, self-efficacy, and social connectedness.^[10] These protective factors are transdiagnostic and directly generalizable to the ACS patient population, forming a critical empirical foundation for the development of our ACS cardiac-psychological integrated care model. The identification of these core resilience factors in the heart failure literature informed the intentional design of our model's structural components and nursing intervention strategies, with each element of the model strategically tailored to foster and strengthen optimism, self-efficacy, and social connectedness in ACS patients, which is consistent with the evidence base for psychosocial resilience in cardiovascular disease more broadly.

1) Biological Link: High resilience is associated with lower pro-inflammatory markers (e.g., IL-6, CRP) and better autonomic nervous system regulation.^[11] The biological pathway involves downregulation of the HPA axis and reduced sympathetic overdrive, which protects the myocardium from stress-induced ischemia.

2) Psychological Link: Resilience serves as a buffer against post-ACS depression and "Fear of Progression", which are major barriers to cardiac rehabilitation.^[12] High-resilience patients demonstrate better emotional regulation, reduced catastrophic thinking about symptoms, and greater adherence to lifestyle modifications.

3) Social Link: Beyond individual factors, family resilience plays a critical role in patient recovery. Family functioning, communication patterns, and collective problem-solving capacity significantly influence psychological outcomes in both heart failure and ACS populations.^[7] Social support networks provide tangible assistance, emotional validation, and a sense of belonging that buffers against isolation and despair.^[13]

4. STRUCTURAL COMPONENTS OF INTEGRATED CARE MODELS

Effective integrated care models for ACS require a paradigm shift from fragmented, physiology-focused care to a multidisciplinary, patient-centered approach where the clinical nurse acts as the central coordinator and Resilience Architect, a role uniquely suited to nurses given their frontline posi-

tion across the entire ACS care continuum (acute inpatient management to post-discharge rehabilitation and long-term follow-up).^[10] The structural components of this model are designed to address the unmet need for holistic, nurse-led care that bridges cardiac and psychological health for ACS patients, and each component is strategically developed to target the biological, psychological, and social protective mechanisms of resilience, breaking the vicious cycle of physical and mental deterioration in this patient population.

This model initiates on Day 1 of ACS inpatient admission, and proceeds in a continuous, sequential manner through acute inpatient care to long-term outpatient follow-up, with core structural components operationalized in phase-specific care settings to align with patients' dynamic recovery needs. This model was developed in December 2025 by a multidisciplinary team comprising cardiac clinical nurses (core leading role), psycho-cardiology specialists, cardiovascular physicians, clinical psychologists, and healthcare informatics experts. The development was anchored in the authors' long-term clinical practice and observational insights of ACS patients at the Psycho-cardiology Medical Center of Beijing Anzhen Hospital in China. After examining the clinical outcomes of ACS patients in this setting, the authors recognized critical unmet holistic care needs, including the persistent fragmentation of cardiac and psychological support and the lack of standardized resilience-building interventions, which were consistently associated with poor long-term prognosis and reduced quality of life in the hospital's ACS patient cohort. Before finalization, the multidisciplinary development team conducted a comprehensive internal clinical validity review for all model components. This review included a critical appraisal of each component against the latest ACS clinical practice guidelines, evidence-based psycho-cardiology research findings, and real-world frontline nursing workflow feasibility, with targeted revisions made to optimize the clinical applicability of model components based on review outcomes. Below is a detailed description of the key structural components of the model and their clinical importance for ACS care.

1) Early Screening: Completed on Day 1 of inpatient admission (the model's initiation point), early and standardized screening is the foundational step of the model, as it identifies "psychologically fragile" ACS patients at high risk of psychological distress (depression, anxiety, fear of progression) and low resilience, which independently increase cardiovascular adverse events (rehospitalization, mortality). Screening cannot be limited to individual psychological status alone, as ecological factors (family functioning, social support) directly shape resilience trajectories and recovery outcomes for ACS patients. Notably, the research team rec-

ognizes that limited empirical research exists specifically on the synergistic use of psychological distress and resilience screening tools in acute-phase ACS care, a critical gap this model aims to address by integrating validated, brief tools into routine nursing workflows. Utilizing standardized tools like the Patient Health Questionnaire-9 (PHQ-9) for depression screening and the Connor-Davidson Resilience Scale (CD-RISC) for resilience assessment during the acute phase to identify “psychologically fragile” patients.^[7] Resilience assessment should be complemented by evaluating family functioning and social support availability, as these ecological factors significantly influence recovery trajectories.^[7]

2) Family-Centered Assessment: Conducted within the first 48 hours of inpatient admission, family resilience is a non-negotiable determinant of ACS patient recovery, as family functioning, communication patterns, and collective adaptive capacity directly influence patient psychological outcomes, treatment adherence, and long-term quality of life. Conventional ACS care focuses solely on the individual patient, neglecting the family system as a core source of resilience (or risk) for the patient. This component addresses this critical gap by centering the family in the care process, as caregiver burden and maladaptive family dynamics can undermine even the most effective individual resilience interventions. Given the crucial role of family resilience in patient outcomes, nursing assessment should extend beyond the individual patient to evaluate family communication patterns, caregiver burden, and the family’s collective capacity to adapt to the cardiac event. The Family Assessment Device (FAD) or brief interviews can identify families requiring additional support.

3) Social Support Mapping: Initiated during inpatient care (within 72 hours of admission) and refined for sustained use in outpatient follow-up, social connectedness is a key protective factor for psychological resilience in ACS patients, providing tangible assistance (e.g., support with medication adherence), emotional validation, and a sense of belonging that buffers against isolation and despair, which are major drivers of psychological distress in post-ACS patients. Many ACS patients face social isolation (e.g., due to functional limitations, fear of activity), and routine cardiac care does not systematically assess or leverage social support networks to sustain resilience. Social support mapping transforms passive social support into an active, structured component of care, ensuring patients have access to sustainable social resources post-discharge. Nurses should assess the patient’s social network, identifying key support persons, potential isolation risks, and available community resources. Social support interventions may include connecting patients with peer support groups, cardiac rehabilitation communities, or

online forums.^[13]

4) Digital Integration: Implemented during inpatient care (to familiarize patients with platforms) and fully operationalized as the core continuity tool for outpatient follow-up, ACS patient recovery is a long-term process, and hospital-based resilience interventions alone are insufficient to sustain progress post-discharge. Digital health (mHealth) addresses the critical challenge of care continuity, as it enables real-time monitoring of both cardiac physiology and psychological status, and delivers “just-in-time” nursing interventions when patients experience mood fluctuations or cardiac symptom concerns, preventing small setbacks from escalating into major adverse events. Digital integration also standardizes resilience-building support, making it scalable and accessible to ACS patients in diverse clinical and community settings. Leveraging mHealth platforms to monitor both ECG data and mood fluctuations, allowing for “just-in-time” nursing interventions.^[14] Digital health interventions can extend resilience-building beyond hospital walls, providing continuous support through smartphone applications that offer psychoeducation, symptom tracking, and crisis support hotlines.

5. THE CLINICAL NURSE AS THE “RESILIENCE ARCHITECT”

In the integrated model, the clinical nurse’s role evolves into that of a “Resilience Architect”, employing specific strategies to rebuild the patient’s psychological infrastructure. This role is underpinned by robust clinical evidence. Nurse-led psycho-cardiology interventions, including family-centered education and social support guidance, have been proven to strengthen treatment compliance and family resilience, directly boosting long-term quality of life for ACS patients.^[15] Additionally, nurse-led digital health and remote follow-up initiatives have demonstrated marked effectiveness in sustaining post-discharge care continuity and resilience-building efforts, effectively addressing the fragmentation of traditional cardiovascular care.^[16]

5.1 Symptom reframing and cognitive reappraisal

ACS patients frequently suffer from cardiophobia, misinterpreting normal physiological sensations (like a slight increase in heart rate during walking) as signs of a new heart attack. Nurses utilize cognitive reappraisal to help patients differentiate between benign somatic sensations and actual cardiac symptoms, effectively breaking the anxiety-tachycardia feedback loop.^[17]

5.2 Brief Positive Psychology Interventions (BPPIs)

Evidence suggests that even short-term nursing interventions can rewire a patient’s outlook. By encouraging “Gratitude

Journaling” or “Strength Spotting”, nurses help patients focus on their survival and capacity for recovery rather than their vulnerability.^[18] This shift builds self-efficacy, which is directly linked to better medication adherence and smoking cessation.^[19]

5.3 The Neuro-cardiac education path

Nurses provide a biological rationale for psychological care by explaining the Brain-Heart Axis. Teaching “Vagal Tone Regulation” techniques, such as paced diaphragmatic breathing, empowers patients to physically down-regulate their stress response, providing a sense of control over their cardiac health.^[20]

- **Mindfulness-Based Stress Reduction (MBSR) Protocol:** Evidence-based mindfulness interventions adapted for cardiac patients typically include:^[21]
- **Body Scan Meditation:** Guiding patients through systematic attention to bodily sensations, reducing somatic anxiety, and improving interoceptive awareness.^[22]
- **Paced Breathing Exercises:** Teaching 4-7-8 breathing (inhale 4 counts, hold 7 counts, exhale 8 counts) to activate the parasympathetic nervous system.^[23]
- **Loving-Kindness Meditation:** Cultivating positive emotions toward self and others, which has been shown to improve heart rate variability and reduce inflammatory markers.^[24]
- **Daily Practice Integration:** Encouraging 10-15 minutes of formal practice twice daily, complemented by informal mindful moments during routine activities.^[25]

5.4 Family and caregiver education

Resilience-building extends beyond the individual patient to include family systems. Nurses educate caregivers on:

- **Avoiding Over-Protection:** Balancing support with autonomy promotion, as excessive caregiving can inadvertently foster patient dependence and learned helplessness.^[7]
- **Communication Skills:** Teaching family members to use supportive, non-catastrophizing language when patients express concerns about symptoms.
- **Resilience Modeling:** Encouraging caregivers to demonstrate adaptive coping behaviors, as family members’ responses significantly influence patient psychological outcomes.
- **Caregiver Self-Care:** Addressing caregiver burden and burnout, ensuring that the family unit as a whole maintains resilience throughout the recovery process.

- **Self-Care Behavior Coaching:** Drawing from self-efficacy theory, nurses guide patients in developing sustainable self-care routines, including medication adherence, dietary modifications, physical activity, and symptom monitoring.^[19]

6. CLINICAL PRACTICE: THE NURSE-LED RESILIENCE DISCHARGE CHECKLIST

To bridge the gap between resilience theory and clinical bedside practice, this review proposes a structured roadmap for the final phase of inpatient ACS care, with the entire resilience discharge checklist to be completed during the final 48 hours of inpatient ACS care (before patient discharge), which is the evidence-based optimal window for such interventions to maximize post-discharge adherence and clinical efficacy. All core intervention strategies elaborated in the preceding subheadings (symptom reframing, neuro-cardiac education, family and caregiver education, positive psychology interventions, and self-care coaching, etc.) are systematically integrated into corresponding items of the checklist below (see Table 1), ensuring full alignment between theoretical intervention frameworks and clinical practice steps.

All nursing action items in Table 1 are designed to operationalize the resilience-building interventions detailed in the prior sections, translating theoretical strategies into actionable, step-by-step clinical practice for inpatient ACS care before discharge. A clear delineation of inpatient versus outpatient model components is established to ensure distinct care actions and goals across the care continuum. The inpatient core components focus on early identification (screening/assessment), foundational resilience skill building, and care transition planning; outpatient follow-up components center on sustained digital monitoring, booster resilience interventions, scheduled psychological follow-up visits, social support network optimization, and personalized self-care plan adjustment based on real-time patient status and recovery progress.

7. IMPLEMENTATION CHALLENGES IN CLINICAL PRACTICE

Despite the benefits, implementation faces significant hurdles:

- **Time and Resource Constraints:** High-acuity CCU environments often prioritize physical stability, leaving little room for psychological assessment.^[26] Standardized resilience interventions require dedicated time that may conflict with clinical workflows, necessitating creative integration of brief screening and intervention into routine care activities.

- **Stigma:** Patients may resist “mental health” labels; thus, nurses must frame psychological care as “stress management for heart recovery” or “building emotional strength for cardiac wellness”.^[13] Destigmatization through normalization-emphasizing that psychological distress is a common, expected response to cardiac events-is essential for patient engagement.
- **Nurse Training and Competency:** Many cardiac nurses receive limited training in psychological interventions during their basic education. Implementation requires ongoing professional development in resilience-building techniques, motivational interviewing, and recognizing psychological crisis indicators.
- **Organizational Culture:** Institution-level commitment is necessary to prioritize psychological care alongside physiological care. This includes administrative support for nurse-led interventions, allocation of resources for screening tools, and integration of mental health outcomes into quality metrics.
- **Sustainability and Scalability:** While pilot programs may demonstrate efficacy, long-term sustainability requires embedding resilience protocols into standard care pathways, developing train-the-trainer models, and creating digital platforms that extend intervention reach beyond hospitalization.

Table 1. Nurse-led resilience-building discharge checklist for ACS inpatients

Phase	Category	Nursing Action Item	Evidence Base
I	Screening	Administer CD-RISC 10 and PHQ-2 to identify high-risk psychological profiles; assess family functioning and social support availability	Eur. Heart Journal (2025); Family Process (2023)
II	Education	Verify patient understands how stress affects heart rate and blood pressure via the ANS; teach brain-heart axis connection	J. Psychosomatic Res. (2021)
III	Skills	Ensure patient can demonstrate Paced Breathing and basic mindfulness techniques; provide written/audio guides for home practice	Nature Rev. Cardiology (2022); J. Psychosom. Res. (2021)
IV	Cognitive	Review the difference between “musculoskeletal discomfort” and “anginal pain”; practice cognitive reframing with patient	J. Cardiovascular Nursing (2022)
V	Social	Assess social support network; educate caregivers on avoiding “over-protection” and fostering autonomy; provide family resilience resources	Family Process (2023); Frontiers in Psychology (2022)
VI	Self-Care	Develop personalized self-care plan including medication adherence, physical activity, and symptom monitoring; strengthen self-efficacy through mastery experiences	Patient Education and Counseling (2022)
VII	Follow-up	Enroll patient in a cardiac mHealth app for remote mood and symptom tracking; schedule psychological follow-up within 2-4 weeks; provide peer support group information	J. Med Internet Res (2023)

8. DISCUSSION

This discussion contextualizes the key findings of the cardiac-psychological integrated care model for ACS patients, centered on psychological resilience-building and led by clinical nurses as Resilience Architects, within the extant psychocardiology and ACS care literature, elaborates on the model’s novelty and clinical implications, addresses implementation challenges with adaptive strategies, acknowledges inherent limitations, and aligns the model with global clinical practice guidelines to frame its place in contemporary cardiovascular care.

8.1 Theoretical and clinical implications of the “resilience architect” nurse role

Framing the clinical nurse as the resilience architect represents a paradigm shift in the conceptualization of nursing

practice within ACS care, advancing the current understanding of nurse-led integrated cardiac-psychological care by moving beyond nurses as passive deliverers of physiological care to active coordinators and builders of holistic patient resilience.^[27] Historically, ACS care has centered on rapid revascularization and pharmacological management, with psychological care relegated to adjunctive or specialist-only support.^[28] This model embeds the nurse at the core of the brain-heart axis care continuum, leveraging their unique frontline position across acute inpatient, post-discharge rehabilitation, and long-term outpatient follow-up. Empirical evidence has long validated nurse-led interventions in reducing ACS rehospitalization rates and improving medication adherence, but the resilience architect role formalizes nurses’ capacity to address the modifiable psychological and social determinants of cardiac health.^[29] This role operational-

izes the transdiagnostic protective factors of psychological resilience, including optimism, self-efficacy, and social connectedness, into routine nursing workflows, bridging the critical gap between physiological stabilization and sustained psychological adaptation. Theoretically, this role aligns with the Society to Cells Resilience Theory, extending its application from heart failure to ACS populations and grounding nursing practice in a biobehavioral framework that acknowledges the bidirectional biological, psychological, and social links of resilience to cardiac outcomes.^[30] Clinically, the Resilience Architect role creates a sustainable, scalable pathway for integrated care, as nurses are the largest healthcare workforce in cardiovascular settings and can deliver resilience-building interventions without over-reliance on specialized psycho-cardiology or psychology staff, addressing the global shortage of mental health providers in cardiac care.

8.2 Novelty and practical value of the resilience-centered integrated care model

Compared to existing fragmented ACS care approaches and other psycho-cardiology intervention frameworks, the proposed cardiac-psychological integrated care model, with psychological resilience-building as its core structural and functional foundation, offers distinct novelty and practical clinical value. Conventional ACS care silos physiological and psychological support, with psychological interventions typically initiated only after the onset of severe distress, and social support is assessed in an ad hoc, non-standardized manner.^[31] This model reverses this reactive approach by integrating proactive resilience assessment and building from Day 1 of inpatient admission, identifying “psychologically fragile” patients and addressing ecological resilience factors (family functioning and social support) as early as the acute phase. Unlike other psycho-cardiology intervention frameworks that focus solely on reducing psychological distress (such as anxiety/depression symptom management), this model targets resilience as a modifiable protective factor, breaking the vicious cycle of physical and mental deterioration by strengthening patients’ capacity to adapt to the chronicity of ACS, rather than just mitigating negative emotional states.^[32] The model’s four key structural components, including early screening, family-centered assessment, social support mapping, and digital integration, are uniquely designed to be sequential, continuous, and phase-specific, aligning with the dynamic recovery needs of ACS patients from acute inpatient care to long-term follow-up. This stands in contrast to one-time or short-term psycho-cardiology interventions that lack care continuity and fail to sustain resilience gains post-discharge. Practically, the model is anchored in real-world clinical practice at the Psycho-cardiology Medical Center of Beijing Anzhen Hospital, with all components val-

idated for feasibility against frontline nursing workflows and revised to address the unique unmet needs of ACS patients in a real-world cardiovascular care setting. The addition of the nurse-led resilience discharge checklist further translates theoretical resilience-building strategies into actionable, step-by-step clinical practice, ensuring that integrated care is not just a conceptual framework but an implementable roadmap for inpatient nurses, with clear alignment between intervention theory and bedside practice.

8.3 Implementation challenges and contextual adaptive strategies

The identified implementation challenges, including time/resource constraints, stigma around cardiac mental health, nurse training gaps, and organizational culture barriers, are not unique to this model but reflect systemic and clinical realities of contemporary cardiovascular care, and their real-world relevance demands nuanced, contextually adaptive strategies rather than one-size-fits-all solutions.

For time and resource constraints in high-acuity CCU environments, where physiological stability is prioritized, brief, validated screening tools (such as CD-RISC 10 and PHQ-2) can be integrated into routine nursing assessments (such as vital sign checks and medication administration) to eliminate dedicated “psychological assessment” time. Additionally, resilience interventions can be delivered in micro-doses (such as 5-minute paced breathing guidance and brief cognitive reframing conversations) during bedside care, rather than as separate long-form sessions. Stigma related to “mental health” labels in cardiac patients can be mitigated through normalization and reframing of psychological care as “cardiac stress management” or “emotional strength building for heart recovery”, framing resilience interventions as an integral part of cardiac rehabilitation rather than a separate mental health service. This reframing is supported by evidence that patients are more engaged with psychological care when it is tied directly to tangible cardiac outcomes (such as reduced stress-induced ischemia and improved heart rate variability).

For nurse training gaps, a train-the-trainer model is proposed, where specialist psycho-cardiology nurses and clinical psychologists train frontline cardiac nurses in core resilience-building techniques (including cognitive reappraisal, brief positive psychology interventions, and vagal tone regulation) and psychological crisis identification. This modular training can be delivered via in-person workshops and digital learning platforms, with ongoing mentorship to build competency without disrupting clinical workflows. Importantly, training should prioritize nurse self-efficacy in delivering psychological care, as many cardiac nurses report anxiety

about “overstepping” into mental health practice.

Organizational culture barriers require institutional commitment to integrating psychological care into core ACS care metrics, with hospital administrators allocating dedicated resources for screening tools, digital health platforms, and nurse training, and embedding mental health and resilience outcomes (such as CD-RISC scores and psychological distress rates) into quality improvement benchmarks alongside traditional cardiac outcomes (such as rehospitalization and mortality). For low-resource healthcare settings, the model can be adapted by simplifying digital integration to low-cost mobile messaging platforms (rather than advanced mHealth apps) and leveraging community health workers to support social support mapping and post-discharge resilience follow-up, ensuring scalability across diverse healthcare systems.

8.4 Limitations of the current model development work

The current evidence-based development of the cardiac-psychological integrated care model has key limitations that must be acknowledged to guide future research and clinical translation.

First, the most significant limitation is the lack of empirical pre/post clinical testing with ACS patient cohorts to date. While the model is built on 33 peer-reviewed studies, clinical consensus statements, and systematic reviews, and validated for internal clinical feasibility by a multidisciplinary team, it has not yet been tested in a real-world clinical setting to verify its efficacy in improving resilience scores, reducing psychological distress, or enhancing long-term cardiac outcomes. This limits the ability to draw causal conclusions about the model’s impact and to identify patient subgroups that may benefit most from specific resilience interventions.

Second, this systematic review only included English-language literature, which may introduce publication bias and limit the generalizability of the model to non-Western ACS populations, even though the model was developed based on clinical insights from a Chinese cardiovascular center.

Third, the model’s digital integration component assumes baseline access to mobile health technology and digital literacy among ACS patients, which may not be universal, particularly among elderly, rural, or socioeconomically disadvantaged patient groups, potentially exacerbating health disparities if not adapted for low-tech settings.

Fourth, the model focuses on the inpatient and early post-discharge phase of ACS care, with less detailed guidance on long-term (≥ 6 months) resilience maintenance. Although

outpatient digital monitoring and follow-up are included, the specific booster interventions needed to sustain resilience gains over the chronic course of ACS remain undefined and require further research.

Finally, the model does not yet account for comorbid chronic conditions (such as diabetes and chronic kidney disease) that are highly prevalent in ACS patients and may modify resilience trajectories and intervention response, a critical consideration for real-world applicability.

8.5 Alignment with global ACS and psycho-cardiology clinical practice guidelines

The design and core components of the cardiac-psychological integrated care model are fully aligned with global ACS and psycho-cardiology clinical practice guidelines, most notably the 2025 ESC Clinical Consensus Statement on Mental Health and Cardiovascular Disease, which serves as a foundational evidence base for the model’s development and implementation recommendations.^[6] The ESC Consensus Statement mandates routine screening for psychological distress in all ACS patients and the integration of evidence-based psychological interventions into standard cardiac rehabilitation, which initiates standardized screening for psychological distress and resilience on Day 1 of inpatient admission and embeds resilience-building interventions into pre-discharge and post-discharge cardiac rehabilitation workflows. The model’s family-centered care approach aligns with the ESC statement’s emphasis on supporting caregiver resilience and addressing family system factors, as family functioning is recognized as a key social determinant of cardiovascular outcomes. Additionally, the model’s focus on nurse-led integrated care aligns with international guidelines from the World Heart Federation and the American Heart Association, which prioritize nursing as a cornerstone of psycho-cardiology care delivery due to nurses’ frontline role in the ACS care continuum. The model’s digital integration component also aligns with the ESC’s recommendations for leveraging digital health to improve care continuity in cardiovascular disease, with real-time monitoring of cardiac physiology and psychological status addressing the guideline’s call for “just-in-time” interventions to prevent adverse events post-discharge. Finally, the model’s future clinical validation framework, with multi-dimensional target measurements spanning clinical, psychological, social-functional, and care delivery outcomes, aligns with the ESC’s emphasis on holistic outcome assessment in psycho-cardiology, moving beyond traditional cardiac endpoints to include patient-reported quality of life, self-efficacy, and caregiver burden as critical measures of care success.

8.6 Broader significance of the model in psycho-cardiology

This resilience-centered cardiac-psychological integrated care model fills a critical gap in the psycho-cardiology literature by providing a structured, nurse-led framework for integrating resilience-building into routine ACS care, a need that has been highlighted in numerous systematic reviews and clinical consensus statements but not yet operationalized into a feasible, phase-specific clinical roadmap. Psycho-cardiology research has long established the bidirectional link between psychological resilience and cardiac health, but this model translates that evidence into practice, making resilience-building accessible to frontline nurses and scalable across cardiovascular care settings.^[33] For ACS patients, the model represents a shift from a fear-based, dependence-driven recovery journey to one of adaptation and strength, addressing the “Fear of Progression” and cardiophobia that are major barriers to cardiac rehabilitation and long-term adherence. For the broader field of psycho-cardiology, the model advances the integration of resilience theory into clinical practice, extending its application from chronic heart failure to acute cardiovascular events and providing a template for developing resilience-centered care models for other cardiovascular conditions (such as heart failure and hypertension). Ultimately, this model reinforces the core tenet of psycho-cardiology, namely, cardiac health and emotional health are inseparable, and holistic ACS care must address both to improve long-term patient prognosis and quality of life.

8.7 Key recommendations

Based on the 2025 ESC Clinical Consensus Statement on Mental Health and Cardiovascular Disease,^[6] healthcare systems should:

- Routinely screen for psychological distress and resilience factors in all ACS patients
- Integrate evidence-based resilience-building interventions into standard cardiac rehabilitation
- Prioritize and scale nurse-led training programs in basic psychological first aid and resilience coaching, building on the proven efficacy of nurse-led care in cardiovascular and psycho-cardiology practice
- Develop family-centered care pathways that support both patients and caregivers
- Allocate dedicated research funding and resources to design and implement rigorous pre/post clinical trials that apply the predefined multi-dimensional target measurements of success, for the empirical validation of this cardiac-psychological integrated care model in diverse ACS patient populations (e.g., urban/rural

settings, different age/disease severity subgroups, and varied healthcare system contexts), to confirm its clinical validity, specificity and scalability in real-world practice.

9. CONCLUSION AND FUTURE DIRECTIONS

Integrated cardiac-psychological care models centered on psychological resilience-building represent a transformative, evidence-informed paradigm shift for universal ACS care management, and the nurse-led resilience-focused model developed in this study is uniquely positioned to be systematically incorporated into all stages of routine ACS care delivery. As the “Resilience Architect”, the clinical nurse plays an irreplaceable and central role in this paradigm shift, transforming the ACS patient’s recovery journey from one of fear and dependence to one of adaptive strength and self-efficacy. This nurse-led care framework is firmly rooted in robust evidence from prior cardiovascular and psycho-cardiology research, which has repeatedly confirmed that nurse-led integrated interventions across the ACS care continuum are an evidence-based, highly scalable approach to optimizing patient outcomes, including improved physiological recovery, reduced psychological distress, enhanced long-term treatment adherence, and diminished risk of recurrent cardiac events. Notably, this author-developed cardiac-psychological integrated care model is a novel, structured, and practice-ready framework that addresses the critical gap in holistic ACS care by unifying cardiac and psychological support with resilience-building as its core. Its phase-specific design, alignment with global clinical guidelines, and adaptability to diverse healthcare settings make it a viable and essential addition to standard ACS care management protocols worldwide. While the model currently lacks rigorous clinical validity and specificity verification through pre/post empirical testing with ACS patient cohorts, pre-defined multi-dimensional target measurements of success have been established as primary and secondary endpoints for future trials, fully aligned with core ACS care outcomes and resilience-building goals. Therefore, the rigorous clinical validation through pre/post patient trials is established as the overarching and most critical priority for future research, which is a necessary step to facilitate the model’s formal integration into mainstream ACS care management, translate its evidence-based theoretical design into tangible real-world clinical benefit, and ensure its scalability across urban/rural, high/low-resource, and international healthcare systems. This validation will further solidify the model’s role as a foundational component of holistic ACS care, ensuring that psychological resilience-building is no longer an adjunct to cardiac care but a core, non-negotiable element of all ACS care management path-

ways.

9.1 Target measurements of success for clinical validation

To systematically evaluate the clinical value and feasibility of the developed cardiac-psychological integrated care model in future empirical testing, multi-dimensional target measurements of success have been defined, derived from evidence-based ACS and psycho-cardiology research, and covering clinical, psychological, social-functional, and care delivery domains.

- **Clinical Outcomes:** Reduced ACS-related rehospitalization and mortality rates; improved long-term medication adherence; increased participation and completion rates of cardiac rehabilitation programs.
- **Psychological Outcomes:** Elevated psychological resilience scores (assessed via the Connor-Davidson Resilience Scale, CD-RISC); reduced depression and anxiety levels (measured by the Patient Health Questionnaire-9 (PHQ-9) and validated anxiety scales); decreased “Fear of Progression” and cardiophobia in ACS patients.
- **Social-Functional Outcomes:** Enhanced family resilience and social support network functionality; improved patient-reported quality of life (QoL) via cardiovascular-specific QoL scales; increased patient self-efficacy and independent self-care capacity.
- **Care Delivery Outcomes:** Sustained post-discharge care continuity (monitored via digital health platform engagement); increased patient adherence to long-term follow-up appointments; reduced caregiver burden and burnout (assessed via standardized caregiver burden scales).

These target measurements will be systematically tracked and analyzed across diverse ACS patient subgroups (e.g., urban/rural settings, different age/disease severity cohorts, varied healthcare system contexts) to verify the model’s efficacy, scalability, and real-world clinical applicability.

9.2 Future research directions

Several knowledge gaps warrant investigation, with pre/post clinical validation of the developed cardiac-psychological integrated care model serving as the foundational overarching focus that guides and contextualizes all subsequent research efforts, with a central goal of supporting the model’s widespread incorporation into routine ACS care management globally:

- **Optimal Intervention Timing:** Determining the most

effective window for initiating resilience interventions post-ACS to maximize long-term adherence and outcomes

- **Personalized Approaches:** Identifying patient subgroups most likely to benefit from specific intervention types based on baseline resilience, social support, and demographic factors
- **Technology Integration:** Leveraging artificial intelligence and machine learning to predict psychological deterioration and deliver personalized digital interventions.^[14]
- **Mechanism Studies:** Further elucidating the biological mechanisms through which resilience interventions influence cardiovascular outcomes, including epigenetic changes and neuroplasticity
- **Economic Analyses:** Conducting cost-effectiveness studies to demonstrate the value proposition of nurse-led resilience programs to healthcare administrators and policymakers

Future efforts should focus on standardized resilience-training protocols, the integration of digital health tools, rigorous pre/post clinical testing, and validation of the developed cardiac-psychological integrated care model, and the ultimate establishment of this model as a core component of psycho-cardiology care that is universally incorporated into all ACS care management pathways worldwide, honoring the inseparable connection between emotional and cardiac health throughout the continuum of care.

ACKNOWLEDGEMENTS

We are very grateful for the valuable contributions of the members of the Department of Psycho-cardiology, Beijing Anzhen Hospital Affiliated to Capital Medical University, especially Haiyang Chen.

AUTHORS CONTRIBUTIONS

Qian Tao: Conceptualization, Writing - Original Draft, Writing - Review & Editing. Zhimin Fan: Conceptualization, Data Curation, Writing - Review & Editing. Meiyuan Liu: Conceptualization, Supervision, Writing - Review & Editing. All authors read and approved the final manuscript.

FUNDING

Not applicable.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare that no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

INFORMED CONSENT

Obtained.

ETHICS APPROVAL

The Publication Ethics Committee of the Association for Health Sciences and Education. The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

PROVENANCE AND PEER REVIEW

Not commissioned; externally double-blind peer reviewed.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not

publicly available due to privacy or ethical restrictions.

DATA SHARING STATEMENT

No additional data are available.

OPEN ACCESS

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

COPYRIGHTS

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

REFERENCES

- [1] Nohria R, Viera AJ. Acute Coronary Syndrome: Diagnosis and Initial Management. *Am Fam Physician*. 2024; 109(1): 34-42. PMID: 38227869
- [2] Ganz FD, Raanan O, Shafir G, et al. Distress among hospitalized patients with acute coronary syndrome. *Nurs Crit Care*. 2022; 27(2): 165-171. PMID:34766409 <https://doi.org/10.1111/nicc.12730>
- [3] Smith JN, Negrelli JM, Manek MB, et al. Diagnosis and management of acute coronary syndrome: an evidence-based update. *J Am Board Fam Med*. 2015; 28(2): 283-93. PMID:25748771 <https://doi.org/10.3122/jabfm.2015.02.140189>
- [4] Kondo A, Oki T, Otaki A, et al. Relationship Between Resilience and Perceived Control After Acute Coronary Syndrome: A Prospective Study. *J Cardiovasc Nurs*. 2023; 38(1): E20-e30. PMID:35297392 <https://doi.org/10.1097/JCN.0000000000000898>
- [5] Princip M, Pazhenkottil AP, Barth J, et al. Effect of Early Psychological Counseling for the Prevention of Posttraumatic Stress Induced by Acute Coronary Syndrome at Long-Term Follow-Up. *Front Psychiatry*. 2022; 13: 846397. PMID:35711604 <https://doi.org/10.3389/fpsy.2022.846397>
- [6] Bueno H, Deaton C, Farrero M, et al. 2025 ESC Clinical Consensus Statement on mental health and cardiovascular disease: developed under the auspices of the ESC Clinical Practice Guidelines Committee. *Eur Heart J*. 2025; 46(41): 4156-4225. PMID:40878270 <https://doi.org/10.1093/eurheartj/ehaf191>
- [7] Feigin V, Abate M, Abate Y et al. Global, regional, and national burden of stroke and its risk factors, 1990-2021: a systematic analysis for the Global Burden of Disease Study 2021. *Lancet Neurol*. 2024; 23(10): 973-1003. PMID:39304265 [https://doi.org/10.1016/S1474-4422\(24\)00369-7](https://doi.org/10.1016/S1474-4422(24)00369-7)
- [8] Arjunan P, Trichur RV. The Impact of Nurse-Led Cardiac Rehabilitation on Quality of Life and Biophysiological Parameters in Patients With Heart Failure: A Randomized Clinical Trial. *J Nurs Res*. 2020; 29(1): e130. PMID:33031130 <https://doi.org/10.1097/JNR.0000000000000407>
- [9] Mizukawa M, Moriyama M, Yamamoto H, et al. Nurse-Led Collaborative Management Using Telemonitoring Improves Quality of Life and Prevention of Rehospitalization in Patients with Heart Failure. *Int Heart J*. 2019; 60(6): 1293-1302. PMID:31735786 <https://doi.org/10.1536/ihj.19-313>
- [10] Abshire Saylor M, Benjasirisan C, Kruahong S, et al. A Contemporary Review of Psychosocial Resilience in Heart Failure Using the Society to Cells Resilience Theory. *Current Geriatrics Reports*. 2023; 12: 176-194. <https://doi.org/10.1007/s13670-023-00398-0>
- [11] Aimo A, Castiglione V, Borrelli C, et al. Oxidative stress and inflammation in the evolution of heart failure: From pathophysiology to therapeutic strategies. *Eur J Prev Cardiol*. 2020; 27(5): 494-510. PMID:31412712 <https://doi.org/10.1177/2047487319870344>
- [12] Chen C, Sun X, Zhang Y, et al. Fear of progression and quality of life in patients with heart failure: a cross-sectional study on the multiple mediation of psychological distress and resilience. *BMC Nurs*. 2025; 24: 60. PMID:39825270 <https://doi.org/10.1186/s12912-025-02688-8>
- [13] Tian L, Tian Y, Sun P, et al. Social support and resilience as mediating factors in the link between illness perception and fear of progression among older patients with chronic heart failure: A multiple mediator model. *Geriatr Nurs*. 2025; 65: 103521. PMID:40639078 <https://doi.org/10.1016/j.gerinurse.2025.103521>
- [14] Harbi AS, Soh KL, Yubbu PB, et al. Digital health intervention in patients undergoing cardiac rehabilitation: systematic review and meta-analysis. *F1000Res*. 2024; 13: 596. PMID:38984016 <https://doi.org/10.12688/f1000research.152315.1>
- [15] Darsin Singh SK, Ahmad A, Rahmat N, et al. Nurse-led intervention on knowledge, attitude and beliefs towards acute coronary syndrome. *Nurs Crit Care*. 2018; 23(4): 186-191. PMID:27071369 <https://doi.org/10.1111/nicc.12240>
- [16] Hwang M, Chang AK. The effect of nurse-led digital health interventions on blood pressure control for people with hypertension: A systematic review and meta-analysis. *J Nurs Scholarsh*. 2023; 55(5): 1020-1035. PMID:36929538 <https://doi.org/10.1111/jnu.12882>
- [17] Xu J, Gao Z, Ji P, et al. Relationship between psychological resilience and quality of life in cancer patients and the multiple mediating roles of stigma and self perceived burden. *Sci Rep*. 2025; 15: 12375. PMID:40210934 <https://doi.org/10.1038/s41598-025-96460-2>

- [18] Bateman RM; Sharpe MD; Jagger JE, et al. 36th International Symposium on Intensive Care and Emergency Medicine: Brussels, Belgium. 15-18 March 2016. *Crit Care*. 2016; 20(Suppl 2): 94. PMID:27885969 <https://doi.org/10.1186/s13054-016-1208-6>
- [19] Kamath DY, Bhuvana KB, Dhiraj RS, et al. Patient and caregiver reported facilitators of self-care among patients with chronic heart failure: report from a formative qualitative study. *Wellcome Open Res*. 2020; 5: 10. PMID:32266322 <https://doi.org/10.12688/wellcomeopenres.15485.2>
- [20] Jalali D, Abdolazimi M, Alaei Z, et al. Effectiveness of mindfulness-based stress reduction program on quality of life in cardiovascular disease patients. *Int J Cardiol Heart Vasc*. 2019; 23: 100356. PMID:31011624 <https://doi.org/10.1016/j.ijcha.2019.100356>
- [21] Zhou RR, Chen LL, Lin LD. Mindfulness-based stress reduction and mental health in department of emergency nurses: A narrative review. *World J Psychiatry*. 2025; 15(9): 107630. PMID: 40933167 <https://doi.org/10.5498/wjp.v15.i9.107630>
- [22] Ditto B, Eclache M, Goldman N. Short-term autonomic and cardiovascular effects of mindfulness body scan meditation. *Ann Behav Med*. 2006; 32(3): 227-34. PMID:17107296 https://doi.org/10.1207/s15324796abm3203_9
- [23] Woo M, Kim T. Effects of slow-paced breathing and humming breathing on heart rate variability and affect: a pilot investigation. *Physiol Behav*. 2025; 299: 114972. PMID:40482984 <https://doi.org/10.1016/j.physbeh.2025.114972>
- [24] Wong G, Sun R, Adler J, et al. Loving-kindness meditation (LKM) modulates brain-heart connection: An EEG case study. *Front Hum Neurosci*. 2022; 16: 891377. PMID:36118979 <https://doi.org/10.3389/fnhum.2022.891377>
- [25] Savoldelli A, Regazzoni V, Rizzola G, et al. Telemedicine and Remote Management of Patients with Heart Failure: From Theory to Daily Practice. *Telemed J E Health*. 2024; 30(10): 2620-2629. PMID:38963767 <https://doi.org/10.1089/tmj.2024.0067>
- [26] Miah N, Halili A, Raqeebuzzaman M. Effectiveness of Nurse-Led Cardiac Rehabilitation Compared to Routine Care: A Systematic Review. *Cureus*. 2025; 17(11): e96408. PMID: 41216251 <https://doi.org/10.7759/cureus.96408>
- [27] Celik S, Taskin Yilmaz F, Gundogdu S, et al. The Effect of Nursing Counseling on Treatment Compliance: Acute Coronary Syndrome and Diabetes Mellitus. *J Nurs Res*. 2024; 32(4): e339. PMID:38975831 <https://doi.org/10.1097/jnr.00000000000000621>
- [28] Krüger N, Krefting J, Kessler T, et al. Ticagrelor vs Prasugrel for Acute Coronary Syndrome in Routine Care. *JAMA Netw Open*. 2024; 7(12): e2448389. PMID:39621344 <https://doi.org/10.1001/jamanetworkopen.2024.48389>
- [29] Bagheri H, Shakeri S, Nazari AM, et al. Effectiveness of nurse-led counselling and education on self-efficacy of patients with acute coronary syndrome: A randomized controlled trial. *Nurs Open*. 2022; 9(1): 775-784. PMID:34766453 <https://doi.org/10.1002/nop2.1129>
- [30] Badawy W, Zinhom H, Shaban M. Perceptions of Resilience Among Nurses: A Qualitative Study Based on the Society-To-Cells Framework. *J Adv Nurs*. 2024. PMID:39740073 <https://doi.org/10.1111/jan.16739>
- [31] Bergrath S, Müller M, Rossaint R, et al. Guideline adherence in acute coronary syndromes between telemedically supported paramedics and conventional on-scene physician care: A longitudinal pre-post intervention cohort study. *Health Informatics J*. 2019; 25(4): 1528-1537. PMID:29865891 <https://doi.org/10.1177/1460458218775157>
- [32] Zhao Z, Feng Y, Wang Y, et al. Relationship between stressful life events and coronary plaque vulnerability among patients with acute coronary syndrome: a moderated mediation model of psychological distress and physiological indices. *Psychol Health Med*. 2023; 28(2): 390-400. PMID:35382649 <https://doi.org/10.1080/13548506.2022.2061717>
- [33] Zhang L, Bao Y, Li G, et al. Prevalence and risk factors of cardiovascular diseases and psychological distress among female scientists and technicians. *J Zhejiang Univ Sci B*. 2022; 23: 1057-1064. PMID:36518057 <https://doi.org/10.1631/jzus.B2200162>