

Research Progress on the Application of Family Resilience during the Recovery Period of Patients with Acute Myocardial Infarction

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Abstract

Acute myocardial infarction (AMI) is a critical form of cardiovascular disease characterized by sudden onset, severe symptoms, and a high incidence of complications. It is associated with high morbidity and mortality rates, posing a serious threat to patients' lives and health. The prolonged recovery period often leads to negative emotions such as anxiety and depression, which significantly impact patients' quality of life and rehabilitation outcomes. Family resilience, as the core capacity of the family system to cope with crises, adapt to adversity, and achieve growth, plays a pivotal role during the recovery phase of AMI patients. It effectively alleviates negative emotions, reduces the caregiving burden on families, and promotes both physical and mental rehabilitation of patients. This article reviews the concept of family resilience, relevant measurement tools, and factors influencing family resilience among patients with acute myocardial infarction. It proposes corresponding clinical nursing interventions for these factors, with the aim of providing a reference and guidance for further research on family resilience during the recovery phase of patients with acute myocardial infarction.

Keywords

Family Resilience, Acute Myocardial Infarction (AMI), Influencing Factors, Nursing Intervention

1. Introduction

Acute myocardial infarction (AMI) is a clinical syndrome defined by myocardial necrosis resulting from acute, persistent myocardial ischemia and hypoxia. It is

characterized by sudden onset, rapid clinical progression, and a high incidence of complications, rendering it one of the leading causes of cardiovascular mortality and disability globally [1]. According to the 2024 China Cardiovascular Health and Disease Report, the crude incidence rate of AMI among Chinese residents aged 18 years and older reached 87.6 per 100,000 population in 2023, and the incidence rate exhibits a pronounced upward trend with increasing age, placing substantial medical and economic burdens on individuals, families, and society at large [2]. Following acute emergency management, patients with AMI require a recovery period of 3 to 6 months, and in some cases even longer. During this convalescent phase, patients typically experience generalized physical weakness and impaired mobility, necessitating long-term adherence to prescribed pharmacotherapies and regular clinical follow-up assessments. Additionally, they remain at elevated risk of major complications including arrhythmias and heart failure, and are highly vulnerable to negative psychological states such as anxiety, depression, and fear. These affective disturbances not only impede functional recovery but also place considerable caregiving strain and psychological burden on family caregivers [3].

As the primary support system for patients, the family exerts a direct impact on their rehabilitation outcomes and quality of life through its ability to cope with disease-related crises. Family resilience, a rapidly growing research focus in nursing in recent years, refers to the capacity of the family system to effectively adapt to challenges, actively recover, and achieve positive growth by integrating internal and external resources and dynamically adjusting its functions when confronted with significant stressors, crises, or adversities [4]. Accumulating evidence has shown that higher levels of family resilience enable AMI patients and their families to better cope with the physical and psychological stressors imposed by the disease, improve patients' mental well-being, enhance care quality, and facilitate earlier functional recovery [5]-[7]. While considerable progress has been made in family resilience research globally, systematic reviews specifically focusing on family resilience during the recovery phase of acute myocardial infarction (AMI) remain limited; furthermore, relevant research in China is still in its early stages, with notable challenges including inadequate theoretical localization and homogenized intervention strategies. Against this background, the present study systematically reviews the concept, measurement tools, influencing factors, and nursing interventions related to family resilience in AMI patients, providing a valuable reference for clinical nursing practice and future research directions.

2. The Concept of Family Resilience

The term “resilience” derives from the Latin verb *resilire*, originally meaning “to rebound or recover”. Originally employed in physics to describe an object's ability to return to its original state after being subjected to external forces, the concept has over time been extended to the fields of psychology and sociology, where it refers to the capacity of individuals or groups to adapt and recover in the face of adversity [8]. In this review, family resilience in AMI recovery is defined at the

family-system level rather than as a trait of the patient or primary caregiver alone. Walsh's family resilience framework identifies three core domains: belief systems, organizational patterns, and communication/problem-solving processes [9]. Hawley and DeHaan also emphasized family resilience as a process of whole-family adaptation and integration across the life span [8]. Ruan Xiao *et al.*'s Chinese conceptualization can be aligned with these international frameworks: dynamic adaptability corresponds to organizational flexibility, stress resistance reflects the maintenance of family functioning under pressure, and proactive coping reflects positive belief systems and collaborative problem solving [4]. This distinction helps differentiate family resilience from family function, individual coping, caregiver burden, and family hardiness. This concept delineates three core attributes of family resilience: First, dynamic adaptability: this emphasizes that family resilience is not a static trait but a dynamic process whereby families continuously adjust their coping strategies and adapt to adversity over time and in response to environmental changes; during crisis management, families not only restore their baseline functions but also achieve self-improvement and growth [9]. Second, stress resistance: this refers to the ability of the family system to maintain the stability of its core functions in the face of adversity, withstand stress impacts, and rapidly return to baseline functioning following stress resolution, and even achieve functional enhancement [4]. Third, proactive coping: this describes the family's ability to maintain a positive outlook during crises, actively mobilize internal and external resources, adopt evidence-based and effective coping strategies, mitigate stress impacts, and strengthen the stability of the family system [10].

3. Measuring Tools for Family Resilience

As research on family resilience continues to advance, international scholars have developed a variety of scales to quantify resilience levels across diverse populations. Several of these scales have been widely applied to families of patients living with chronic conditions, including acute myocardial infarction (AMI) and cancer, and have demonstrated satisfactory psychometric properties with good reliability and validity. Below, we present a detailed overview of the four most widely used family resilience measurement tools currently in clinical and research practice [11].

3.1. Family Resilience Assessment Scale (FRAS)

The Family Resilience Assessment Scale (FRAS), developed by Sixbey in 2005 based on Walsh's family resilience framework, is currently one of the most widely used and well-validated tools for measuring family resilience globally [12]. The commonly used version comprises six dimensions (family communication and problem-solving, utilizing social and economic resources, maintaining a positive outlook, family connectedness, family spirituality, and ability to make meaning of adversity) with a total of 54 items. It uses a 4-point Likert scale, yielding a total score ranging from 54 to 216, where higher scores correspond to higher levels of family resilience. The orig-

inal scale has an overall Cronbach's alpha of 0.96, with Cronbach's alpha values for individual dimensions ranging from 0.70 to 0.96, indicating excellent internal consistency. This scale was subsequently localized and revised by Dong *et al.* in 2018 with consideration for cultural differences and respondent burden; the Chinese version retains four dimensions and 44 items, demonstrating a Cronbach's alpha of 0.96 for the total scale and 0.70 to 0.97 for its subscales [13].

3.2. Family Index of Regenerativity and Adaptation-General (FIRA-G)

The Family Index of Regenerativity and Adaptation-General (FIRA-G), developed by McCubbin *et al.* [14], consists of seven subscales with a total of 79 items. This scale employs a 4-to-5-point Likert rating system, offering a broad and comprehensive assessment range that enables the measurement of family coping patterns across multiple dimensions. The Cronbach's alpha coefficients for each subscale range from 0.69 to 0.82. However, due to the tool's excessive number of items and complex content, respondents may encounter difficulties during completion, potentially compromising the quality of the collected data. Its practical utility thus requires further validation.

3.3. Family Resilience Questionnaire (FRQ)

The Family Resilience Questionnaire (FRQ) was developed by Faccio *et al.* in 2019 based on Walsh's family resilience framework, initially for cancer patients [15]. It includes 4 dimensions (communication and cohesion, perceived social support, family coping, and spirituality), 24 items, and a 7-point Likert scale, with a total score ranging from 24 to 168. Higher scores reflect stronger family resilience. It has good psychometric properties and is suitable for chronic disease families.

3.4. Family Resilience Assessment (FRA)

The Family Resilience Assessment (FRA), developed by Duncan Lane *et al.* in 2017 based on Walsh's family resilience theoretical model, was initially designed for breast cancer patients and their families and has subsequently been widely validated and applied to families affected by a range of other chronic diseases [16]. This scale is structured around three core themes (belief systems, organizational patterns, and communication processes), encompassing nine dimensions and a total of 29 items. It uses a 5-point Likert scale, with responses scored from 1 ("never") to 5 ("always"), yielding a total score ranging from 29 to 145, where higher scores correspond to higher levels of family resilience.

The original FRA has a Cronbach's alpha of 0.929, indicating good reliability and validity [16]. To adapt this scale for use in the Chinese population, Zhang *et al.* conducted localization and cross-cultural adaptation, evaluating its psychometric properties in a sample of Chinese breast cancer patients. The finalized Chinese version of the FRA yielded a Cronbach's alpha of 0.961 for the total scale, with Cronbach's alpha values ranging from 0.852 to 0.937 for individual dimensions and a test-retest reliability of 0.86, confirming that the Chinese version of

the FRA also possesses satisfactory reliability and validity [17]. This scale features a clear factor structure and concise items, covering all core domains of family resilience; it is therefore suitable for assessing family resilience in AMI patients and provides a sound scientific basis for the development of targeted clinical interventions.

4. Factors Influencing Family Resilience in Patients with Acute Myocardial Infarction

Factors influencing family resilience during the recovery phase of patients with acute myocardial infarction (AMI) are multifaceted, encompassing multiple domains including patient individual characteristics, disease-related factors, psychological factors, family dynamics, and social contextual influences. In this section, all influencing factors are interpreted as factors affecting the family system rather than the patient alone. Identifying these modifiable and non-modifiable factors provides critical evidence for the development of targeted, evidence-based clinical interventions. Based on the available literature, the key factors affecting family resilience in AMI patients can be broadly classified into the following four categories.

4.1. Personal Demographic Factors

Age and educational level are core demographic factors. Research by Pang *et al.* demonstrated that the family resilience score in convalescent AMI patients aged ≥ 55 years (76.91 ± 3.05) was significantly lower than that in patients aged < 55 years (77.45 ± 4.61); notably, age ≥ 55 years was identified as an independent risk factor for reduced family resilience (OR = 3.785, 95% CI: 1.451 - 6.119, $P < 0.05$) [18]. Elderly patients experience progressive decline in physical function and a higher burden of complications, exhibiting a high degree of dependence on family care. Since their primary caregivers are frequently themselves elderly family members, the overall family support capacity is diminished, which in turn compromises family resilience [18].

In terms of educational attainment, the family resilience score was significantly lower in patients with an associate degree or below (73.41 ± 4.57) versus those with a bachelor's degree or above (76.32 ± 4.25 , $P < 0.05$) [18]. Patients with higher educational levels have greater access to evidence-based rehabilitation knowledge and medical resources, demonstrate stronger communication and collaborative skills, and can effectively mobilize social support to strengthen family resilience [19]; in contrast, patients with lower educational levels exhibit limited disease-related awareness, suboptimal utilization of external support resources, a higher propensity for negative affective states, and greater caregiving burden, which collectively contribute to reduced family resilience [18].

4.2. Disease-Related Factors

Disease course, disease severity, and complications are key disease-related influencing factors. Research by Pang *et al.* demonstrated that patients with a disease

duration of ≥ 5 months had a significantly lower family resilience score (72.58 ± 6.42) compared to those with a duration < 5 months (76.91 ± 4.56), and a disease duration of ≥ 5 months was identified as a risk factor for reduced family resilience (OR = 4.059, 95% CI: 2.746 - 5.373, $P < 0.05$) [18]. A prolonged disease course exerts a sustained drain on the caregiving capacity of family members and increases the financial burden. Additionally, the persistent impairment of patients' physical and mental functions weakens the family's collective coping capacity [19] [20]. Furthermore, greater disease severity and a higher number of complications translate to higher caregiving difficulty and burden, and consequently lower levels of family resilience [21].

4.3. Psychological Factors

Psychological resilience, basic psychological need satisfaction, and hope levels are key psychological factors that collectively influence family resilience. Research by Pang *et al.* demonstrated a positive correlation between psychological resilience and family resilience ($r = 0.406$, $P < 0.05$), with psychological resilience serving as an independent protective factor for family resilience (OR = 4.627, 95% CI: 3.647 - 5.608, $P < 0.05$) [18]. Ding *et al.* found that basic psychological need satisfaction positively and significantly predicts family resilience ($\beta = 0.489$, $P < 0.001$), and hope levels are also positively correlated with family resilience; notably, these two factors act as chain mediators in the pathway linking basic psychological need satisfaction to family resilience [22]. Patients with a positive psychological state can actively cope with the disease and foster a supportive, collaborative family atmosphere; conversely, negative affective states exacerbate the psychological and caregiving burden on family members and ultimately diminish family resilience [23].

4.4. Family and Social Factors

Family communication, family intimacy, social support, and health insurance status are important external influencing factors. Research by Chen *et al.* demonstrates a positive correlation between family resilience and patients' quality of life during AMI recovery [19]. A positive family atmosphere and effective family communication can mitigate caregiving conflicts and enhance family resilience [24] [25]. Regarding social support, studies by Pang *et al.* demonstrate a positive correlation between the utilization of social resources and both psychological resilience and quality of life ($r = 0.325$, 0.368 ; $P < 0.05$) [18]. Medical guidance and community-based services provide substantial support to affected families; households with health insurance bear a lighter medical burden, and their family resilience levels are significantly higher than those of self-paid households [18] [26].

5. Nursing Intervention Measures for Family Resilience during the Recovery Phase of Patients with Acute Myocardial Infarction

The following interventions are organized at the family-system level and are linked to the specific influencing factors identified above; evidence is labeled as

AMI-specific or extrapolated from other chronic disease populations where appropriate.

5.1. Psychological Intervention

This psychological intervention mainly targets psychological resilience, basic psychological need satisfaction, hope, anxiety, and depression described in Section 4.3. The supporting evidence is mainly from AMI studies [18] [22] [23]. With the core objectives of enhancing patients' psychological resilience and meeting their basic psychological needs, this intervention approach respects patients' autonomy in treatment, promptly recognizes their rehabilitation progress, and strengthens their sense of self-efficacy [22]. It also guides family members to enhance emotional companionship and effective communication to alleviate patients' loneliness and anxiety [23]. Additionally, interventions such as mindfulness-based stress reduction (MBSR) and cognitive-behavioral therapy (CBT) may be used to correct patients' negative cognitions; when these approaches are drawn from broader chronic disease or psychosocial intervention literature, they should be regarded as extrapolated evidence that requires further validation in AMI populations.

5.2. Family System Intervention

This family system intervention mainly targets family communication, family function, caregiver burden, elderly caregivers, and prolonged disease course described in Sections 4.1, 4.2, and 4.4. The supporting evidence includes AMI studies [18]-[21] [25] and extrapolated evidence from chronic disease family-resilience research [24]. The family communication climate is optimized by organizing regular family meetings to facilitate open, honest communication between patients and family members about their respective needs, thereby reducing caregiving conflicts [24] [25]. Family members are provided with standardized training on AMI rehabilitation knowledge and evidence-based caregiving skills, which clarifies individual caregiving responsibilities, reduces caregiver burnout, and strengthens overall family caregiving capacity [6] [24]. For high-risk families characterized by elderly caregivers, prolonged disease course, and substantial financial burdens, individualized one-on-one guidance is provided to help them develop tailored coping strategies, thereby enhancing family stress resistance [18].

5.3. Social Support Intervention

This social support intervention mainly targets social resource utilization, community support, and medical burden described in Section 4.4. The supporting evidence includes AMI studies on social resource utilization and medical insurance [18] [19] [26], while evidence from maintenance hemodialysis and other chronic disease populations should be considered extrapolated evidence [27]. A comprehensive social support network is established and a standardized post-discharge continuous nursing follow-up system is implemented to deliver ongoing evidence-based rehabilitation guidance and health counseling. Families are guided

to utilize community-based rehabilitation services and peer support groups, and to access medical insurance reimbursement and healthcare assistance programs, particularly for economically disadvantaged households, thereby alleviating their financial burdens. Resources from healthcare institutions, communities, family and friends, and volunteers are integrated to provide comprehensive support covering professional, emotional, and material dimensions, thereby strengthening the external support system for family resilience.

5.4. Hierarchical Individualized Nursing Intervention

This hierarchical individualized nursing intervention integrates the demographic, disease-related, psychological, family, and social factors described in Sections 4.1 - 4.4. The supporting evidence is mainly from AMI studies [18]-[21] [26], with some intervention logic extrapolated from broader family-resilience research [10]. Stratified interventions are implemented based on patients' age, disease duration, educational attainment, and financial status: for elderly patients, enhanced family care training is provided and personalized rehabilitation care plans are developed [18]; for patients with prolonged disease courses or more complications, continuous psychological counseling, rehabilitation encouragement, and complication monitoring are provided [20] [21]; for patients with low educational attainment, simplified health education approaches are employed to improve their disease self-management capabilities [18]; for patients experiencing financial difficulties, relevant assistance resources are coordinated and enhanced psychological counseling is provided [20] [26]. Dynamic adjustment of intervention protocols promotes synchronous physical and psychological recovery in patients, thereby enhancing family resilience [10].

6. Summary

Family resilience serves as a critical resource for families to maintain functional homeostasis and promote patients' synchronous physical and psychological recovery in the context of disease-related stress. Its level not only directly determines the rehabilitation outcomes and quality of life of patients with acute myocardial infarction (AMI), but also exerts profound positive effects on the mental health of family caregivers and overall family functioning. Internationally, considerable progress has been made in research on the conceptualization, assessment tools, and intervention strategies of family resilience. In contrast, relevant research in China remains in its early stages, with notable challenges including inadequate theoretical localization, homogenized intervention studies, and a lack of evidence on long-term intervention efficacy. Against this background, future research should be grounded in China's unique cultural context and integrate well-established international research experiences to conduct large-scale, multicenter, prospective cohort studies. The ultimate goal is to establish a family resilience assessment system and targeted intervention model tailored specifically for Chinese AMI patients and their families, thereby providing a robust evidence-based foundation for ad-

vancing the high-quality development of cardiac rehabilitation nursing in China.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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