

Naturalistic Decision-Making Patterns in Cardiometabolic Multimorbidity Self-Care: A Qualitative Study

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ABSTRACT

PURPOSE Self-care is central to managing cardiometabolic multimorbidity, yet primary care clinicians have limited insight into how patients navigate self-care decisions in daily life. This study explored self-care decision-making contexts, processes, and patterns among patients with cardiometabolic multimorbidity to inform family medicine practice.

METHODS We conducted a qualitative cohort study guided by naturalistic decision-making theory among 27 adults with cardiometabolic multimorbidity (mean age = 62.7 years; 16 men). Participants were purposively sampled from a tertiary hospital and a community health center in Zhejiang Province, China. We conducted semistructured, face-to-face interviews with patients between September 2024 and February 2025. Transcripts were analyzed using an integrated thematic and narrative approach within a context-mechanism-outcome framework.

RESULTS Self-care decision making among the patients occurred within problem-driven contexts of uncertainty, characterized by 4 dominant "problem" themes: persistent symptom-management challenges, acute health crises, psychological and emotional distress, and uncertainty in illness and treatment. Across 134 self-care decision-making chains, 4 patterns were identified: an experience-anchored pattern (drawing on past experiences for quick responses), a values trade-off pattern (balancing health against competing life priorities), a passive-reactive pattern (making decisions reactively only when compelled by acute crises or authoritative warnings), and a proactive-integrative pattern (leveraging multiple resources proactively to address potential health issues).

CONCLUSIONS Patients with cardiometabolic multimorbidity navigate self-care through 4 decision-making patterns. Recognizing these patterns may help family physicians tailor communication, clarify patients' values, promote shared goal setting, and strengthen patient self-efficacy by linking patients to community and psychosocial resources, thereby supporting continuity, timely help seeking, and person-centered care for cardiometabolic multimorbidity.

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INTRODUCTION

Cardiometabolic multimorbidity, defined as the co-occurrence of 2 or more cardiometabolic conditions (eg, type 2 diabetes, coronary heart disease, stroke), represents a highly prevalent and clinically persistent pattern of multimorbidity.^{1,2} It contributes substantially to population health burdens, including increased mortality, cognitive decline, and growing pressure on health systems.^{3,4} The onset and progression of cardiometabolic multimorbidity are closely linked to modifiable lifestyle factors such as diet and physical activity, making the optimization of daily habits a key therapeutic strategy.^{2,5} Effective self-care behaviors are therefore crucial for mitigating these risks and sustaining primary care systems.^{6,7}

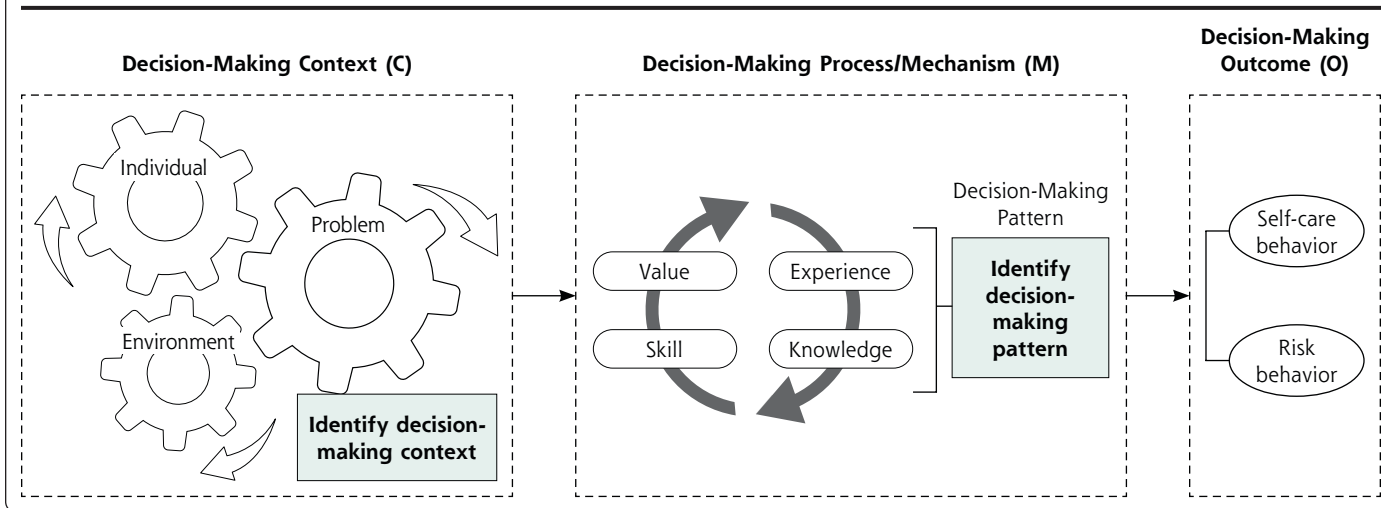
The middle-range theory of self-care of chronic illness conceptualizes self-care behaviors across 3 dimensions: maintenance (maintaining stability), monitoring (tracking symptoms), and management (responding when symptoms occur).⁸ Empirical research consistently indicates that robust self-care significantly improves health indicators, reduces acute events, delays complications, and enhances the overall quality of life among patients with cardiometabolic multimorbidity.⁹ Yet adherence remains suboptimal, reflecting the complexity of multimorbidity and decision-making challenges such as poor symptom recognition, difficulties with medication adherence, and competing social roles.^{3,10,11}

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Figure 1. Diagram Showing a Theoretical Framework of the Self-Care Decision-Making Process in Cardiometabolic Multimorbidity, Viewed Through the Lens of Naturalistic Decision-Making Theory

Despite growing attention to self-care, significant gaps remain in understanding *how* patients with cardiometabolic multimorbidity navigate real-world self-care decisions within dynamic contexts.¹² Much of the evidence comes from cross-sectional quantitative studies that examine self-care determinants (eg, health literacy, self-efficacy) or frequencies of self-care behaviors (eg, medication adherence rates),^{13,14} which conceptualize behaviors as static outcomes (*what* decisions are made) rather than context-dependent processes.¹² Similarly, qualitative studies have primarily focused on barriers to and facilitators of self-care without delving into the underlying mechanisms of decision making.¹⁵ These gaps partly reflect the limits of rational-choice models (eg, the health belief model), which are well suited to explaining intentional, belief-driven behaviors but are less equipped to capture iterative, time-pressured decisions under uncertainty, ambiguity, and goal conflict (conditions that typify cardiometabolic multimorbidity self-care).¹⁶ Accordingly, a more context-sensitive explanatory framework linking decision contexts, mechanisms, and behavioral outcomes is needed to comprehensively understand *how* patients with cardiometabolic multimorbidity navigate self-care decisions in everyday life.¹⁷

Naturalistic decision-making (NDM) theory provides such a lens.¹⁸ Originally developed in high-risk fields (eg, aviation, firefighting), NDM theory examines how individuals make decisions in complex, uncertain, and time-constrained situations and has been increasingly applied in health care.¹⁹ NDM is particularly relevant to cardiometabolic multimorbidity, where patients often interpret fluctuating symptoms across conditions and balance competing demands under constrained resources.²⁰ Prior studies suggest that self-care decision making emerges from the dynamic interplay of personal, problem-related, and environmental factors.²¹ In these contexts, patients draw on an integrated repertoire of knowledge, skills, experience, and values to steer their decision making.²²

We therefore used in our study a qualitative method that integrates NDM theory with a realist context-mechanism-outcome (CMO) heuristic. NDM theory illuminates the process of *how* patients with cardiometabolic multimorbidity make self-care decisions in real-world settings, whereas the CMO framework provides an explanatory structure by linking self-care contexts, underlying mechanisms, and observable behaviors to explain *why* particular self-care decisions emerge in specific contexts and lead to distinct outcomes.^{23,24} This integration enables us to map the self-care “decision-making chain” in cardiometabolic multimorbidity as a contextually embedded process, elucidating not just *what* decisions are made but also *how* and *why* they are made within specific contexts.²⁵

This qualitative study aimed to explore the self-care decision-making processes of patients with cardiometabolic multimorbidity through the lens of NDM theory. Specifically, it addressed 3 core questions: (1) What contexts do patients with cardiometabolic multimorbidity encounter when making self-care decisions in daily life? (2) How do self-care decisions unfold? and (3) What patterns do patients use in their self-care decision making? By addressing these questions, we sought to advance self-care theory in cardiometabolic multimorbidity and generate practical insights to inform context-sensitive interventions in family medicine.

METHODS

Study Design and Ethics

We conducted a qualitative study in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines.²⁶ Ethical approval was obtained from the Ethics Committee of Zhejiang University School of Medicine (ID: 2022-006). Patients provided written informed consent and could withdraw at any time prior to data analysis. Transcripts were deidentified to ensure confidentiality.

Theoretical Framework

Guided by NDM theory,¹⁸ we applied a realist-informed CMO heuristic²⁴ to explore how *contextual* conditions activate decision *mechanisms* (eg, experience, values, knowledge, skills) that shape self-care decision-making *outcomes* in cardiometabolic multimorbidity ([Figure 1](#)). The operational definitions of self-care were based on the middle-range theory of self-care of chronic illness⁸ to ensure conceptual consistency in coding and interpretation ([Table 1](#)).

Study Setting, Patients, and Recruitment

The study took place in a tertiary hospital and a community health center in Zhejiang Province, China. We used a purposive, maximum-variation sampling strategy to recruit information-rich patients with diverse self-care experiences. Sampling was guided by predefined criteria, including sociodemographic characteristics (age, sex, education level, occupation, and urban or rural residence), clinical characteristics (number and combination of cardiometabolic conditions), and care setting (tertiary hospital vs community health center). Inclusion criteria were (1) aged at least 18 years, (2) presence of at least 2 clinically documented cardiometabolic conditions (eg, type 2 diabetes, coronary heart disease, chronic kidney disease, hypertension, stroke), (3) ability to converse in Mandarin, and (4) capacity to provide informed consent. Exclusion criteria were severe cognitive impairment, severe/unstable psychiatric disorders (eg acute psychosis, manic episode), terminal illness, or any condition that precluded interview participation.

Data Collection

We used a semistructured interview guide informed by NDM theory to explore self-care decision making in real-life contexts, eliciting accounts of daily self-care practices, specific decision-making events, contextual influences, and reflections on decision processes and consequences. The guide was developed through a structured process and pilot-tested with 2 eligible patients (not included in analyses); minor refinements improved clarity and sequencing.²⁷ The full interview guide is provided in [Supplemental Appendix 1](#).

Table 1. Key Concepts and Definitions of the Self-Care Decision-Making Process in Patients With Cardiometabolic Morbidity

Key concept	Definition
Decision-making context (C)	The dynamic interaction between the individual, problem, and environment that shapes the self-care decision-making context
Individual	Personal attributes, such as sociodemographics (age, sex, education), self-efficacy, health history
Problem	Health issues or symptoms that trigger a self-care response
Environment	External factors (eg, social support, resources, setting) influencing decision options
Decision-making mechanism (M)	The internal processes through which patients interpret situations and decide how to act, drawing on experiences, personal values, skills, and knowledge
Experiences	Past exposures and events that shape intuitive knowledge and response patterns
Values	Personal or cultural preferences and principles guiding judgments of right and wrong
Skills	Practical ability to apply knowledge effectively in self-care tasks
Knowledge	Health-related information recalled from memory and applied to inform decisions
Decision-making outcome (O)	The result of the decision-making process, either engaging in proactive self-care actions or choosing inaction, including risk behaviors
Self-care maintenance	Routine, proactive behaviors aimed at maintaining health stability and preventing deterioration (eg, medication adherence, healthy diet)
Self-care monitoring	Regular observation and recording of physical or emotional signs (eg, symptom tracking)
Self-care management	Evaluation of changes in signs or symptoms and implementation of appropriate responses, including self-initiated actions or seeking professional care (eg, adjusting medication, contacting health care professionals)
Risk behaviors	Non-action or delayed action that may jeopardize health

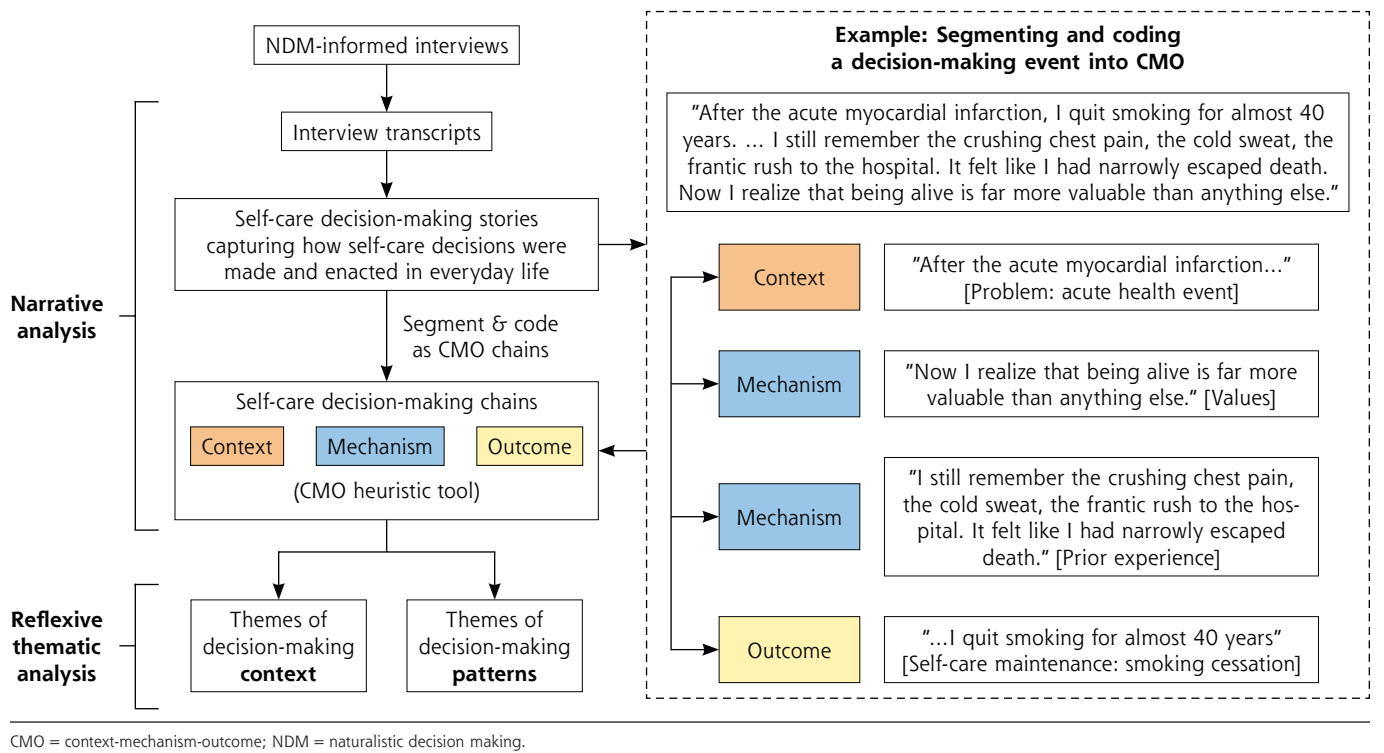
Coding example

An example of coding the self-care decision-making process:

"After the acute myocardial infarction [C, problem: acute health event], I quit smoking for almost 40 years... [O, self-care maintenance: smoking cessation] I still remember the crushing chest pain, the cold sweat, the frantic rush to the hospital. It felt like I had narrowly escaped death. [M, experiences] Now I realized that being alive is far more valuable than anything else [M, values] ..."

Note: The concepts and operational definitions of the self-care decision-making process are based on the middle-range theory of self-care of chronic illness⁸ and related literature. The coding example follows the context-mechanism-outcome (C-M-O) analytic tool rooted in the realist paradigm and is viewed through the lens of naturalistic decision-making theory.

One trained interviewer with no prior relationship to the patients (J.Y.) conducted face-to-face interviews in private rooms. The interviews lasted 32 to 64 minutes (median, 45) and were audio-recorded and transcribed verbatim within 24 hours using voice recognition software (iFLYTEK Co, Ltd), and supplemented with field notes.

Figure 2. Diagram Showing the Integrated Analytic Process for Understanding Naturalistic Self-Care Decision Making in Patients With Cardiometabolic Multimorbidity

Recruitment and data collection continued until conceptual saturation was achieved. Saturation was assessed through iterative, team-based analysis and constant comparison across the dataset. We considered saturation reached when no new explanatory insights or extensions to the analytic structure emerged across interviews representing differing demographic and clinical characteristics, and additional data served only to elaborate and stabilize the existing analytic structure.^{28,29} Data were collected from September 2024 to February 2025. [Supplemental Appendix 2](#) provides further information on data collection.

Data Analysis

We adopted an integrated analytic strategy combining narrative analysis³⁰ and reflexive thematic analysis³¹ ([Figure 2](#)). For narrative analysis,³⁰ interview transcripts were first treated as self-care decision-making stories to identify discrete self-care decision events (triggers, interpretations, actions or deliberate inaction, and perceived outcomes). We segmented the transcripts and coded each event into structured CMO self-care decision-making chains, which served as the primary analytic units for within- and cross-case comparison ([Table 1](#) and [Figure 2](#)). Reflexive thematic analysis³¹ was then used to identify recurring contextual themes and cross-case patterns of self-care decision making. Coding and interpretation evolved through team discussion and reflexive memoing (ie, documenting analytic and reflective notes throughout the research

process). We used NVivo software version 14 (Lumivero, LLC) to support data management and audit trails; further analytic detail is in [Supplemental Appendix 3](#).

RESULTS

Patient Characteristics and Decisions

A total of 27 patients (16 men and 11 women) with cardiometabolic multimorbidity were recruited to the study. They had a mean age of 62.7 years (range, 23-83). Most had 2 or 3 cardiometabolic conditions. Information on each patient's education, occupation, residence, marital status, and recruitment site is provided in [Supplemental Table 1](#).

We identified a total of 134 self-care decision-making chains across the interview transcripts. [Supplemental Appendix 2](#) summarizes the full range and frequency of self-care behaviors identified. The most common pertained to medication adherence (23 patients), vital signs (17 patients), and exercising (14 patients).

Problem-Driven Decision-Making Context

Self-care decision making occurred in contexts shaped by interacting problem-related, personal, and environmental factors. These interactions generated dynamic uncertainty, with self-care decisions typically triggered by health-related problems and made under time pressure or psychological strain. Within this problem-driven context, we identified 4

Table 2. Core “Problem” Themes Triggering Self-Care Decision Making in Cardiometabolic Multimorbidity

Theme	Subthemes	Description	Excerpted quotes (patient ID and description)
Persistent symptom-management challenges	• Difficult to alleviate • Disruption to daily life • Difficult to identify or perceive in time	Patients with cardiometabolic morbidity face ongoing, fluctuating, or novel symptoms, requiring constant, ambiguous cue interpretation and decision making.	“Every nerve in my body seemed to ache.” (P07, male, 51 years old) “I’m often exhausted... sometimes I can’t catch my breath... when my heart acts up, it feels like there’s a weight on my chest.” (P08, female, 66 years old)
Acute health crises	• Life-threatening episodes • Fear of recurrence	Life-threatening episodes (eg, cardiac arrest, loss of consciousness, myocardial infarction) induce marked physiologic and emotional shock, increasing vulnerability and influencing subsequent self-care choices.	“They told my family I was in critical condition and to prepare for the worst.” (P01, female, 71 years) “I broke out in a cold sweat and felt terrible... I could hardly breathe.” (P03, male, 61 years old)
Psychological and emotional distress	• Anxiety • Depression • Helplessness	Living with cardiometabolic morbidity often entails considerable psychological distress (anxiety, frustration, helplessness), leading to delayed or avoidant behaviors, which further complicates symptom appraisal and self-care.	“The doctor said my worries had turned into depression.” (P07, male, 51 years old) “I felt trapped, with no one to talk to. My health was failing, and my family was falling apart. Sometimes I thought it would be better if I were dead.” (P02, male, 62 years old)
Uncertainty in illness and treatment	• Unpredictable disease progression • Uncertainty of treatment efficacy • Inconsistent medical guidance	Uncertainty regarding disease progression, treatment efficacy, and prognosis intensifies stress and complicates decision making, especially when medical guidance is inconsistent or contradictory.	“I had no symptoms at all and never suspected heart disease.” (P05, male, 65 years old) “A year after my stent, I still got dizzy. I’m not sure whether it’s my heart or lingering effects from a stroke... my doctor hasn’t given me a clear answer.” (P07, male, 51 years old)

P = patient.

recurring “problem” themes: persistent symptom-management challenges, acute health crises, psychological and emotional distress, and uncertainty in illness and treatment ([Table 2](#)).

Self-Care Decision-Making Patterns

Building on the self-care decision-making context presented above, we further identified 4 self-care decision-making patterns: experience-anchored, values trade-off, passive-reactive, and proactive-integrative ([Figure 3](#) and [Supplemental Appendix 3](#)). Each pattern represented a distinct way in which patients with cardiometabolic multimorbidity made adaptive decisions in various contexts, drawing on processes such as situational awareness (problem recognition), goal balancing, pattern matching (drawing on past experience), and mental simulation (anticipating consequences). These self-care decision-making patterns were not fixed; rather, they were fluid and behavior-specific, in that the same patient could transition between different patterns based on context. We describe these patterns in greater detail and give examples of relevant quotes from patients, identified by their patient (P) number, below.

Experience-Anchored Decision-Making Pattern

The experience-anchored decision-making pattern was common among patients with long-term cardiometabolic multimorbidity or previous acute events/marked symptom distress,

and involved rapidly matching current symptoms (eg, chest tightness) with prior personal or vicarious experiences and implementing responses deemed effective.

“I started sweating and my hands and feet began trembling. I knew it was probably low blood sugar again, so I quickly grabbed the fruit candy I keep by my bed, and I felt better soon after.” (P23, female, 62 years old)

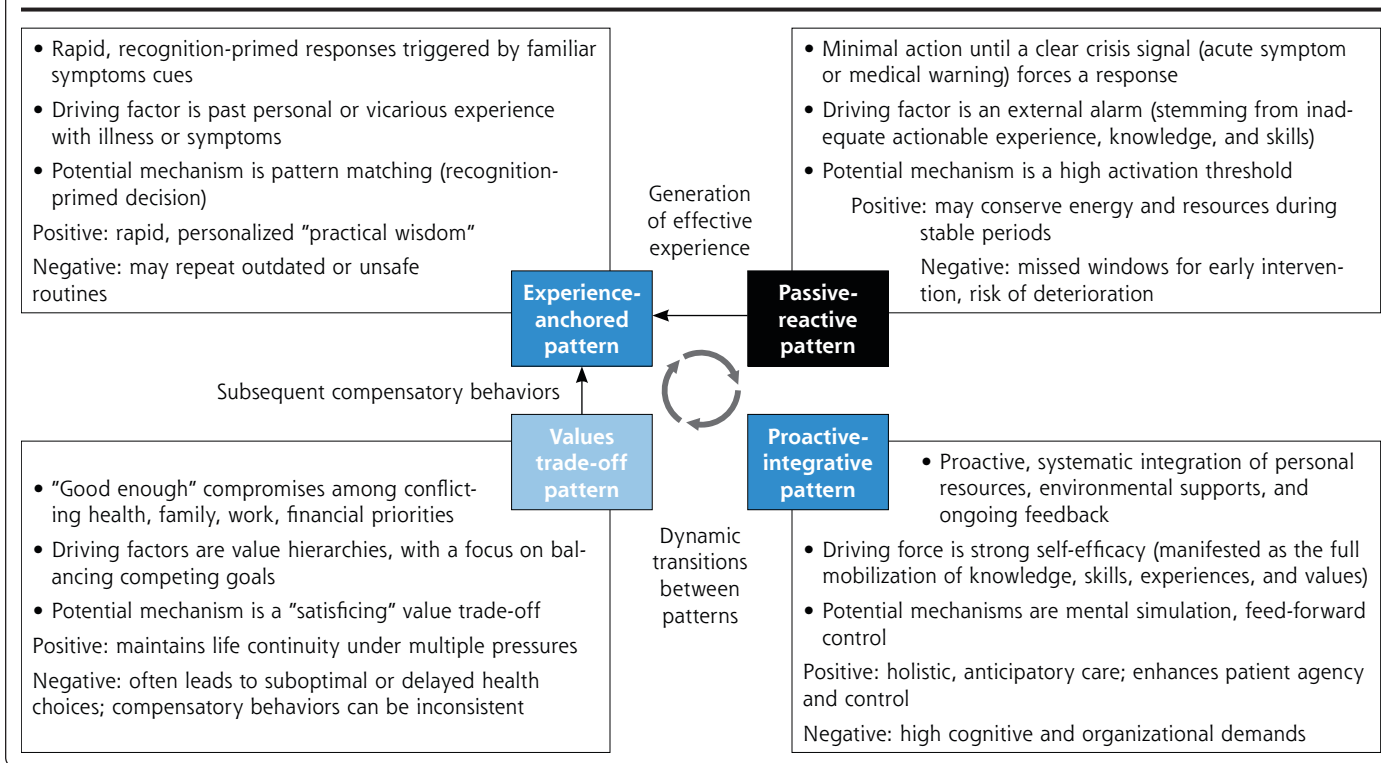
Self-care decision making in this pattern primarily involved *self-care management* (responding to symptoms). Drawing on accumulated experience enabled patients to act quickly through personally developed “practical wisdom.” When experiential knowledge was incomplete or unverified, however, responses could escalate or diverge from recommended care.

“At the hospital, they always told me to eat less and gave me injections... Eventually I thought, ‘What is the point of going back?’ I suspected I had heart disease, and someone recommended Suxiao Jiuxin Wan [a Chinese patent medicine for angina relief]. I started with 5 pills, but soon I was taking 20, then 25 pills ...” (P01, female, 71 years old)

Values Trade-off Decision-Making Pattern

In the values trade-off decision-making pattern, self-care decision making reflected value-based trade-offs in which health goals were negotiated against competing life demands.

Figure 3. Diagram Showing an Overview of Self-Care Decision-Making Patterns in Cardiometabolic Multimorbidity



Patients prioritized caregiving, work, or financial responsibilities and recalibrated self-care to accommodate broader life commitments, often settling for “good enough” rather than optimal adherence.

“At business dinners with leaders, I end up eating out 5 days a week... Honestly, it’s hard for anyone to stick to just vegetables.” (P08, female, 66 years old)

These decisions enabled continuity of social and economic roles but often resulted in partial or delayed adherence. Some patients responded to trade-offs with “compensatory behaviors,” such as increased monitoring or additional exercise after dietary indulgence.

“I usually check [my blood glucose level] every 3 days, but if I eat too many sweets, I may check more often. If the result is high, I’ll eat less that day.” (P02, male, 62 years old)

In such instances, compensatory adjustments appeared to move decision making toward a more experience-anchored pattern. When these decisions lacked structured or scientific guidance, however, self-care remained unstable and fragmented.

Passive-Reactive Decision-Making Pattern

The passive-reactive decision-making pattern was characterized by passive or delayed self-care, with action triggered only after a clear “wake-up” signal, such as an acute event or explicit medical warning. It was most commonly observed among patients who underestimated health risks, had limited

health literacy, or struggled with symptom recognition—particularly during prolonged asymptomatic periods or emotional distress.

“I had no symptoms and didn’t pay much attention, but a routine check-up showed abnormal ECG [electrocardiogram] and echocardiogram results. The doctor warned me it was likely heart disease, so I quit smoking and started controlling my diet.” (P05, male, 65 years old)

Monitoring and preventive behaviors were limited in the absence of overt symptoms, and subtle cues were often overlooked until a crisis prompted action. In several cases, such events subsequently shaped future responses, serving as experiential reference points for later decisions, suggesting that passive-reactive decision making may evolve into the experience-anchored pattern over time.

Proactive-Integrative Decision-Making Pattern

In the proactive-integrative decision-making pattern, patients adopted a systematic and forward-looking approach to self-care that integrated personal resources, environmental supports, and problem-specific knowledge into daily routines, encompassing maintenance, monitoring, and management behaviors. Self-monitoring supported situational awareness and ongoing adjustments.

“Every morning, I check my blood sugar and blood pressure, then take my medication. I log the readings in a notebook; if the numbers are high, I walk more, and it usually improves.” (P27, male, 83 years old)

Patients described anticipating potential fluctuations and adjusting behaviors accordingly, with self-care behaviors flexibly adapted to changes in physical capacity or daily circumstances.

"My grandchildren stay up until 11 PM, so I can't sleep before they do. I've found that a light snack before bed keeps my blood sugar from dropping overnight." (P23, female, 62 years old)

In a minority of patients, this pattern appeared more stable and sustained over time, accompanied by reported higher self-efficacy and a consistent sense of control over health management. Under these conditions, self-care decision making unfolded within a more balanced self-efficacy-driven context, as individual, problem-related, and environmental factors were more coherently aligned.

"...When I was younger, I used to run, but now—at 79—I need to protect my knees, so I've switched to lower-impact exercise... I practice Qigong [a traditional Chinese mind-body exercise] with friends and pick up new routines from videos on my phone, and it's worked really well. ... I try to avoid medication unless it's truly necessary—that's a principle I always stick to." (P04, male, 79 years old)

DISCUSSION

Summary

Drawing on an NDM perspective, we systematically mapped how patients with cardiometabolic multimorbidity make day-to-day self-care decisions. Four recurring problem themes (persistent symptom-management challenges, acute health crises, psychological and emotional distress, and uncertainty in illness and treatment) shaped a predominantly problem-driven decision context. Building on this contextual understanding, we further explored how patients' knowledge, skills, experiences, and values interact to produce 4 distinct decision-making patterns: experience-anchored, values trade-off, passive-reactive, and proactive-integrative. Patients could shift between patterns as circumstances changed.

Comparison With Existing Literature

This study advances existing research by conceptualizing self-care decision making in cardiometabolic multimorbidity management as a dynamic, context-dependent process, rather than a set of static behaviors or fixed determinants.⁷ Although prior quantitative studies have focused on the frequency and predictors of self-care behaviors, our findings link what patients face (context), the reasoning and resources they draw on (mechanisms), and what they do next (outcomes), offering a practical explanation of why different self-care responses emerge in different situations. Our findings extend the self-care patterns identified by Lee et al.¹⁷ Furthermore, building on the findings of Daley et al,²⁵ we delineate 4 distinct decision-making patterns, each incorporating core NDM propositions, thereby offering a more comprehensive theoretical application to cardiometabolic multimorbidity.

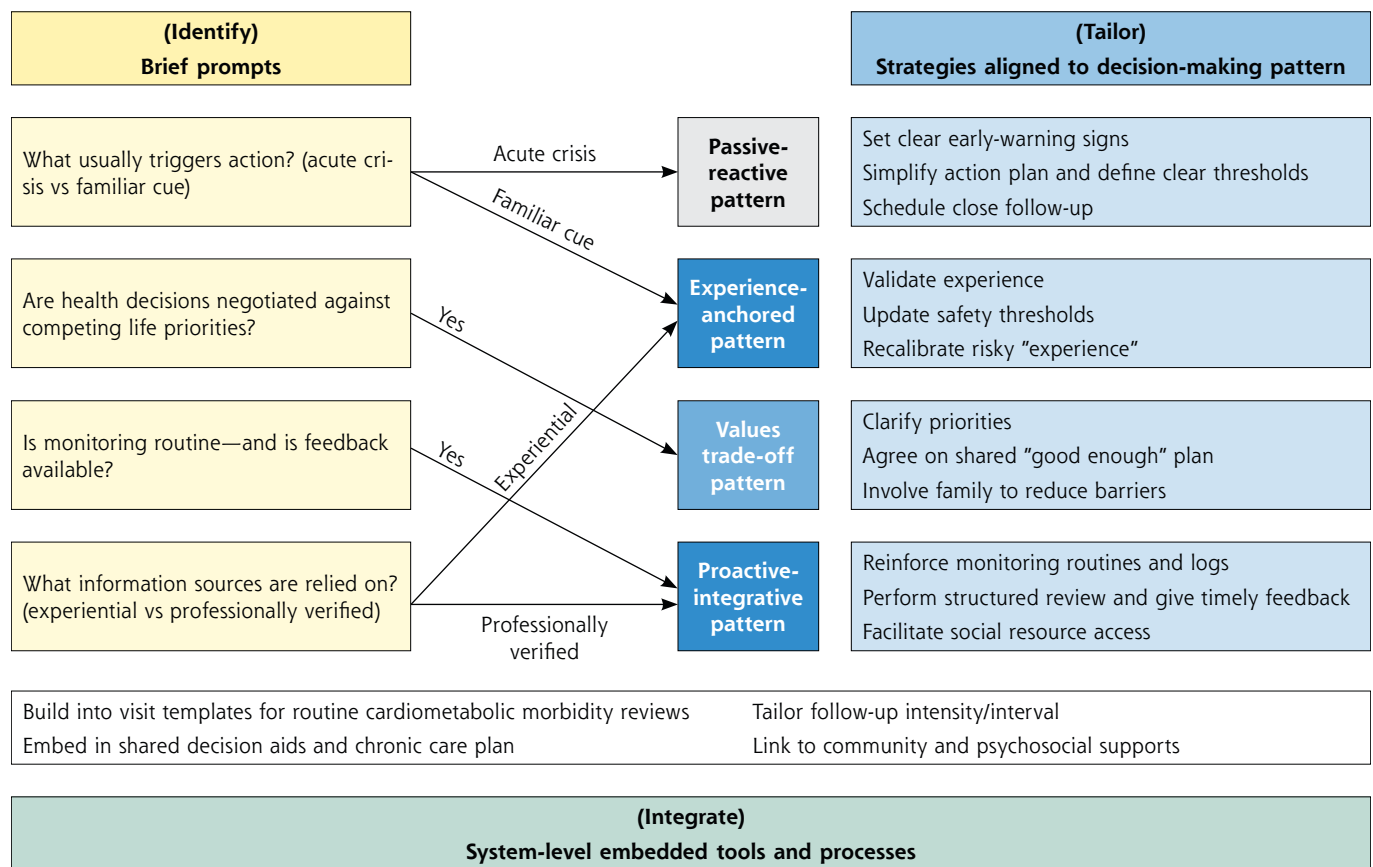
The experience-anchored decision-making pattern aligns with Klein's recognition-primed decision model, wherein familiar symptoms trigger rapid, experience-based responses.¹⁸ In self-care, particularly monitoring behaviors, such anchoring may enhance efficiency under time pressure.²⁰ Yet reliance on entrenched scripts carries inherent risks. As Lee et al¹⁷ demonstrated in their "maintainers" and Schmitz et al³² observed in the "inverse novice effect," self-care decision making that is grounded in outdated or incomplete knowledge may yield misinterpretation or biased judgement. For patients with cardiometabolic multimorbidity navigating fluctuating symptoms and uncertain trajectories, however, these well-rehearsed routines may simultaneously provide psychological reassurance and a sense of stability.^{1,3}

The values trade-off decision-making pattern, dominated by value-based preferences, exemplifies the concept of "satisficing" (a portmanteau of satisfying and sufficing) within NDM.¹⁹ Here, patients frequently accept suboptimal health choices to preserve broader life priorities (eg, family responsibilities, financial constraints), which in turn contributes to nonadherence.³³ Cultural and structural contexts may shape these trade-offs.³⁴ In the Chinese setting, norms of family obligation and interdependence, particularly among older adults or those occupying central family roles, may intensify decisions to defer care in order to reduce perceived burden on relatives or avoid disrupting household functioning.³⁵ Comparable value-based trade-offs appear in other settings, although their expression varies with health care accessibility, social welfare provision, and prevailing health beliefs. Situating such decisions within broader sociocultural contexts helps explain cross-national variation in self-care adherence and reframes seemingly suboptimal health choices as pragmatic adaptations to lived realities.

The passive-reactive decision-making pattern is characterized by high activation thresholds, with early warning signs often overlooked until problems become severe, reflecting limitations in self-monitoring and symptom perception among patients with cardiometabolic multimorbidity and reducing opportunities for timely intervention.³⁶ In contrast, the proactive-integrative decision-making pattern involves routine monitoring, anticipation, and flexible adjustment supported by feedback and social and health care resources, and is consistent with higher self-efficacy and a more "active-cooperation profile."³⁷ Furthermore, passive-reactive decision making was more frequently observed among patients experiencing financial constraints or residing in rural areas, where access to monitoring tools and timely feedback was limited,³⁸ whereas the proactive-integrative pattern was more often seen in those with more stable health care access, stronger social support, and greater opportunities for regular monitoring and feedback.³⁹

Collectively, these findings suggest that variation in contextual conditions may shape how self-care decision-making patterns are formed and enacted.^{20,37}

Figure 4. Diagram Showing a Pattern-Informed Clinical Workflow for Self-Care in Cardiometabolic Multimorbidity: Identify, Tailor, and Integrate



Note: No single prompt defines a pattern; these prompts are intended to help clinicians infer the patient’s dominant decision-making pattern in the current context. Patterns may change over time.

Implications for Practice and Research

The identification of 4 self-care decision-making patterns offers a practical lens for translating qualitative insights into routine family medicine workflows (Figure 4). Clinicians may ascertain a patient’s dominant decision-making pattern by using brief prompts that assess how decisions are triggered, how health priorities are negotiated, and whether monitoring and feedback are routinely embedded in care.⁴⁰ Once identified, the patient’s decision-making pattern could then guide communication and support, including recalibrating experiential scripts, clarifying values and goals, simplifying action plans, or sustaining structured monitoring and feedback.^{41,42} At a system level, embedding this pattern-informed approach into chronic care and shared decision-making tools may support more personalized, context-sensitive care while reducing implementation burden, including linkage to community and psychosocial resources (eg, social prescribing/social care interventions) where appropriate.⁴³

Future research could advance this work in several directions. First, longitudinal and mixed-methods studies may help deepen understanding of the ways in which contextual factors shape self-care decision-making patterns, while also

elucidating how the temporal dynamics of underlying cognitive mechanisms (eg, situational awareness, mental simulation) operate over time. Second, rigorous randomized and quasi-experimental trials are needed to evaluate whether pattern-informed interventions improve engagement, adherence, and clinical outcomes.⁴⁴ Third, digital health technologies (eg, mobile health applications, wearable sensors) may provide scalable tools to support context-responsive self-care through real-time monitoring and adaptive support aligned with patients’ decision-making patterns. Alongside these digital technologies, the potential contribution of artificial intelligence–based approaches warrants further investigation to determine whether, and under what conditions, such tools might complement clinical care and support progression toward more sustained, proactive self-care.⁴⁵

Strengths and Limitations

Key strengths of our study lie in its methodologic integration and analytic depth. The combined use of narrative and thematic analyses enabled systematic identification of both self-care decision-making contexts and within-person decision-making processes. Moreover, using self-care

decision-making chains as the analytic unit enabled behavior-level interpretation of the entire decision-making process within the CMO heuristic and extended NDM theory to self-care research. Finally, by extending the focus from patients with single diseases to those with cardiometabolic multimorbidity, our study offers a more comprehensive and representative account of self-care decision making in complex, clinically common populations.

Several limitations warrant consideration. First, patients were recruited from a single region in China; generalizability of the findings to broader populations or other settings may be influenced by cultural norms (eg, family roles, health beliefs), socioeconomic conditions, and health care access. Second, one-time interviews and patients' self-reports of past experience may have introduced biases, including social desirability bias, recall bias, and interviewer influence, limiting the insight into longitudinal change. Third, although self-care behaviors were coded and categorized into 3 dimensions (maintenance, monitoring, management), the qualitative nature of the research, combined with the diversity of these behaviors, constrained more in-depth analysis of relationships among these dimensions. Lastly, the translation of Mandarin expressions into English may have affected nuance despite our careful translation procedures.

Conclusions

This study positions self-care among patients with cardiometabolic multimorbidity as a context-sensitive adaptive decision-making system. Through in-depth qualitative analysis, we mapped the full self-care decision-making process and elucidated 4 core problem themes that trigger self-care decision making, along with 4 decision-making patterns: experience-anchored, values trade-off, passive-reactive, and proactive-integrative. This study contributes advances the theory of self-care decision-making and offers a practical blueprint for scalable, patient-centered interventions that can improve long-term management of cardiometabolic multimorbidity in primary care.



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Key words: decision making; decision theory; multimorbidity; cardiometabolic syndrome; diabetes; heart diseases; stroke; chronic kidney diseases; hypertension; chronic disease; naturalistic decision-making theory; self-care; qualitative research; patient-centered care; primary care

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[Supplemental materials](#)

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