Clinical Interventions in Aging

Dovepress
Taylor & Francis Group

Open Access Full Text Article

ORIGINAL RESEARCH

Factors Influencing Healthcare-Seeking Decisions Delay During Acute Exacerbations in Older Adults with Chronic Heart Failure: An Analysis Based on a Cross-Sectional Study

Bei-Bei Wang[1,2,*], Si-Yi Wang[3,*], Si-Xuan Han[1], Xiao-Bing Yang[3], Qi-Di Liu[3], Shao-Yue Chen[4], Xiao-Xian Wu[5], Yan-Yan Hong[1]

[1]Department of Nursing, Nanjing Hospital of Chinese Medicine Affiliated to Nanjing University of Chinese Medicine, Nanjing, 210022, People's Republic of China; [2]School of Elderly Care Services and Management, Nanjing University of Chinese Medicine, Nanjing, 210023, People's Republic of China; [3]School of Nursing, Nanjing University of Chinese Medicine, Nanjing, 210023, People's Republic of China; [4]Department of Cardiovascular, Nanjing Hospital of Chinese Medicine Affiliated to Nanjing University of Chinese Medicine, Nanjing, 210022, People's Republic of China; [5]Department of Cardiovascular, Nanjing First Hospital, Nanjing Medical University, Nanjing, 210006, People's Republic of China

*These authors contributed equally to this work

Correspondence: Yan-Yan Hong, Department of Nursing, Nanjing Hospital of Chinese Medicine Affiliated to Nanjing University of Chinese Medicine, Nanjing, 210022, People's Republic of China, Email fsyy00210@njucm.edu.cn

Purpose: Older adults with chronic heart failure often experience significant delays in making healthcare-seeking decisions from the onset of symptom exacerbation to the final decision to seek medical care. Guided by the Health Belief Model and the Theory of Planned Behavior, this study investigates the duration and factors influencing delayed healthcare-seeking decisions following symptom acute exacerbations in older adults with chronic heart failure.

Patients and Methods: A cross-sectional study was conducted from November 2023 to June 2024, employed a convenience sampling method, involving 244 older adults with chronic heart failure hospitalized in two general hospitals in Nanjing, China. Data were collected using a questionnaire survey and all research instruments were validated and tested for reliability.

Results: The results showed that the healthcare-seeking decisions time among the 244 patients ranged from 2 hours to 4410 hours, with a median time of 187.5 hours (7.8 days), Q1 of 82.0 hours, and Q3 of 504.5 hours. Regression analysis indicated that symptom management self-efficacy ($\beta = 0.637$, $P < 0.001$), social support ($\beta = -0.195$, $P < 0.001$), heart failure somatic perception ($\beta = -0.159$, $P = 0.003$), speed of onset ($\beta = -0.119$, $P = 0.028$), and attempts at self-management ($\beta = 0.102$, $P = 0.031$) were significantly associated with the delay in healthcare-seeking decisions.

Conclusion: This study revealed that healthcare-seeking decision delays are common among older adults with chronic heart failure in China, primarily influenced by factors such as heart failure somatic perception, social support, symptom management self-efficacy. The findings suggest that strengthening health education, improving social support networks, and optimizing multidisciplinary collaboration may help shorten decision-making time, thereby improving patients' clinical outcomes and quality of life.

Keywords: heart failure, older adults, healthcare-seeking decision delay, social support, symptom management self-efficacy

Introduction

Heart failure represents the terminal stage of various cardiac diseases and has become a serious global public health challenge.[1] In Western countries, its prevalence exceeds 2% and continues to rise with population aging.[2] It is the leading cause of hospitalization among individuals aged 65 years and older.[3] Most patients experience acute exacerbations characterized by symptoms such as dyspnea and fatigue.[4] Each episode may accelerate disease progression, posing

Received: 1 July 2025
Accepted: 18 November 2025
Published: 3 December 2025

severe threats to quality of life and survival;[5] therefore, timely medical attention is crucial.[6] However, more than 50% of patients experience delays in seeking care,[7] with delay durations ranging from several hours to several days.[8]

Older adults with chronic heart failure (CHF) differ significantly from younger patients in terms of disease presentation. They often have multiple chronic comorbidities, such as hypertension, diabetes, and chronic lung diseases.[9] Additionally, elderly patients may also overlook early symptoms, such as fatigue and shortness of breath, attributing them to aging or other illnesses, which can lead to delay in seeking treatment.[10,11] This phenomenon significantly impacts patients' health outcomes, making it crucial to explore the influencing factors to develop effective interventions.

Most studies currently categorize total delay time into three stages: patient delay, transportation delay, and hospital delay.[12] Given that transportation and hospital delays have been significantly reduced with improvements in healthcare services, decision delay has become the primary focus of research.[13] This stage refers to the time interval between the patient's perception of symptom worsening (eg, dyspnea, fatigue) and the decision to seek professional help. It has been identified as the most time-consuming component of total delay; thus, reducing decision-making delay is crucial for improving patient outcomes. As there is currently no evidence suggesting differences in healthcare-seeking behaviors among patients with HFrEF, HFmrEF, and HFpEF, these three types of chronic heart failure were collectively included in this study. Although international studies have confirmed the prevalence of healthcare-seeking delay among heart failure patients,[14–16] the current situation and influencing factors of decision delay among older adults with heart failure in China remain unclear. Therefore, this study integrates the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB) (as illustrated in Figure 1) to: (1) assess the status of decision delay among older adults experiencing symptom exacerbation; (2) identify its key influencing factors; and (3) provide empirical evidence for the development of targeted intervention strategies.

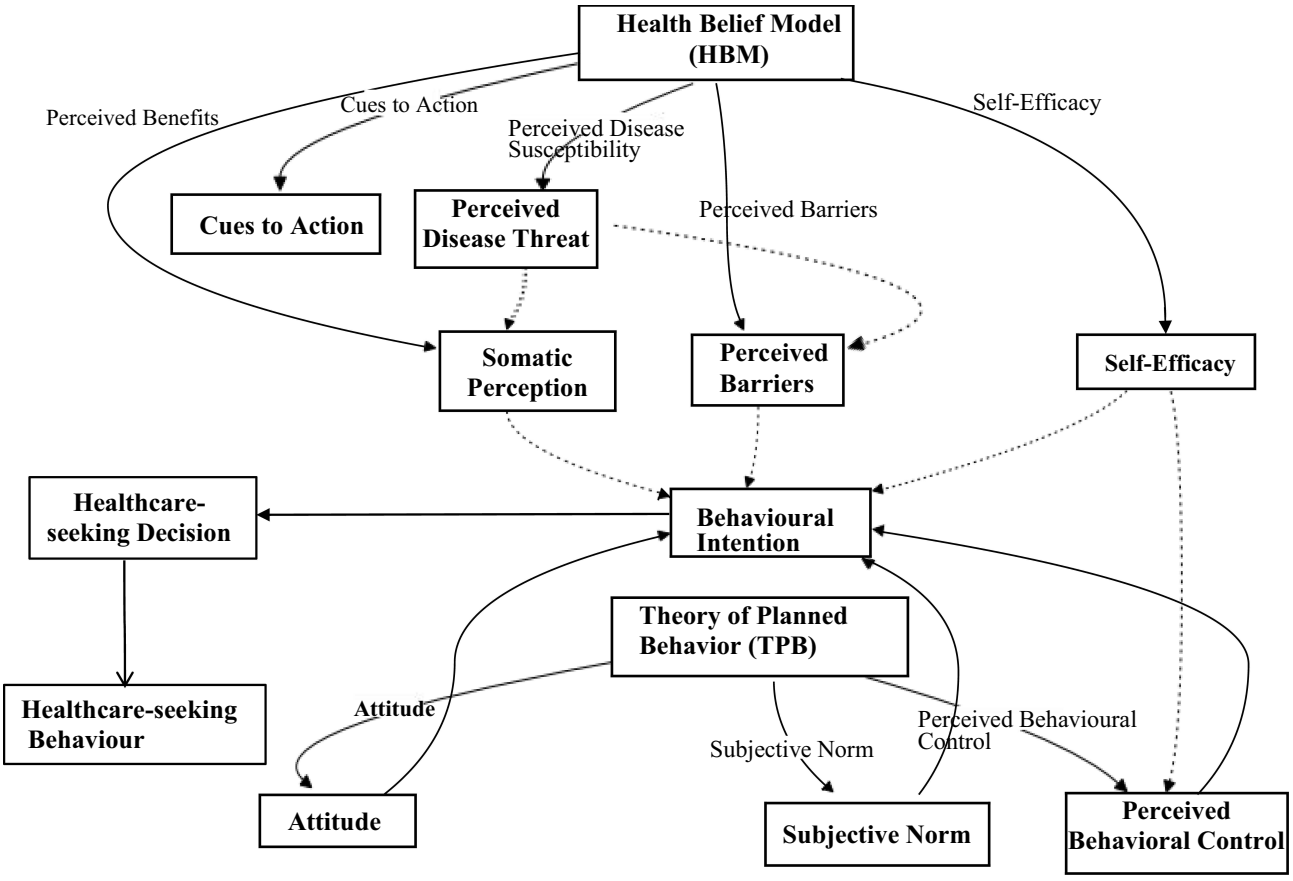

Figure 1 Integration of Health Belief Model and the Theory of Planned Behavior.

HBM is a theoretical model used to explain and predict health behaviors. HBM emphasizes the importance of individuals' perceptions of disease threat (includes perceived susceptibility and perceived severity), perceived benefits and barriers to health behaviors, self-efficacy, and cues to action in the formation of health behaviors.[17,18] TPB posits that an individual's behavioral intentions directly influence their actual behavior. These behavioral intentions are shaped by three key elements: attitude, subjective norm, and perceived behavioral control.[19] The elements in HBM and the elements in the TPB both have behavioral intention as a mediator, and behavioral intention has a direct impact on the decision to seek medical care, which in turn directly affects the behavior of seeking medical care. Self-efficacy is one of the components of the HBM and it indirectly affects behavioral intention, which in turn directly impacts the decision to seek medical care, thus influencing healthcare behavior. At the same time, self-efficacy in HBM is linked to perceived behavioral control in TPB which directly affects the behavioral intention and has a direct effect on the decision to seek medical treatment. The perceived threat component in HBM, which includes perceived susceptibility and perceived severity, emphasizes the impact of an individual's awareness of their disease status on their behavior. In heart failure patients, an insufficient perception of this threat may lead to an underestimation of the risks associated with acute exacerbations, thereby affecting their decision to seek timely medical care. Therefore, the perceived threat component in HBM (perceived susceptibility) indirectly affects somatic perception, and somatic perception indirectly influences behavioral intention, thereby directly affecting the decision to seek medical care. Related to this is the subjective norm in TPB, which refers to this pertains to the influence of significant others or groups (such as family members, doctors, and friends) on the individual's behavior. The subjective norm directly affects behavioral intention, influencing the decision to seek medical care through behavioral intention, thus directly impacting health- care behavior. In this study, we aim to provide a more comprehensive and in-depth theoretical framework for analyzing the delay in seeking medical care during acute exacerbations among older adults with CHF by integrating the unique perspectives of the HBM and the TPB.

Materials and Methods

Study Design

This study was designed as a cross-sectional research project, adhering to the STROBE guidelines for methodological rigor and reporting standards. The research was carried out in two general hospitals located in Nanjing, China, with the participant recruitment and data collection phases spanning from November 2023 to June 2024.

Formula for Calculating Delay Time: Healthcare-seeking decision delay time = Time of deciding to seek medical care − Time of symptom onset

Patients were asked to indicate as accurately as possible, in days, hours, the time between the worsening of HF symptoms they experienced and their contacting a healthcare provider (ie GP, nurse or emergency department).[20]

Participants and Setting

To facilitate organizational work and sample acquisition, this study used a convenience sampling method. Older adults with CHF who met the research criteria were selected as subjects from the cardiovascular intensive care units and cardiovascular wards of two general hospitals in Nanjing. The inclusion criteria were as follows: (1) age ≥ 65 years; (2) meeting the diagnostic criteria for chronic heart failure during acute exacerbations according to the "2021 ESC Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure";[21] (3) patients diagnosed with heart failure for ≥ 3 months, with underlying conditions such as valvular heart disease, coronary artery disease, arrhythmias, hypertension, and other cardiovascular diseases; (4) patients with heart failure classified as New York Heart Association (NYHA) class II–IV. The exclusion criteria were as follows: (1) presence of psychiatric disorders or cognitive decline, rendering the patient unable to complete the research questionnaire; (2) patients with secondary acute heart failure, such as those with acute myocardial infarction, post-interventional therapy, or post-heart transplantation; (3) patients were excluded from analyses when they had a healthcare-seeking decision time of 0 hours. To exclude psychiatric disorders or cognitive decline, we reviewed the medical records, inquired the medical history and administered the Mini-mental State

Examination (MMSE). To identify and exclude patients with cognitive decline, we used literacy-adjusted thresholds as follows: illiterate <17; elementary school <20; and secondary school and above <24.

The sample size was calculated using the sampling survey sample size estimation formula $N = \mu_{\alpha}^2 p(1-p)/\delta^2$. The allowable error δ was controlled at 15% of the overall rate p, and a bilateral test with $\alpha = 0.05$ was selected, where $\mu_{\alpha} = 1.96$. Based on literature data,[11] the rate of delay in seeking medical care among heart failure patients was estimated at 50%, with P = 0.5. The calculated sample size was approximately 171 cases. To account for potential drop-outs during the study (eg, lack of cooperation, invalid questionnaires etc)., the sample size was expanded according to an anticipated 20% loss rate. Consequently, the sample size was expanded according to the anticipated loss rate: 171 × (100%+20%) ≈ 206. This study included a total of 244 cases that met the criteria.

Survey Instruments

General Information Questionnaire for Older Adults with CHF

This questionnaire consists of three parts: (1) Demographic data of older adults with CHF: age, gender, educational level, occupation, marital status, average monthly household income, type of health insurance, and place of residence. (2) Disease-Related Information: the patient's smoking and drinking history, comorbidities (eg, hypertension, diabetes), history of cardiovascular and cerebrovascular diseases, the number of medications typically taken, the duration of heart failure, symptoms prompting the decision to seek medical care, and the speed of disease onset. (3) Environment-Related Information at Onset: the location of the onset, whether family members were present, the patient's condition at the time, and whether they attempted self-treatment.

Chinese Version of the Heart Failure Somatic Perception Scale (HFSPS)

This scale is used to assess heart failure-specific physical symptoms in patients. The Cronbach's alpha coefficient for the scale is 0.870. The scale consists of 18 items that evaluate the burden of symptoms such as dyspnea, fatigue, nocturia, and loss of appetite. This scale was adapted by Chen et al[22] from the Heart Failure Somatic Perception Scale developed by Jurgens et al in 2017.[23] The Cronbach's alpha coefficient of the original scale is 0.900. In this study, the Cronbach's alpha coefficient of the scale is 0.810, the reliability of the scale is 0.813.

Chinese Version of the Perceived Barriers to Healthcare-Seeking Decision Scale (PBHSD-C)

This scale is designed to assess the level of perceived barriers patients encounter when seeking medical care. The original scale was developed by Al-Hassan MA[24] from Jordan and was later modified by Li et al[25] to study myocardial infarction. The total score ranges from 10 to 60, with higher scores indicating more significant perceived barriers to seeking healthcare. The Cronbach's alpha coefficient of the modified scale is 0.740. In this study, the Cronbach's alpha coefficient of the scale is 0.740, the reliability of the scale is 0.837.

Self-Efficacy for Symptom Management Scale (SESMs)

This scale is used to assess the self-efficacy of chronic heart failure patients in managing their symptoms. The SESMs was adapted by Shang et al[26] from the Chronic Disease Self-Efficacy Scale originally developed by Lorig.[27] The Cronbach's alpha coefficient of the scale is 0.910. In this study, the Cronbach's alpha coefficient of the scale is 0.911, the reliability of the scale is 0.896.

Chinese Version of the Social Support Rating Scale (SSRS)

This scale is used to assess the social support conditions of patients by Liu et al,[28] applied this scale to mental workers and conducted reliability and validity testing. Reliability analysis showed that the Cronbach's alpha coefficient for the entire scale was 0.896, and for the subscales, it ranged from 0.825 to 0.849, indicating good reliability and validity. In this study, the Cronbach's alpha coefficient of the scale is 0.504, the reliability of the scale is 0.714.

Simplified Coping Style Questionnaire (SCSQ)

The SCSQ scale, developed by Xie et al,[29] is used to assess patients' coping styles. The scale consists of 20 items, with the first 12 items belonging to the positive coping dimension and the last 8 items to the negative coping dimension. The Cronbach's alpha coefficient for the entire scale is 0.900, with the Cronbach's alpha for the positive coping subscale

being 0.890 and for the negative coping subscale being 0.780. In this study, the Cronbach's alpha coefficient of the scale is 0.812, the reliability of the scale is 0.820.

Survey Method

All investigators received standardized training covering participant screening, questionnaire use, and data entry. The questionnaire was finalized after pilot testing and group discussions. When patients' heart failure symptoms were stabilized, investigators explained the study purpose and obtained written informed consent. Participants were informed that they could withdraw at any time, and all data were kept strictly confidential. The survey was conducted on a one-to-one basis. For patients unable to complete the questionnaire independently, investigators assisted through objective verbal administration. Completed questionnaires were collected immediately, checked for completeness and authenticity, and invalid ones were excluded. Each session took approximately 30 minutes, and no financial compensation was provided.

Data Analysis

The questionnaire data were double-checked and entered Excel, then imported into SPSS 27.0 for analysis, with a significance level set at $\alpha = 0.05$ and $P < 0.05$. Univariate analysis was performed to compare decision delay time among patients with different sociodemographic, disease, and onset characteristics. For data meeting the assumptions of normality and homogeneity of variance, *t*-tests or one-way ANOVA were used; otherwise, nonparametric tests (Mann–Whitney U-test or Kruskal–Wallis H-test) were applied. Spearman correlation analysis was conducted to examine the relationships between bodily perception, perceived barriers, self-efficacy, social support, coping styles, and decision delay time. Multiple linear regression analysis was performed to explore the influencing factors of decision delay time (log-transformed), using as independent variables those that showed statistical significance in the univariate and correlation analyses.

Results

Sample Characteristics

During the study period, a total of 936 patients were hospitalized for acute heart failure across the participating institutions. A total of 264 questionnaires were distributed in this study and 256 were returned, with a valid return rate of 96.97%. After excluding 12 unqualified questionnaires, the final number of questionnaires included in the analysis was 244, which met the sample size requirement. Of the 244 patients, all were aged 65 years or older. 50.41% were male patients and 49.59% were female patients. Occupational distribution showed that 89.75% of the patients were retired. Educational level showed that 60.25% of the patients had junior high school education or above. Distribution of residence showed that 77.46% of the patients lived in urban areas. The percentage of patients in NYHA functional class III and IV was 93.85%. There was no significant difference in the healthcare seeking decisions time by patients' age, gender, occupation, education level, and NYHA function. Detailed information regarding patients' characteristics and scores on each variable is presented in Table 1.

Distribution of Healthcare-Seeking Decision Delay Time in Older Adults with CHF

A histogram of the data with a bin width of 1 day is illustrated in Figure 2 where the red line represents the cumulative percentage. The median healthcare-seeking decision delay time is 187.50, with Q1 being 82.00 and Q3 being 504.50. There are still 20 patients (8.2%) with delays of more than 1000 hours, distributed very discreetly up to 4410 hours. It can be found that the distribution of delay time is asymmetric, extending a long tail to the maximum.

Univariate Analysis of General Data and Healthcare-Seeking Decision Delay Time in Older Adults with CHF

Using non-parametric tests, significant correlations were found between healthcare-seeking decision delay time and the following factors: profuse sweating ($Z = 3.620$, $P < 0.001$), duration of heart failure ($Z = 3.196$, $P = 0.001$), number of

Table 1 Univariate Analysis of General Data and Healthcare-Seeking Decision Delay Time Among Patients (N = 244)

Variable	Category	N (%)	Decision Delay Hours	Z or H	P value
Demographic Data:					
Age	65-76 years	130 (53.28)	184.00 (72.00, 615.25)[a]	Z=0.437	0.662
	>76 years	114 (46.72)	199.00 (98.25, 415.00)[a]		
Gender	Male	123 (50.41)	179.00 (61.00, 505.00)[a]	Z=1.014	0.311
	Female	121 (49. 59)	216.00 (118.50, 499.50)[a]		
Education Level	Junior high school or below	183 (75.00)	181.00 (97.00, 502.00)[a]	H=0.807	0.668
	High school	43 (17.62)	206.00 (61.00, 491.00)[a]		
	Bachelor's or above	18 (7.38)	183.00 (70.00, 924.25)[a]		
Occupation	Employed	10 (4.10)	152.50 (57.00, 453.25)[a]	H=0.550	0.759
	Retired	219 (89.75)	189.00 (83.00, 505.00)[a]		
	Unemployed	15 (6.15)	216.00 (68.00, 733.00)[a]		
Marital Status	Married	201 (82.38)	187.00 (81.00, 516.50)[a]	H=2.571	0.109
	Divorced	1 (0.41)			
	Widowed	42 (17.21)	209.50 (98.25, 372.25)[a]		
Monthly Income	≤3000	83 (34.01)	230.00 (82.00, 470.00)[a]	H=2.918	0.232
	3001-5000	140 (57.38)	190.50 (97.75, 615.25)[a]		
	>5000	21 (8.61)	163.00 (55.50, 291.00)[a]		
Payment Method	Medical insurance	214 (87.70)	190.50 (78.75, 502.25)[a]	H=4.325	0.115
	Fully self-funded	25 (10.25)	250.00 (133.50, 743.50)[a]		
	Fully public-funded	5 (2.05)	118.20 ± 77.69[b]		
Residence	Rural	13 (5.33)	179.00 (133.50, 607.50)[a]	H=2.974	0.226
	Township	42 (17.21)	258.00 (136.75, 735.00)[a]		
	City	189 (77.46)	181.50 (73.25, 470.25)[a]		
Living Situation	With spouse	138 (56.56)	181.00 (80.00, 615.00)[a]	Z=0.001	0.999
	With children	106 (43.44)	187.00 (88.00, 400.00)[a]		
Disease-Related Data:					
Smoking	Never	130 (53.29)	204.00 (114.00, 495.25)[a]	Z=0.872	0.383
	History / Ongoing	114 (46.72)	180.50 (60.25, 510.00)[a]		
Alcohol	Never	135 (55.33)	208.00 (116.00, 468.00)[a]	Z=0.746	0.456
	History / Ongoing	109 (44.67)	180.00 (61.00, 583.00)[a]		
History of Hypertension	Yes	199 (81.56)	184.00 (83.00, 508.00)[a]	Z=0.171	0.864
	No	45 (18.44)	216.00 (69.50, 497.00)[a]		

(*Continued*)

Table 1 (Continued).

Variable	Category	N (%)	Decision Delay Hours	Z or H	P value
History of Diabetes	Yes	67 (27.46)	181.00 (82.00, 362.00)[a]	Z=0.872	0.383
	No	177 (72.54)	201.00 (81.50, 525.50)[a]		
Coronary Artery Disease	Yes	108 (44.26)	197.00 (73.25, 591.25)[a]	Z=0.526	0.599
	No	136 (55.74)	183.50 (87.00, 473.50)[a]		
Angina	Yes	3 (1.23)	1071.33 ± 960.79[b]	Z=1.848	0.065
	No	241 (98.77)	184.00 (81.00, 502.50)[a]		
Myocardial Infarction	Yes	18 (7.37)	183.50 (58.25, 557.00)[a]	Z=0.526	0.599
	No	226 (92.63)	188.00 (82.75, 503.50)[a]		
Arrhythmia	Yes	43 (17.62)	176.00 (108.00, 362.00)[a]	Z=0.445	0.656
	No	201 (82.38)	200.00 (77.50, 525.50)[a]		
Stroke	Yes	63 (25.81)	208.00 (100.00, 374.00)[a]	Z=0.205	0.837
	No	181 (74.19)	182.00 (80.00, 570.50)[a]		
Atrial Fibrillation	Yes	119 (48.77)	192.00 (82.00, 505.00)[a]	Z=0.524	0.601
	No	125 (51.23)	184.00 (75.00, 500.00)[a]		
Number of Medications	<4 kinds	25 (10.25)	116.00 (36.50, 400.00)[a]	H=5.979	0.050
	4-6 kinds	145 (59.42)	181.00 (88.00, 502.50)[a]		
	>6 kinds	74 (30.33)	229.50 (131.25, 707.25)[a]		
Duration	≤1 year	79 (32.38)	154.00 (53.00, 337.00)[a]	Z=3.196	0.001
	>1 year	165 (67.62)	234.00 (122.50, 632.50)[a]		
Symptoms-Related Data:					
Profuse Sweating	Yes	88 (36.10)	151.50 (50.00, 348.50)[a]	Z=3.620	<0.001
	No	156 (63.93)	235.00 (50.00, 348.50)[a]		
Palpitations	Yes	217 (88.93)	200.00 (88.00, 516.50)[a]	Z=1.165	0.244
	No	27 (11.07)	170.00 (50.00, 346.00)[a]		
Edema	Yes	156 (63.93)	196.00 (85.50, 673.00)[a]	Z=0.860	0.390
	No	88 (36.10)	181.50 (76.75, 465.75)[a]		
Fatigue	Yes	225 (92.22)	190.50 (82.75, 512.25)[a]	Z=1.258	0.209
	No	19 (7.78)	147.00 (38.00, 425.50)[a]		
Headache	Yes	18 (7.38)	132.00 (41.50, 279.00)[a]	Z=1.751	0.080
	No	226 (92.62)	200.00 (83.00, 508.00)[a]		
Vomiting	Yes	5 (2.05)	179.00 (65.50, 347.00)[a]	Z=0.602	0.547
	No	239 (97.95)	200.80 ± 145.43[b]		

(*Continued*)

https://doi.org/10.2147/CIA.S550676

Table 1 (Continued).

Variable	Category	N (%)	Decision Delay Hours	Z or H	P value
Speed of Onset	Sudden	69 (28.28)	108.00 (35.50, 175.50)[a]	Z=6.440	<0.001
	Gradual	175 (71.72)	321.00 (142.00, 712.00)[a]		
NYHA	II	15 (6.15)	230.00 (75.00, 755.00)[a]	H=1.563	0.458
	III	184 (75.41)	188.50 (114.50, 502.75)[a]		
	IV	45 (18.44)	169.00 (56.00, 512.50)[a]		
Onset-Related Data:					
Location	At home	242 (99.18)	188.50 (82.75, 505.75)[a]	Z=2.168	0.030
	Public place	2 (0.82)			
Condition	Resting	236 (96.72)	196.00 (97.50, 520.75)[a]	Z=2.837	0.005
	Active	8 (3.28)	44.50 (19.25, 147.75)[a]		
Attempted Relaxation	Yes	234 (95.90)	187.50 (82.00, 505.75)[a]	Z=0.416	0.677
	No	10 (4.10)	190.50 (55.25, 337.50)[a]		
Told Someone Nearby	Yes	14 (5.74)	62.50 (30.50, 343.25)[a]	Z=2.219	0.026
	No	230 (94.26)	196.00 (98.50, 512.25)[a]		
Attempted Self-Treatment	Yes	96 (39.34)	262.50 (130.50, 672.25)[a]	Z=2.298	0.022
	No	148 (60.66)	173.00 (63.00, 385.75)[a]		

Notes: [a]Indicates median (1st quartile, 3rd quartile), [b]Indicates mean ± standard deviation.

medications typically taken (H = 5.979, P = 0.050), speed of disease onset (Z = 6.440, P < 0.001), location of onset (Z = 2.168, P = 0.030), condition at the time of onset (Z = 2.837, P = 0.005), told someone nearby at the time of onset (Z = 2.219, P = 0.026), and attempted self-treatment (Z = 2.298, P = 0.022), as shown in Table 1.

Correlation Analysis of Healthcare-Seeking Decision Delay Time with Heart Failure Somatic Perception, Perceived Barriers to Healthcare- Seeking Decision, Symptom Management Self-Efficacy, Social Support, and Coping Styles

Correlation analysis revealed that heart failure somatic perception ($\gamma = -0.443$, $P < 0.001$), social support ($\gamma = -0.492$, $P < 0.001$), and positive coping styles ($\gamma = -0.585$, $P < 0.001$) were negatively correlated with the delay time in healthcare-seeking decisions. Conversely, perceived barriers to healthcare-seeking decision ($\gamma = 0.515$, $P < 0.001$), symptom management self-efficacy ($\gamma = 0.675$, $P < 0.001$), and negative coping styles ($\gamma = 0.400$, $P < 0.001$) were positively correlated with the delay time. Additionally, patients' social support was positively correlated with heart failure somatic perception ($\gamma = 0.315$, $P < 0.001$) and positive coping styles ($\gamma = 0.538$, $P < 0.001$), as seen in Table 2.

Multiple Linear Regression Analysis of Healthcare-Seeking Decision Delay in Older Adults with CHF

The healthcare-seeking decision delay time (THSDD hours) generally follows a lognormal distribution, which has positive, right-skewed, and long-tail characteristics and is commonly used to describe the response time of a medical system.[30,31] If a random variable is log-normally distributed, then its logarithm has a normal distribution. Therefore, we

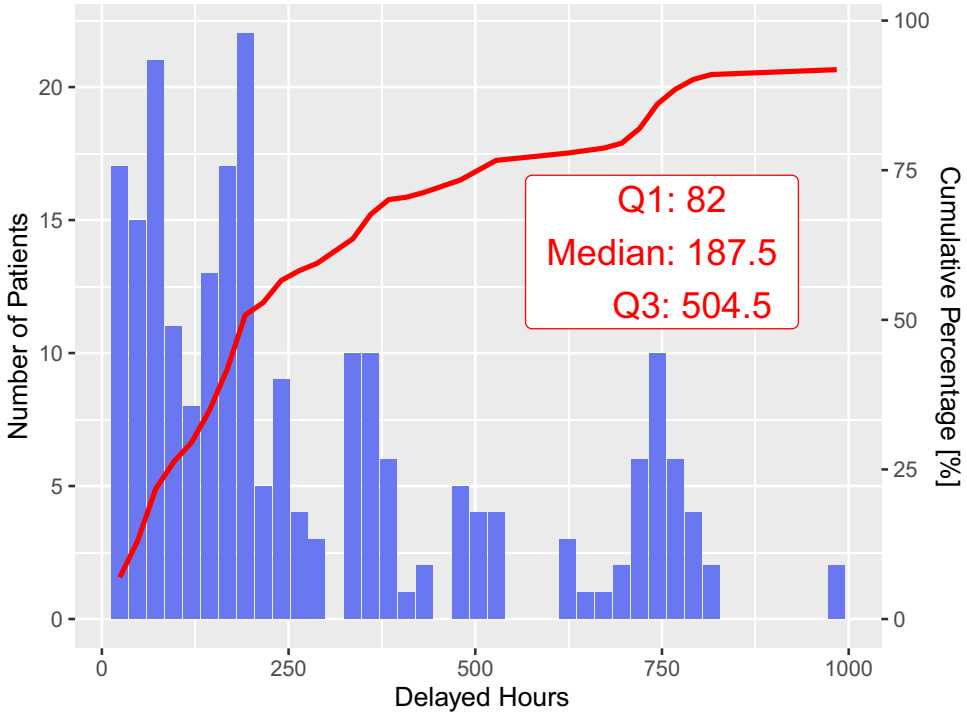

Figure 2 Histogram of Healthcare-Seeking Decision Delay Time Among Patients.

applied a normal fit to the histogram of THSDD in hours to represent the data distribution more accurately, as depicted in Figure 3. The chi-square test of goodness of fit, χ^2/ndf = 8.289/5, P = 0.141 > 0.05, indicates that $\log_{10}T_{HSDD}$ approximately follows a normal distribution.

Since the overall distribution of T_{HSDD} can be described by a log-normal distribution, $\log_{10}T_{HSDD}$ is used as the dependent variable in the linear regression analysis, that is, the linear regression equation is expressed as:

$$\log_{10} T_{HSDD} = \beta_0 + \beta_0 x_1 + \beta_0 x_1 + \ldots + \beta_n x_n + \varepsilon,$$

Table 2 Results of Correlation Analysis of Healthcare-Seeking Decision Delay Time

	HFSP	PBHSD	SMSE	SS	PC	NC	HSDDT	$\overline{X}$	σ
HFSP	1							38.34	7.85
PBHSD	−0.450[a]	1						31.42	3.89
SMSE	−0.432[a]	0.642[a]	1					4.89	1.28
SS	0.315[a]	−0.415[a]	−0.492[a]	1				29.81	3.62
PC	0.347[a]	−0.339[a]	−0.491[a]	0.538[a]	1			14.69	4.01
NC	−0.198[a]	0.234[a]	0.185[a]	−0.063	0.100	1		14.12	2.95
HSDDT	−0.443[a]	0.515[a]	0.675[a]	−0.492[a]	−0.585[a]	0.400[a]	1		

Note: [a]Indicates P < 0.01.

Abbreviations: HFSP, Heart Failure Somatic Perception; PBHSD, Perceived Barriers to Healthcare-Seeking Decision; SMSE, Symptom Management Self-Efficacy; SS, Social Support; PC, Positive Coping; MC, Negative Coping; HSDDT, Healthcare-Seeking Decision Delay Time.

https://doi.org/10.2147/CIA.S550676

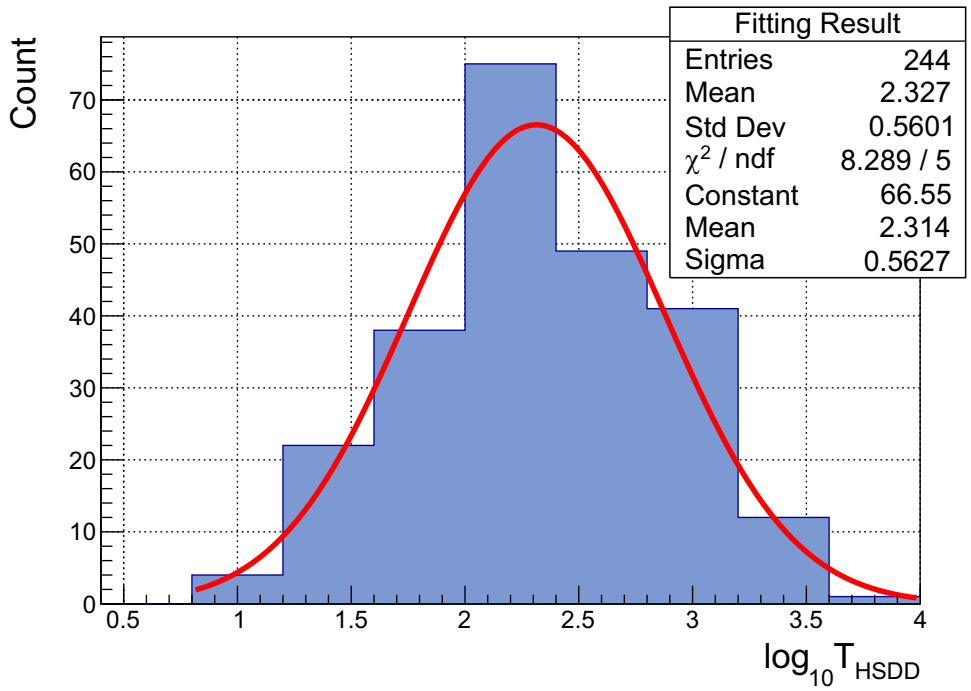

Figure 3 Logarithmic Distribution of Healthcare-Seeking Decision Delay Time Among Patients.

Where $\beta_i (i = 1, 2, \ldots, n)$ represent the regression coefficients, and $x_i (i = 1, 2, \ldots, n)$ denote the independent variables. 14 variables that showed significant differences in the univariate analysis. Among them, the two variables, Location of Onset and Told Someone Nearby, exhibit a significantly asymmetric distribution, rendering their statistical tests of limited value. Consequently, these two variables were excluded, and a total of 12 variables were ultimately included for a stepwise multiple linear regression analysis. The results showed that 5 variables entered the regression equation: symptom management self-efficacy (β = 0.637, P < 0.001), social support (β = −0.195, P < 0.001), heart failure somatic perception (β = −0.159, P = 0.003), speed of onset (β = −0.119, P = 0.028), and attempted self-treatment (β = 0.102, P = 0.031) (F = 43.545, P < 0.001). The adjusted R^2 was 0.467, explaining 46.7% of the total variance. See Table 3.

Table 3 Multiple Stepwise Linear Regression Analysis of Factors Influencing Healthcare-Seeking Decision Delay (N = 244)

Independent Variable	Unstandardized Coefficients		Standardized Coefficients	t-value	P-value	Collinearity Statistics	
	B	SE	β			Tolerance	VIF
Symptom Management Self-Efficacy	0.040	0.003	0.637	12.847	<0.001	1.000	1.000
Social Support	−0.031	0.009	−0.195	−3.604	<0.001	0.799	1.252
Heart Failure Somatic Perception	−0.012	0.004	−0.159	−3.020	0.003	0.817	1.223
Speed of Onset	−0.152	0.069	−0.119	−2.212	0.028	0.774	1.293
Attempted Self-Treatment	0.121	0.056	0.102	2.167	0.031	0.987	1.014

Discussion

Analysis of the Status Quo of Healthcare-Seeking Decision Delay During Acute Exacerbations in Older Adults with CHF

The results of this study reveal a wide range in the time to healthcare-seeking decisions during acute exacerbations among 244 older adults with CHF, spanning from 2 hours to 4410 hours, with a median time of 187.5 hours (7.8 days). This median time is comparable to the 180 hours reported in other studies[15,16] on healthcare-seeking decision delay in adult heart failure patients, suggesting the reliability of our findings. The slightly longer delay observed in this study may be attributed to differences in the characteristics of the study population, mainly focusing on a Chinese elderly cohort aged 65 and above. The shift in social roles due to age may influence their self-perception of health issues, symptom recognition, and healthcare- seeking decision delay.[10] Further data analysis and literature comparison indicate that the healthcare-seeking decision delay is generally prolonged in older adults with CHF, significantly exceeding that of patients with other types of cardiovascular diseases,[32,33] with the median delay time surpassing that of different cardiovascular condition. This could be related to the high prevalence of comorbidities and the long duration of the disease in heart failure patients.[34] Elderly patients often have multiple comorbidities, necessitating complex medication management.[20] The complexity of their medication regimens may lead patients to attempt self-adjustment of their medications when symptoms arise rather than immediately seeking professional medical help, thereby prolonging the time taken to make a healthcare decision.[35] Regarding the duration of heart failure, patients with a disease course longer than one year experienced longer decision delays than those with a disease course of one year or less. Long-term illness may cause patients to become accustomed to or even ignore symptoms, reducing their sensitivity to the emergence of new symptoms[11] and, consequently, prolonging the time taken to make a healthcare-seeking decision. This finding suggests that healthcare professionals should pay particular attention to patients with a longer duration of heart failure, encouraging them to make timely healthcare-seeking decisions to improve disease prognosis.

Key Factors Influencing Healthcare-Seeking Decision Delay During Acute Exacerbations in Older Adults with CHF

In this study, symptom management self-efficacy is an independent factor influencing healthcare-seeking decision delay during acute exacerbations in older adults with heart failure ($\beta = 0.637$, $P < 0.001$). Self-efficacy refers to an individual's belief in their ability to successfully perform a specific task.[36] A high perceived sense of self- efficacy may cause these patients to prefer self-management when symptoms arise, thus prolonging the time taken to make a healthcare-seeking decision. This finding is consistent with the results of Shi et al,[37] who studied factors contributing to healthcare-seeking decision delay in patients with hemorrhoids. They found that individuals with solid self-efficacy in managing disease symptoms are likelier to employ self-coping styles than consult healthcare providers. According to the HBM, enhanced self-efficacy influences behavioral intentions, affecting individual decision-making. Therefore, this patient population must strengthen health education to reduce the delay in healthcare- seeking decisions, thereby improving disease prognosis. Although some studies suggest that high self-efficacy may prolong the time to make healthcare-seeking decisions, research by Zheng et al[38] presents a contrasting view, proposing that high self-efficacy in patients with chronic kidney disease may reduce delays in healthcare-seeking decisions. This discrepancy might be due to patient psychological and behavioral differences in different disease contexts. Future research should further explore this area.

According to the HBM, perceived susceptibility influences healthcare decision-making through the mediating effects of Somatic perception and behavioral intention, ultimately affecting healthcare-seeking decisions. Somatic perception is sensitivity to bodily sensations and bodily activities caused by physiological changes.[39] In this study, somatic perception of heart failure is an independent factor influencing healthcare-seeking decision delay during acute exacerbations in older adults with CHF ($\beta = -0.159$, $P = 0.003$). This is similar to previous studies in that insidious, vague, or nonspecific symptoms lead to patient uncertainty,[37] which in turn leads to reduced patient decision-making ability and ultimately to prolonged decision-making time for patients to seek medical care.[40] In addition, there was a significant correlation between excessive sweating, the speed of onset, and the delay in healthcare-seeking decisions. This suggests that somatic perception severity and urgency are more likely to raise the patient's awareness, prompting them to seek medical

assistance more quickly.[41] This finding aligns with the results of Schiff et al,[42] who studied the relationship between symptom perception and delayed time: different symptoms exhibit different time courses, with patients experiencing gradually worsening symptoms potentially waiting longer than those with acute symptom onset. This suggests that healthcare professionals could develop intervention strategies focused on symptom recognition, symptom assessment, and timely response to symptoms, enhancing patients' symptom awareness and improving their symptom management.[5]

In the theory of TPB, subjective norms influence healthcare decision-making through behavioral intention. In this study, more than half of the older adults with heart failure (56.56%) had a stable family support system, which may be related to traditional Chinese culture. Most elderly individuals live with their children, allowing them to receive encouragement and assistance promptly when symptoms occur, thereby significantly influencing their healthcare-seeking decisions. This finding is consistent with the conclusions of Sethares et al.[43] Furthermore, this study identified social support as an independent factor affecting healthcare-seeking decision delay among older adults with heart failure during acute exacerbations ($\beta = -0.195$, $P < 0.001$). Higher levels of social support were associated with shorter decision-making delay. Social support not only provides practical assistance for older adults with limited mobility but also enhances their subjective well-being through emotional and material support,[44,45] effectively buffering panic and anxiety during symptom onset and promoting more proactive healthcare-seeking behaviors.[46] Therefore, clinical practice should emphasize assessing and strengthening patients' social support systems. Strengthening communication with patients and their families can foster a sense of care and companionship, thereby encouraging the development of positive health behaviors.

Practical Recommendations

Based on the findings of this study, several practical recommendations can be proposed to reduce healthcare decision delays among older adults with CHF during acute exacerbations. First, health education for patients and their family members should be strengthened to help them recognize early symptom changes and enhance awareness of worsening conditions, thereby improving self-management and promoting timely medical consultation. Second, healthcare providers should pay attention to patients' self-efficacy and social support by establishing continuous follow-up, telephone check-ins, or community nursing interventions to enhance confidence and adherence, reducing delays caused by hesitation or uncertainty. Third, medical institutions should improve multidisciplinary collaboration and strengthen communication between primary and specialized care to offer accessible consultation and referral pathways, enhancing the efficiency of identifying and managing acute exacerbations. At the policy level, mechanisms such as decision-making guidance or risk alerts for older adults with chronic diseases could be developed to encourage proactive identification of high-risk groups. Finally, future research should further explore the long-term effects of different interventions on patients' decision-making behaviors and outcomes, providing evidence for building a more scientific and sustainable model for chronic disease management in older adults.

Limitations and Future Research Perspectives

Despite providing valuable insights into the complex mechanisms of healthcare-seeking decision delay in older adults with CHF, this study acknowledges certain limitations. First, the sample size of this study is relatively limited, which may constrain the generalizability of the results. Second, the study data were primarily collected from a specific region, which may not fully represent the healthcare-seeking behaviors of older adults with CHF across China. Additionally, the data collection relied on patients' self-reports, which may introduce recall bias. Finally, as a cross-sectional study, this research does not capture how patients' healthcare-seeking decisions change over time, nor does it assess the impact of these decisions on long-term outcomes such as survival rates and quality of life. It is important to note that this study primarily focused on the healthcare-seeking behavior of older adults with CHF in China. Future research should further explore the differences in healthcare-seeking decisions among patients from different cultural backgrounds, as cultural sensitivity is crucial in understanding patient behavior, designing interventions, and delivering healthcare services. Cross-cultural comparative studies could help better identify and address the unique needs of patients from diverse cultural backgrounds. Moreover, future research should focus on long-term follow-up data to gain a deeper understanding of the trends in patients' healthcare-seeking decisions and to reveal causal relationships between various factors.

Conclusion

This study conducted an in-depth analysis of factors influencing healthcare-seeking decision delays among older adults with CHF during acute exacerbations. The findings revealed that such delays are common among this population in China and are primarily influenced by factors such as heart failure somatic perception, social support, symptom management self-efficacy. These findings not only deepen the understanding of healthcare decision-making behaviors among older adults with CHF but also suggest that enhancing health education, building and improving social support networks, and strengthening multidisciplinary collaboration could help shorten decision delays, thereby improving clinical outcomes and quality of life. Future research should further expand this field to explore additional influencing factors and intervention strategies to improve healthcare experiences and health outcomes for older adults with CHF. Moreover, greater attention from society is expected to address the issue of healthcare decision-making among this population, jointly promoting better healthcare accessibility and quality of life.

Ethics Approval and Consent to Participate

The first author explained the research objectives to all participants and obtained written informed consent from all study participants. All experimental protocols were approved by the Ethics Committee of Nanjing Hospital of Chinese Medicine Affiliated to Nanjing University of Chinese Medicine (ethics code: KY2023328) and were conducted in accordance with the principles of the Declaration of Helsinki. All methods in this study were performed in accordance with relevant guidelines and regulations.

Acknowledgments

The study team used an unauthorized version of the Chinese MMSE without permission; however, this has now been rectified with PAR. The MMSE is a copyrighted instrument and may not be used or reproduced in whole or in part, in any form or language, or by any means without written permission from PAR (www.parinc.com). The authors thank all participants and researchers involved in this study. The authors thank Dr. Bin Shen and Ms. Yan-Li Lin for their assistance in the early stages of data collation and manuscript discussion. The authors would like to express their gratitude to the local team members at two hospitals in Nanjing for their assistance during data collection, as well as to all older adults with heart failure for their support. This paper has been uploaded to Research Square as a preprint: https://www.researchsquare.com/article/rs-5114634/v1.

Funding

This work was supported by the Chinese Medicine Science and Technology Development Program of Jiangsu Province (Grant No. MS2022044) and the Health Science and Technology Development Special Fund Project of Nanjing (Grant No. YKK21198).

Disclosure

The authors declare that there are no competing interests in this work.

References

1. Khan MS, Shahid I, Bennis A, Rakisheva A, Metra M, Butler J. Global epidemiology of heart failure. *Nat Rev Cardiol*. 2024;21(10):717–734. doi:10.1038/s41569-024-01046-6
2. Daubert C. Heart failure: a major public health problem. *Presse Med*. 2024;53(1):104224. doi:10.1016/j.lpm.2024.104224
3. Tsao CW, Aday AW, Almarzooq ZI, et al. Heart disease and stroke statistics—2023 update: a report from the American heart association. *Circulation*. 2023;147(8):e93–e621. doi:10.1161/CIR.0000000000001123
4. Mitter SS, Pinney SP. Advances in the management of acute decompensated heart failure. *Med Clin North Am*. 2020;104(4):601–614. doi:10.1016/j.mcna.2020.03.002
5. Shakoor A, Abou Kamar S, Malgie J, et al. The different risk of new-onset, chronic, worsening, and advanced heart failure: a systematic review and meta-regression analysis. *European J Heart Failure*. 2024;26(2):216–229. doi:10.1002/ejhf.3048
6. Abdin A, Anker SD, Butler J, et al. `Time is prognosis' in heart failure: time-to-treatment initiation as a modifiable risk factor. *ESC Heart Failure*. 2021;8(6):4444–4453. doi:10.1002/ehf2.13646
7. Altice NF, Madigan EA. Factors associated with delayed care-seeking in hospitalized patients with heart failure. *Heart Lung*. 2012;41(3):244–254. doi:10.1016/j.hrtlng.2011.09.007

8. Gravely-Witte S, Jurgens CY, Tamim H, Grace SL. Length of delay in seeking medical care by patients with heart failure symptoms and the role of symptom-related factors: a narrative review. *European J Heart Failure*. 2010;12(10):1122–1129. doi:10.1093/eurjhf/hfq122
9. Dahlström U. Frequent non-cardiac comorbidities in patients with chronic heart failure. *European J Heart Failure*. 2005;7(3):309–316. doi:10.1016/j.ejheart.2005.01.008
10. Teixeira A, Arrigo M, Tolppanen H, et al. Management of acute heart failure in elderly patients. *Archiv Cardiovasc Dis*. 2016;109(6–7):422–430. doi:10.1016/j.acvd.2016.02.002
11. Jurgens CY, Hoke L, Byrnes J, Riegel B. Why do elders delay responding to heart failure symptoms? *Nursing Res*. 2009;58(4):274–282. doi:10.1097/NNR.0b013e3181ac1581
12. Margolisa G, Letourneau-Shesaf S, Khoury S, et al. Trends and predictors of prehospital delay in patients undergoing primary coronary intervention. *Coronary Artery Dis*. 2018;29(5):373–377. doi:10.1097/MCA.0000000000000608
13. Kontsevaya A, Kononets EN, Goryachkin EA. Delayed help-seeking for emergency medical care of patients with acute coronary syndrome/myocardial infarction: review of studies. *Russian J Cardiol*. 2019;24(8):132–139. doi:10.15829/1560-4071-2019-8-132-139
14. Lin CY, Hammash M, Miller JL, et al. Delay in seeking medical care for worsening heart failure symptoms: predictors and association with cardiac events. *Eur J Cardiovasc Nurs*. 2021;20(5):454–463. doi:10.1093/eurjcn/zvaa032
15. Lee KS, Lee H, Park JH. Association between residence location and pre-hospital delay in patients with heart failure. *Int J Environ Res Public Health*. 2021;18(12):6679. doi:10.3390/ijerph18126679
16. Xu M, Ruan T, Huang X, et al. Care-seeking delay of patients with heart failure in China: a mixed-method study. *ESC Heart Failure*. 2024;11(4):2086–2099. doi:10.1002/ehf2.14757
17. Rosenstock IM. Historical origins of the health belief model. *Health Educ Monograph*. 1974;2(4):328–335. doi:10.1177/109019817400200403
18. Bandura A. Health promotion by social cognitive means. *Health Educ*. 2004;31(2):143–164. doi:10.1177/1090198104263660
19. Ajzen I. The theory of planned behavior. *Organizational Behav Human Decision Processes*. 1991;50(2):179–211. doi:10.1016/0749-5978(91)90020-T
20. Nieuwenhuis MMW, Jaarsma T, van Veldhuisen Dirk J, Van Der Wal MHL. Factors associated with patient delay in seeking care after worsening symptoms in heart failure patients. *J Card Fail*. 2011;17(8):657–663. doi:10.1016/j.cardfail.2011.04.004
21. McDonagh TA, Metra M, Adamo M, et al. 2021 ESC guidelines for the diagnosis and treatment of acute and chronic heart failure: developed by the task force for the diagnosis and treatment of acute and chronic heart failure of the European society of cardiology (ESC) with the special contribution of the heart failure association (HFA) of the ESC (vol 39, 860, 2018). *Eur Heart J*. 2021;42(48):4901. doi:10.1093/eurheartj/ehab670
22. Chen CC, Fang WJ, An Y, Wang L, Fan XZ. The multiple mediating effects of illness perceptions and coping strategies on the relationship between physical symptoms and depressive symptoms in patients with heart failure. *Eur J Cardiovasc Nurs*. 2020;19(2):125–133. doi:10.1177/1474515119864759
23. Jurgens CY, Lee CS, Riegel B. Psychometric analysis of the heart failure somatic perception scale as a measure of patient symptom perception. *J Cardiovasc Nurs*. 2017;32(2):140–147. doi:10.1097/JCN.0000000000000320
24. Al-Hassan MA, Omran SM. The effects of health beliefs on health care-seeking decisions of Jordanian patients with myocardial infarction symptoms. *Int J Nursing Pract*. 2005;11(1):13–20. doi:10.1111/j.1440-172X.2005.00497.x
25. Li PWC, Lee DTF, Doris SF. Psychometric evaluation of the perceived barriers to health care-seeking decision in Chinese patients with acute coronary syndromes. *Heart Lung*. 2014;43(2):140–145. doi:10.1016/j.hrtlng.2014.01.001
26. Shang LWX, Shen MF, Chen WY, Pandey B, Zhu DQ. An investigation of symptom management self-efficacy and its influencing factors in patients with chronic heart failure. *Chin J Nurs*. 2014;49(6):674–679. doi:10.3761/j.issn.0254-1769.2014.06.008
27. Lorig KR, Sobel DS, Ritter PL, Laurent D, Hobbs M. Effect of a self-management program on patients with chronic disease. *Effective Clin Pract*. 2001;4(6):256–262.
28. Liu JW, Li FY, Lian YL. Investigation of reliability and validity of the social support scale. *J Xinjiang Med Univ*. 2008;31(01):1–3.
29. Xie YN. A preliminary study on the reliability and valid-ity of simplified coping style scale. *Chin J Clin Psychol*. 1998;6(02):53–54.
30. Limpert E, Stahel WA, Abbt M. Log-normal distributions across the sciences: keys and clues: on the charms of statistics, and how mechanical models resembling gambling machines offer a link to a handy way to characterize log-normal distributions, which can provide deeper insight into variability and probability—normal or log-normal: that is the question. *BioScience*. 2001;51(5):341–352. doi:10.1641/0006-3568(2001)051[0341:LNDATS2.0.CO;2
31. Strum DP, May JH, Vargas LG. Modeling the uncertainty of surgical procedure times: comparison of log-normal and normal models. *J Am Soc Anesthesiologists*. 2000;92(4):201–215. doi:10.1097/00000542-200004000-00035
32. Lee JJ, Malhotra C, Sim KLD, Yeo KK, Finkelstein E, Ozdemir S. A longitudinal study of the association of awareness of disease incurability with patient-reported outcomes in heart failure. *Med Decis Mak*. 2024;45(1):97–108. doi:10.1177/0272989X241297694
33. Nguyen HL, Saczynski JS, Gore JM, Goldberg RJ. Age and sex differences in duration of prehospital delay in patients with acute myocardial infarction a systematic review. *Circ Cardiovasc Qual Outcomes*. 2010;3(1):82–92. doi:10.1161/CIRCOUTCOMES.109.884361
34. Butrous H, Hummel SL. Heart failure in older adults. *Cana J Cardiol*. 2016;32(9):1140–1147. doi:10.1016/j.cjca.2016.05.005
35. MacInnes J. An exploration of illness representations and treatment beliefs in heart failure. *J Clin Nurs*. 2014;23(9–10):1249–1256. doi:10.1111/jocn.12307
36. Waller CG. Understanding prehospital delay behavior in acute myocardial infarction in women. *Crit Pathways Cardiol*. 2006;5(4):228–234. doi:10.1097/01.hpc.0000249621.40659.cf
37. Shi Y, Yang DL, Chen S, et al. Factors influencing patient delay in individuals with haemorrhoids: a study based on theory of planned behavior and common sense model. *J Adv Nurs*. 2019;75(5):1018–1028. doi:10.1111/jan.13900
38. Zheng J, Guo AH, Xue BW, et al. Exploring patient delay in people with chronic kidney disease: a cross-sectional study. *Medicine*. 2024;103(7):e37077. doi:10.1097/MD.0000000000037077
39. Jurgens CY. Somatic awareness, uncertainty, and delay in care-seeking in acute heart failure. *Res Nursing Health*. 2006;29(2):74–86. doi:10.1002/nur.20118
40. Okada A, Tsuchihashi-Makaya M, Kang J, Aoki Y, Fukawa M, Matsuoka S. Symptom perception, evaluation, response to symptom, and delayed care seeking in patients with acute heart failure an observational study. *J Cardiovasc Nurs*. 2019;34(1):36–43. doi:10.1097/JCN.0000000000000526

41. Ericsson M, Thylen I, Stromberg A, Angerud KH, Moser DK, Lawesson SS. Factors associated with patient decision time in ST-segment elevation myocardial infarction, in early and late responders-an observational cross-sectional survey study. *Eur J Cardiovasc Nurs*. 2022;21(7):694–701. doi:10.1093/eurjcn/zvab124
42. Schiff GD, Fung S, Speroff T, McNutt RA. Decompensated heart failure: symptoms, patterns of onset, and contributing factors. *Am J Med*. 2003;114(8):625–630. doi:10.1016/S0002-9343(03)00132-3
43. Sethares KA, Sosa ME, Fisher P, Riegel B. Factors associated with delay in seeking care for acute decompensated heart failure. *J Cardiovasc Nurs*. 2014;29(5):429–438. doi:10.1097/JCN.0b013e3182a37789
44. Norberg EB, Boman K, Löfgren B. Activities of daily living for old persons in primary health care with chronic heart failure. *Scand J Caring Sci*. 2008;22(2):203–210. doi:10.1111/j.1471-6712.2007.00514.x
45. Su H, Zhou Y, Wang H, Xing L. Social support, self-worth, and subjective well-being in older adults of rural China: a cross-sectional study. *Psychol Health Med*. 2022;27(7):1602–1608. doi:10.1080/13548506.2021.1905861
46. Venkatesan VCK, Madhavi S, Suresh KR, Kuzhanthaivel P. A study to explore the factors related to treatment seeking delay among adults diagnosed with acute myocardial infarction at KMCH, Coimbatore. *Indian Heart J*. 2018;70(6):793–801. doi:10.1016/j.ihj.2018.01.007