ORIGINAL RESEARCH

Knowledge, Attitudes, and Practices Among Elderly CHD Patients Towards Self-Perceived Health Abilities

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Objective: This study aimed to assess the knowledge, attitudes and practices (KAP) among elderly coronary heart disease (CHD) patients toward self-perceived health abilities.

Methods: This web-based study was carried out between April 2023 and September 2023 at Guang'anmen Hospital, China Academy of Chinese Medical Sciences. A self-developed questionnaire was utilized to collect demographic information from elderly CHD patients, and evaluate their KAP towards self-perceived health abilities.

Results: A total of 568 valid questionnaires were collected. Among the participants, the average age was 65.97±5.50 years, and 298 (52.46%) were female, and the mean scores for knowledge, attitudes, and practices were 6.34±2.29 (possible range: 0–9), 35.24±4.99 (possible range: 9–45), and 27.79±10.09 (possible range: 9–45), respectively. The structural equation model demonstrated that elderly CHD patients' knowledge directly affects attitudes and practices, with path coefficient of 0.93 (P<0.001) and 0.39 (P=0.033), respectively. Moreover, attitudes play an intermediary role between knowledge and practice with path coefficient of 0.75 (P<0.001). Furthermore, residence directly affects knowledge with path coefficient of 0.67 (P<0.001), cardiac function directly affects knowledge with path coefficient of −0.97 (P<0.001) and history of interventional therapy directly affects practice with path coefficient of 4.23 (P<0.001).

Conclusion: Elderly CHD patients demonstrated sufficient knowledge, positive attitudes, and proactive practices towards self-perceived health abilities. However, educational programs and behavior modification are recommended, particularly for elderly with lower age and education, living in rural areas, lacking interventional therapy, obese, or taking multiple CHD medications.

Keywords: knowledge, attitudes, practices, cross-dimensional study, coronary heart disease, self-perceived health abilities

Introduction

Coronary heart disease (CHD) is a prevalent cardiovascular disorder characterized by the stenosis or occlusion of coronary arteries, resulting in insufficient blood supply to the heart. In China, the age-standardized prevalence of CHD was estimated at 2.23%.[1] The prevalence of CHD exhibited an upward trend with advancing age, particularly among individuals aged 50 years and above.[1] CHD often leads to reduced physical capabilities, limitations in daily activities, and a compromised sense of well-being among elderly.[1] Besides, elderly patients with CHD usually experience reduced exercise tolerance, and increased vulnerability to physical exertion.[2] Moreover, CHD can contribute to heightened psychological stress, increased healthcare utilization and decreased productivity, thereby imposing heavy public health burden.[3] Therefore, preventive measures, early diagnosis, and effective treatment of CHD were crucial among elderly patients.

Self-perceived health abilities refer to an individual's assessment of their own health status and their confidence in managing health-related tasks and challenges.[4] This concept encompasses various aspects, including self-efficacy, perceived control over one's health, and the ability to perform health-promoting behaviors. Specifically, in the prevention

stage of CHD, self-perceived abilities involve maintaining a balanced diet, engaging in regular physical activity, and consistently monitoring blood pressure and cholesterol levels.[5–7] Following a CHD diagnosis, the abilities encompass adherence to routine health check-ups, medications (such as statins, antiplatelet agents, and beta-blockers), and participation in cardiac rehabilitation.[8,9] Additionally, awareness of self-perceived health abilities is essential for prompt healthcare seeking, and a lack of knowledge can impede treatment.[10] Moreover, positive attitudes toward self-perceived health ability can significantly enhance adherence to regular follow-up appointments and bolster confidence in medical interventions.[11] However, knowledge, attitudes, and practices (KAP) regarding elderly CHD patients' self-perceived health abilities were largely unknown.

This study aimed to explore the KAP among elderly CHD patients towards their self-perceived health abilities, and further identify influential factors. By elucidating these relationships, the findings of this research could contribute to the development of educational interventions aimed at enhancing the KAP among elderly CHD patients towards self-perceived health abilities.

Materials and Methods

Study Design and Participants

This cross-dimensional survey was conducted between April 2023 and September 2023 at Guang'anmen Hospital, China Academy of Chinese Medical Sciences. The study was approved by the Ethics Committee of Guang'anmen Hospital, China Academy of Chinese Medical Sciences (Approval No. 2022-KY-260) and informed consent was obtained from the study participants.

The inclusion criteria for this study were as follows: 1) aged 60 years or older. 2) diagnosed with CHD. 3) willing to sign an informed consent form, indicating voluntary participation in the study. Those who are currently undergoing inpatient treatment or residing in long-term care facilities are excluded from this study.

Questionnaire Design

The questionnaire was crafted under the guidance of the 2023 AHA/ACC/ACCP/ASPC/NLA/PCNA Guideline for the Management of Patients With Chronic Coronary Disease[12] and pertinent literature on CHD.[13–15] The initial draft underwent revisions based on feedback from 3 senior experts specializing in cardiovascular disease and geriatrics. both holding the title of chief physician Subsequently, a preliminary trial was then conducted on a limited scale (n=34), resulting in a Cronbach's alpha value of 0.887, indicating good internal consistency.

The final questionnaire was presented in Chinese and comprised four dimensions: demographics, knowledge, attitudes, and practices. The demographics dimension comprised 10 items. The knowledge dimension comprised 9 items, with 1 point for a correct answer and 0 points otherwise. The total knowledge dimension score ranged from 0 to 9. The attitude dimension consisted of 9 items, rated on a five-point Likert scale from "strongly agree" (5 points) to "strongly disagree" (1 point), with possible score ranged from 9 to 45. The practice dimension included 9 items, rated on a five-point Likert scale from "always" (5 points) to "never" (1 point). The total practice dimension score ranged from 9 to 45.

Data collection was conducted through online questionnaire on Sojump (http://www.sojump.com), and distributed across diverse social media platforms. Upon initiating the e-questionnaire, participants were required to indicate their consent before proceeding to answer questions. All the questions were mandatory for submission. Anonymity was maintained throughout data collection. To prevent duplicate submissions from a single IP address and ensure survey integrity, IP restriction was implemented.

Statistical Methods

STATA 17.0 (Stata Corporation, College Station, TX, USA) was used for statistical analysis. The continuous variables were expressed as mean±SD, and the categorical variables was expressed as n (%). The continuous variables conformed to a normal distribution were tested by the t-test or ANOVA. In multivariate analysis, 50% of the total score was used as the cut-off value. The structural equation model (SEM) of knowledge, attitudes and practices among elderly CHD patients toward self-perceived health abilities was constructed with AMOS 24.0 (IBM, NY, United States). The

hypotheses as following: 1) knowledge had direct effects on attitudes, 2) knowledge had direct effects on practices, and 3) attitudes had direct effects on practices. The model fitting was evaluated with CMIN/DF (Chi-square fit statistics/ degree of freedom), RMSEA (root mean square error of approximation), IFI (incremental fix index), TLI (Tucker-Lewis index) and CFI (comparative fix index). In this analysis, $P<0.05$ was considered statistically significant.

Results

A total of 679 questionnaires were initially collected. However, 21 of these exhibited apparent logical inconsistencies and were subsequently discarded. Furthermore, 90 responses were excluded due to the participants indicating "not sure" for all items within the knowledge dimension. As a result, a final count of 568 valid questionnaires was retained for further analysis.

The mean age of participants was 65.97±5.50 years. A considerable proportion of participants were female (52.46%), with a body mass index (BMI) within 18.5–23.9 kg/m^2 (51.41%), residing in urban areas (56.87%), and married (85.74%). Notably, 51.06% had Grade II heart function, and the majority (86.27%) had not undergone interventional therapy. Furthermore, 81.69% of participants took 2 or fewer coronary heart disease-related medications (Table 1). More than half (54.40%) of participants had comorbid hypertension, followed by hyperlipidemia (29.75%), diabetes (18.31%), and other conditions (13.03%) (Figure S1).

The mean scores for knowledge, attitudes, and practices were 6.34±2.29 (possible range: 0–9), 35.24±4.99 (possible range: 9–45), and 27.79±10.09 (possible range: 9–45), respectively. Notably, urban residents exhibited higher scores ($P<0.001$). Higher attitude scores were observed among urban residents ($P=0.019$), individuals with Grade I heart function ($P=0.007$), and those prescribed 3–4 coronary heart disease-related medications ($P=0.014$). Additionally, higher practice scores were observed among male participants ($P=0.039$), individuals with Grade I heart function ($P=0.035$),

Table 1 Demographic Characteristics and KAP Scores

	N (%)	Knowledge		Attitudes		Practices	
		Score	**P**	**Score**	**P**	**Score**	**P**
Total	568	6.34±2.29		35.24±4.99		27.79±10.09	
Gender			0.894		0.718		0.039
Male	270 (47.54)	6.39±2.26		34.94±5.47		28.87±10.01	
Female	298 (52.46)	6.29±2.33		35.51±4.50		26.81±10.09	
Age	65.97±5.50						
BMI			0.238		0.753		0.530
<18.5 (Underweight)	73 (12.85)	5.70±2.60		34.88±5.33		28.82±9.03	
18.5–23.9 (Normal)	292 (51.41)	6.43±2.24		35.24±4.83		27.76±10.07	
24–27.9 (Overweight)	162 (28.52)	6.47±2.22		35.38±4.94		27.81±10.59	
28 (Obese)	41 (7.22)	6.29±2.26		35.24±5.83		26.10±10.15	
Residence			<0.001		0.019		0.924
Rural	245 (43.13)	5.96±2.46		34.71±5.31		27.90±9.82	
Urban	323 (56.87)	6.63±2.12		35.63±4.71		27.71±10.31	
Marital status			0.697		0.291		0.067
Single	18 (3.17)	6.06±2.34		33.44±7.06		26.56±12.32	
Married	487 (85.74)	6.37±2.28		35.37±4.91		28.17±9.96	
Other	63 (11.09)	6.14±2.38		34.68±4.88		25.22±10.19	
Education level			0.333		0.496		0.122
Junior high school and below	203 (35.74)	6.11±2.44		35.17±5.21		26.88±10.49	
High school and technical school	198 (34.86)	6.39±2.29		35.01±4.85		27.89±9.87	
College and above	167 (29.40)	6.55±2.10		35.59±4.90		28.78±9.82	

(*Continued*)

Table 1 (Continued).

	N (%)	Knowledge		Attitudes		Practices	
		Score	P	Score	P	Score	P
Monthly family income			0.092		0.111		0.408
<2000	75 (13.20)	6.00±2.37		34.25±5.29		26.73±11.28	
2000–5000	192 (33.80)	6.13±2.49		35.47±4.47		27.94±9.97	
5000–10,000	189 (33.27)	6.42±2.13		34.98±5.69		27.37±9.94	
≥10,000	112 (19.72)	6.77±2.10		35.91±4.24		28.96±9.73	
Heart function classification			0.761		0.007		0.035
Grade I	229 (40.32)	6.39±2.26		35.98±4.57		28.11±10.80	
Grade II	290 (51.06)	6.35±2.27		34.87±4.94		27.82±9.71	
Grade III	40 (7.04)	6.05±2.63		35.03±5.22		28.10±7.88	
Grade IV	9 (1.58)	5.78±2.64		29.00±9.46		17.56±8.28	
History of interventional therapy			0.882		0.579		0.014
Yes	78 (13.73)	6.23±2.45		34.56±6.00		30.38±9.88	
No	490 (86.27)	6.35±2.27		35.34±4.81		27.38±10.08	
Number of coronary heart disease-related medications			0.710		0.014		0.003
2 or fewer	464 (81.69)	6.32±2.28		35.27±4.90		27.71±10.33	
3~4	80 (14.08)	6.51±2.25		36.03±4.82		29.95±8.79	
5 or more	24 (4.23)	6.00±2.81		32.04±6.15		22.25±6.91	

those with a history of interventional therapy (P=0.014), and those taking 3–4 coronary heart disease-related medications (P=0.003) (Table 1).

The correct rate in the knowledge dimension ranged from 28.35% to 83.10%. The three knowledge items with the highest correctness rates were as follows: "Patients with higher self-perceived health ability tend to adopt more positive coping strategies" (K6) with a correctness rate of 83.10%, "Generally, the stronger the belief in the curability of the disease among patients, the higher their self-perceived health ability" (K8) with a correctness rate of 79.58%,

Lack of energy or a lack of knowledge about the disease will make it difficult for patients to engage in disease control and negatively impact their self-perceived health ability (K7)

with a correctness rate of 79.05%. The three items with the lowest correctness rates were:

The probability of developing coronary heart disease is the same for individuals with risk factors such as hypertension, hyperlipidemia, diabetes, hyperuricemia, obesity, smoking, alcohol consumption, psychological factors like anxiety, depression, stress, or a lack of physical activity as for those without these issues (K3)

with a correctness rate of 28.35%,

Self-perceived health ability is typically assessed using a Health Competence Perception Scale, which consists of 8 items and is divided into two dimensions: behavioral expectations and outcome expectations. Higher scores indicate higher self-perceived health ability (K9)

with a correctness rate of 68.13%,

Commonly used medications for treating coronary heart disease include aspirin and/or clopidogrel bisulfate, statins, metoprolol succinate, metoprolol tartrate, angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, calcium channel blockers, nitrates, and traditional Chinese medicines like Compound Salvia Droplets, Quick-Acting Cardiovascular Pills, and Musk Cardiac Bolus (K4)

with a correctness rate of 70.25% (Table 2).

Table 2 Knowledge

	Correctness rate (%)
K1. Coronary heart disease refers to a condition where the coronary arteries develop atherosclerotic lesions leading to narrowing or blockage of the vessel lumen, or due to functional changes (spasms) in the coronary arteries.	74.30
K2. Coronary heart disease presents various clinical types, including asymptomatic myocardial ischemia (silent coronary heart disease), angina type, myocardial infarction type, ischemic cardiomyopathy type, sudden death type, etc.	73.77
K3. The probability of developing coronary heart disease is the same for individuals with risk factors such as hypertension, hyperlipidemia, diabetes, hyperuricemia, obesity, smoking, alcohol consumption, psychological factors like anxiety, depression, stress, or a lack of physical activity as for those without these issues.	28.35
K4. Commonly used medications for treating coronary heart disease include aspirin and/or clopidogrel bisulfate, statins, metoprolol succinate, metoprolol tartrate, angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, calcium channel blockers, nitrates, and traditional Chinese medicines like Compound Salvia Droplets, Quick-Acting Cardiovascular Pills, and Musk Cardiac Bolus.	70.25
K5. The concept of self-perceived health ability is the individual's ability to identify personal health issues and take proactive measures to improve their current physical condition, which is a self-assessment of the individual's ability to effectively manage their health.	77.11
K6. Patients with higher self-perceived health ability tend to adopt more positive coping strategies.	83.10
K7. Lack of energy or a lack of knowledge about the disease will make it difficult for patients to engage in disease control and negatively impact their self-perceived health ability.	79.05
K8. Generally, the stronger the belief in the curability of the disease among patients, the higher their self-perceived health ability.	79.58
K9. Self-perceived health ability is typically assessed using a Health Competence Perception Scale, which consists of 8 items and is divided into two dimensions: behavioral expectations and outcome expectations. Higher scores indicate higher self-perceived health ability.	68.13

In the attitudes dimension, positive response rates, encompassing both "Strongly Agree" and "Agree", varied from 44.37% to 84.33%. A significant majority (84.33%) of participants exhibited positive attitudes towards seeking advice from their attending physician towards their self-perceived health ability (A3). Similarly, most participants (82.75%) agreed that they were willing to adjust their mindset and lifestyle habits based on the results of their self-perceived health ability to improve their condition (A9). In contrast, only 44.37% concurred with the notion that, due to feeling physically and mentally exhausted from coronary heart disease, they were unwilling to further focus on their own health (A5) (Table 3).

Practice adherence rates, covering both "Always" and "Often", ranged from 32.75% to 45.95%. The majority (45.95%) of participants affirmed actively acquiring knowledge related to CHD and self-perceived health ability through various channels such as books, the internet, newspapers, and more (P1). However, only 32.75% of participants actively participated in filling out the self-perceived health ability assessment scale (P4) (Table 4).

Pearson correlation analysis revealed significantly positive correlations between knowledge and practice (r=0.215, P<0.001), as well as attitude and practice (r=0.396, P<0.001) (Table 5). In the multivariate logistic analysis, age (OR=1.043, 95% CI: 1.010–1.079, P=0.012) and urban residence (OR=1.463, 95% CI: 1.040–2.058, P=0.029) were independently associated with knowledge (Table 6). Knowledge (OR=1.392, 95% CI: 1.280–1.520, P<0.001) and heart function classification of Grade II were independently associated with attitudes (OR=0.526, 95% CI: 0.355–0.774, P=0.001) (Table 7). Furthermore, attitudes (OR=1.133, 95% CI: 1.085–1.185, P<0.001), education level of college and above (OR=1.574, 95% CI: 1.008–2.470, P=0.047), and a history of interventional therapy (OR=2.197, 95% CI: 1.223–4.073, P=0.010) were independently associated with practices. However, obesity (OR=0.425, 95% CI: 0.181–0.978, P=0.046) and taking 5 or more CHD-related medications (OR=0.325, 95% CI: 0.115–0.842, P=0.025) displayed negative associations with practice scores (Table 8).

The fitting index of the structural equation model (SEM) outperformed the respective threshold value, signifying that the data satisfactorily fit the structural model (RMSEA=0.000, SRMR=0.012, TLI=1.028, CFI=1.000) (Table 9). Elderly CHD patients' knowledge directly affects attitudes and practices, with path coefficient of 0.93 (P<0.001) and 0.39

Table 3 Attitudes

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
A1. You are willing to obtain information related to self-perceived health competence from various sources, including the internet, television, books, and other means.	31.51%	47.88%	16.02%	3.34%	1.23%
A2. You are willing to participate in in-hospital education on self-perceived health competence conducted by the hospital.	29.75%	52.99%	14.26%	1.58%	1.40%
A3. You are happy to seek advice from your attending physician regarding your self-perceived health competence.	36.26%	48.06%	13.73%	0.70%	1.23%
A4. You recognize that the level of self-perceived health competence can have a different impact on the progression of coronary heart disease.	28.16%	50.00%	17.60%	2.99%	1.23%
A5. Due to feeling physically and mentally exhausted from coronary heart disease, you are unwilling to further focus on your own health.	18.83%	25.52%	16.02%	34.15%	5.45%
A6. You acknowledge that improving self-perceived health competence can to some extent enhance the quality of life for coronary heart disease patients.	26.40%	52.46%	17.95%	2.11%	1.05%
A7. If self-perceived health competence assessments are conducted within the hospital, you are willing to actively participate.	27.99%	51.23%	17.42%	1.93%	1.40%
A8. If participating in the self-perceived health competence scale assessment, you are happy to truthfully provide your information to obtain accurate evaluation results.	25.17%	54.57%	17.42%	1.40%	1.40%
A9. To improve your condition, you are willing to adjust your mindset and lifestyle habits based on the results of your self-perceived health competence score.	27.28%	55.45%	14.26%	1.93%	1.05%

Table 4 Practices

	Always	Often	Sometimes	Occasionally	Never
P1. The frequency with which you actively acquire knowledge related to coronary heart disease and self-perceived health competence through various channels such as books, the internet, newspapers, and more.	26.93%	19.01%	22.88%	22.71%	8.45%
P2. The frequency with which you actively participate in lectures and discharge education on self-perceived health competence for coronary heart disease patients within the hospital.	19.01%	16.72%	22.18%	24.82%	17.25%
P3. The frequency with which you proactively seek guidance from experts such as your attending physician on the meaning of the self-perceived health competence assessment scale (referred to as the assessment scale) results or inquire about any issues.	19.54%	18.48%	22.71%	26.58%	12.67%
P4. The frequency with which you actively participate in filling out the self-perceived health competence assessment scale.	17.60%	15.14%	24.47%	28.52%	14.26%
P5. The frequency with which you seek more knowledge about the characteristics and prevention of coronary heart disease based on the results of the assessment scale.	18.66%	17.07%	24.82%	28.16%	11.26%
P6. The frequency with which you change unhealthy habits in your life based on the results of the assessment scale.	18.30%	22.71%	26.40%	23.06%	9.50%
P7. The frequency with which you adjust your mindset in dealing with your own illness based on the assessment scale results.	18.13%	21.65%	25.35%	23.76%	11.09%
P8. The frequency with which you educate other elderly coronary heart disease patients around you about self-perceived health competence-related knowledge.	16.90%	19.19%	26.58%	24.82%	12.50%
P9. The frequency with which you pay attention to changes in your physical condition before and after self-management based on the scale scores.	18.66%	21.83%	26.40%	22.53%	10.56%

Table 5 Pearson Correlation Analysis

	Knowledge	**Attitude**	**Practice**
Knowledge	1		
Attitude	0.370 (P=0.983)	1	
Practice	0.215 (P<0.001)	0.396 (P<0.001)	1

Table 6 Univariate and Multivariate Analysis of Knowledge

	Univariate Analysis			**Multivariate Analysis**		
	OR	**95% CI**	**P**	**OR**	**95% CI**	**P**
Gender						
Male	Ref.					
Female	0.891	0.636–1.248	0.503			
Age	1.044	1.011–1.080	0.010	1.043	1.010–1.079	0.012
BMI						
<18.5 (Underweight)	Ref.					
18.5–23.9 (Normal)	1.476	0.881–2.475	0.138			
24–27.9 (Overweight)	1.699	0.971–2.979	0.063			
28 (Obese)	1.520	0.703–3.350	0.291			
Residence						
Rural	Ref.			Ref.		
Urban	1.478	1.053–2.076	0.024	1.463	1.040–2.058	0.029
Marital status						
Single	Ref.					
Married	1.251	0.470–3.226	0.644			
Other	0.938	0.319–2.689	0.905			
Education level						
Junior high school and below	Ref.					
High school and technical school	1.156	0.776–1.726	0.476			
College and above	1.102	0.727–1.675	0.647			
Monthly family income						
<2000	Ref.					
2000–5000	1.136	0.662–1.944	0.641			
5000–10,000	1.233	0.717–2.115	0.447			
≥10,000	1.751	0.958–3.212	0.069			
Heart function classification						
Grade I	Ref.					
Grade II	0.975	0.684–1.388	0.889			
Grade III	1.099	0.555–2.239	0.789			
Grade IV	0.824	0.213–3.407	0.778			
History of interventional therapy						
Yes	1.076	0.662–1.772	0.770			
No	Ref.					
Number of coronary heart disease-related medications						
2 or fewer	Ref.					
3~4	1.209	0.744–1.996	0.450			
5 or more	1.145	0.499–2.778	0.753			

Table 7 Univariate and Multivariate Analysis of Attitudes

	Univariate Analysis			Multivariate Analysis		
	OR	95% CI	P	OR	95% CI	P
Knowledge	1.397	1.287–1.523	<0.001	1.392	1.280–1.520	<0.001
Gender						
Male	Ref.					
Female	1.062	0.762–1.481	0.720			
Age	1.026	0.995–1.059	0.109			
BMI						
<18.5 (Underweight)	Ref.					
18.5–23.9 (Normal)	1.071	0.638–1.792	0.793			
24–27.9 (Overweight)	1.175	0.673–2.048	0.569			
28 (Obese)	1.681	0.769–3.781	0.199			
Residence						
Rural	Ref.			Ref.		
Urban	1.506	1.077–2.108	0.017	1.275	0.855–1.899	0.232
Marital status						
Single	Ref.					
Married	2.108	0.816–5.815	0.130			
Other	1.842	0.642–5.592	0.263			
Education level						
Junior high school and below	Ref.					
High school and technical school	0.975	0.658–1.447	0.902			
College and above	1.131	0.748–1.714	0.560			
Monthly family income						
<2000	Ref.			Ref.		
2000–5000	1.349	0.789–2.308	0.273	1.352	0.743–2.464	0.323
5000–10,000	1.179	0.690–2.017	0.547	1.071	0.572–2.003	0.831
≥10,000	1.922	1.061–3.508	0.032	1.537	0.771–3.080	0.223
Heart function classification						
Grade I	Ref.			Ref.		
Grade II	0.570	0.399–0.813	0.002	0.526	0.355–0.774	0.001
Grade III	0.605	0.307–1.198	0.146	0.637	0.305–1.342	0.231
Grade IV	0.274	0.057–1.066	0.072	0.297	0.059–1.240	0.105
History of interventional therapy						
Yes	0.945	0.585–1.534	0.817			
No	Ref.					
Number of coronary heart disease-related medications						
2 or fewer	Ref.					
3~4	1.319	0.814–2.169	0.266			
5 or more	0.670	0.288–1.528	0.340			

(P=0.033), respectively. Moreover, attitudes play an intermediary role between knowledge and practices with path coefficient of 0.75 (P<0.001). Furthermore, residence directly affects knowledge with path coefficient of 0.67 (P<0.001), cardiac function directly affects knowledge with path coefficient of −0.97 (P<0.001) and history of interventional therapy directly affects practice with path coefficient of 4.23 (P<0.001) (Table 10 and Figure 1).

Discussion

Elderly CHD patients possessed sufficient knowledge, positive attitudes, and proactive practices towards self-perceived health abilities. Moreover, positive relationships were identified among their KAP scores. These results provided

Table 8 Univariate and Multivariate Analysis of Practices

	Univariate Analysis			Multivariate Analysis		
	OR	95% CI	P	OR	95% CI	P
Knowledge	1.127	1.048–1.214	0.001	1.016	0.932–1.108	0.711
Attitude	1.132	1.090–1.178	<0.001	1.133	1.085–1.185	<0.001
Gender						
Male	Ref.			Ref.		
Female	0.699	0.501–0.974	0.035	0.701	0.487–1.006	0.055
Age	1.017	0.987–1.049	0.270			
BMI						
<18.5 (Underweight)	Ref.			Ref.		
18.5–23.9 (Normal)	0.734	0.430–1.234	0.248	0.684	0.382–1.207	0.194
24–27.9 (Overweight)	0.704	0.398–1.232	0.223	0.620	0.333–1.139	0.127
28 (Obese)	0.441	0.199–0.955	0.040	0.425	0.181–0.978	0.046
Residence						
Rural	Ref.					
Urban	1.029	0.737–1.436	0.866			
Marital status						
Single	Ref.					
Married	0.995	0.374–2.566	0.992			
Other	0.562	0.190–1.613	0.285			
Education level						
Junior high school and below	Ref.			Ref.		
High school and technical school	1.338	0.904–1.985	0.146	1.426	0.936–2.181	0.099
College and above	1.631	1.080–2.474	0.021	1.574	1.008–2.470	0.047
Monthly family income						
<2000	Ref.					
2000–5000	1.393	0.816–2.385	0.225			
5000–10,000	1.142	0.669–1.955	0.626			
≥10,000	1.498	0.833–2.708	0.178			
Heart function classification						
Grade I	Ref.					
Grade II	1.224	0.865–1.735	0.254			
Grade III	1.150	0.586–2.279	0.685			
Grade IV	0.269	0.039–1.140	0.106			
History of interventional therapy						
Yes	1.858	1.134–3.113	0.016	2.197	1.223–4.073	0.010
No	Ref.			Ref.		
Number of coronary heart disease-related medications						
2 or fewer	Ref.			Ref.		
3~4	1.632	1.003–2.704	0.052	1.156	0.671–2.015	0.604
5 or more	0.362	0.138–0.855	0.027	0.325	0.115–0.842	0.025

Table 9 Model Fitness Indices for the KAP Structural Equation Model

| Indicators	Reference	Results
RMSEA	<0.08 Good	0.000
SRMR	<0.08 Good	0.012
TLI	>0.8 Good	1.028
CFI	>0.8 Good	1.000

Table 10 The Estimates of Structural Equation Model

Model Paths	Estimate	P>|z|
Knowledge <- Residence	0.67	<0.001
Attitudes <- Knowledge	0.93	<0.001
Attitudes <- Residence	0.31	0.417
Attitudes <- Heart function classification	−0.97	0.001
Attitudes <- Number of coronary heart disease-related medications	−0.46	0.216
Practices <- Knowledge	0.39	0.033
Practices <- Attitudes	0.75	<0.001
Practices <- Heart function classification	−0.01	0.988
Practices <- Number of coronary heart disease-related medications	−1.16	0.15
Practices <- History of interventional therapy	4.23	<0.001

significant insights into targeted educational interventions to improve the KAP levels of CHD patients towards self-perceived health abilities.

Consistent with our findings, cardiovascular disease patients in Iran had high levels of knowledge and positive attitudes towards the condition.[16] Similarly, another Indian study revealed satisfying KAP scores among ischemic heart disease patients towards their medications.[17] This suggests that patients with cardiovascular conditions across different regions possess adequate knowledge, maintain positive attitudes, and engage in proactive practices related to their health management. Therefore, CHD education through community programs and doctor-patient communication can be warranted to maintain and promote the KAP scores among the affected elderly.

In the knowledge dimension, the majority (83.10%) agreed that individuals with higher self-perceived health ability are inclined to adopt positive coping strategies. This indicated a prevailing awareness of the psychological impacts of self-perceived health. The result aligned with previous assumption that self-perceived health ability played a role in managing chronic conditions like CHD.[18,19] On the contrary, the low concurrence rate (28.35%) regarding the likelihood of CHD among individuals with risk factors such as hypertension[20] and psychological stress[21] raised concerns about the participants' awareness of the multifactorial nature of CHD. Consistent with the Ethiopian study, 46% of patients with cardiovascular conditions exhibited inadequate knowledge concerning cardiovascular risk factors.[22] Patient education should focus on raising awareness about the interplay of different risk factors, the importance of comprehensive risk assessment, and the potential benefits of preventive measures such as lifestyle modifications, medication adherence, and regular health screenings. Moreover, 68.13% of participants concurred that self-perceived health ability is typically assessed using a Health Competence Perception Scale. This suggested the recognition of subjective health assessment among elderly CHD patients. Prior research has explored the significance of subjective questionnaires in capturing the psychosocial dimensions, including cardiovascular conditions.[23]
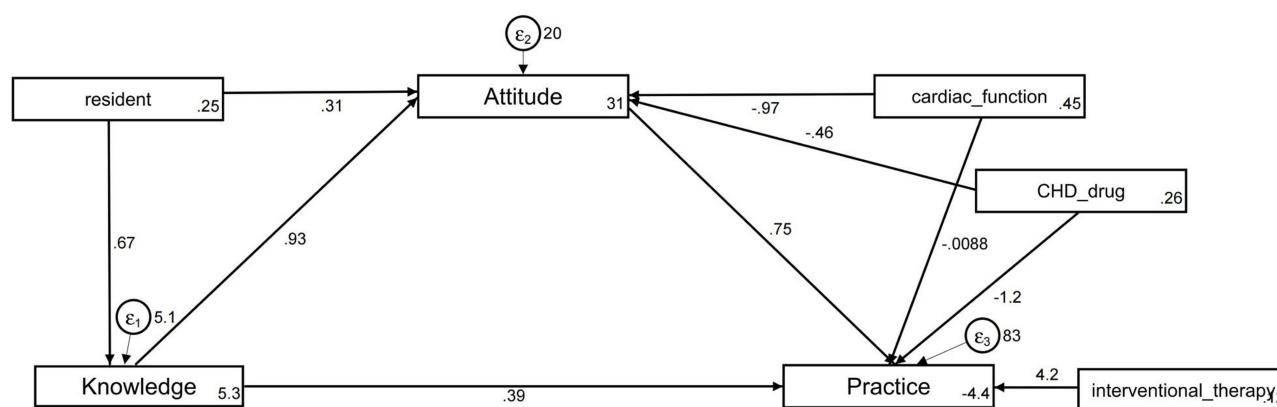
Figure 1 Structural equation model.

The positive attitude expressed by a majority (84.33%) towards seeking advice from attending physicians regarding self-perceived health abilities underscored the perceived importance of medical guidance in managing one's health. This positive inclination aligned with the established role of healthcare professionals in providing essential information, guidance, and support for individuals with CHD.[24,25] Similarly, 82.75% of participants with the willingness to adjust mindset and lifestyle habits based on their self-perceived health ability indicated a proactive viewpoint towards health management. Aligned with studies highlighting the patient engagement in self-management behaviors, the finding could inform tailored interventions according to patients' intrinsic motivations.[26] However, 44.37% of participants were unwilling to focus on their health due to physical and mental exhaustion from CHD. Previous researches across various chronic illnesses have highlighted the disease burden as barriers in health management.[27,28] Therefore, targeted interventions are warranted to address the multifaceted challenges faced by CHD participants.

In the practice dimension, 45.95% of participants expressed their enthusiasm to obtain knowledge related to CHD and self-perceived health ability through various channels, which underscored the significance of information-seeking behaviors. This aligned with the principles of patient empowerment and health literacy, emphasizing the importance of actively seeking health-related information to make informed decisions about their well-being.[29,30] Conversely, the lower percentage (32.75%) of participants actively participating in filling out the self-perceived health ability assessment scale raised considerations about the willingness in structured self-assessments. Several factors might contribute to this discrepancy, including perceived time constraints, discomfort with self-assessment tools, or a potential lack of awareness regarding the benefits of such assessments.[31]

The positive relationships of KAP scores towards self-perceived health abilities among CHD patients were in accordance with health behavior theories.[32] Essentially, individuals possessing knowledge of self-perceived health abilities are inclined to harbor positive attitudes, subsequently translating into proactive practices for the prevention and management of the condition. Influential factors of KAP scores were further identified. Firstly, the positive associations of age and urban residence with knowledge scores were observed. Older individuals might accumulate knowledge through increased exposure to health information or experiences with the healthcare system.[33] Urban residents, with potentially greater access to healthcare resources and information, might also exhibit higher knowledge scores.[34] Secondly, the negative association between Grade II heart function and attitude scores suggested that individuals with more severe cardiac impairment could harbor negative attitudes. This finding highlighted the psychological and emotional burdens of advanced heart disease on CHD patients.[35] Thirdly, higher education levels and interventional therapy were positively associated with practice scores. Individuals with higher education levels could possess enhanced health literacy, enabling them to engage more actively in health-promoting behaviors.[36] Similarly, those with interventional therapy might adhere to practices for better health outcomes. Fourthly, the negative associations of obesity and taking ≥5 CHD-related medications with practice scores indicated barriers to adopting health practices. Obesity could be related to challenges in maintaining a healthy lifestyle. Besides, a higher medication burden might pose challenges in adherence to recommended practices due to complex treatment regimens.

Several limitations should be acknowledged. Firstly, the cross-dimensional design posed challenges in establishing causality, and the limited sample size impacted the generalizability of our findings. Secondly, self-reported data could cause social desirability bias, potentially inflating scores.[37]

Conclusion

Sufficient knowledge, positive attitudes, and proactive practices towards self-perceived health abilities were determined among elderly CHD patients. Knowledge is positively associated with attitudes and practices, wherein attitudes play a mediating role. This finding suggests that guiding knowledge and attitudes can foster practices in self-perceived health abilities. Although the KAP scores were generally high in the study population, the research identified certain deficiencies. Educational interventions should be initiated to emphasize the risk factors of CHD, address physical and mental exhaustion and improve participation in self-assessment. Caution should be paid to elderly with lower ages and education levels, those residing in rural areas, those without interventional therapy, those experiencing obesity, and those taking a higher number of CHD medications.

Data Sharing Statement

All data generated or analyzed during this study are included in this article and Supplementary Information Files.

Ethics Approval and Consent to Participate

This work has been carried out in accordance with the Declaration of Helsinki (2000) of the World Medical Association. This study was approved by the Ethic Committee of Guang'anmen Hospital, China Academy of Chinese Medical Sciences (Approval No. 2022-KY-260), and all participants provided written informed consent.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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