Relationship between the Self-Efficacy and Mental Health of Elderly Patients with Coronary Heart Disease in Rural Hebei Province

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Abstract: *Objective:* To investigate the self-efficacy and mental health of elderly patients with coronary heart disease (CHD) in rural Hebei Province as well as to analyze the relationship between them. *Methods:* From June 2021 to December 2021, 480 elderly patients with CHD from rural areas, who had been discharged by the Department of Cardiology from three tertiary hospitals in three cities with different economic levels in Hebei Province for more than a year, were selected as the research subjects. The general self-efficacy scale (GSES) and symptom self-rating scale (SCL-90) were used to investigate the self-efficacy and mental health of these patients. SPSS 25.0 was used for data analysis. *Results:* The total mean self-efficacy score of elderly patients with CHD in rural Hebei Province was 17.18 ± 4.68, which is lower than the international norm ($t = -32.067$, $P = 0.000$) and the national norm ($t = -28.783$, $P = 0.000$) ; the total average SCL-90 score was 148.64 ± 55.13, which is higher than the national norm for adults and the reference norm for ordinary elderly people; except for hostility and psychosis, the other dimensions were significantly higher than the national norm for adults ($P < 0.05$); except for psychosis, the other dimensions were significantly higher than the reference norm for ordinary elderly people ($P < 0.05$); the self-efficacy score was found to be negatively correlated with the total SCL-90 score and the score for each dimension ($P < 0.05$). *Conclusion:* Elderly CHD patients with higher self-efficacy in rural Hebei Province have higher mental health level. It is suggested that the mental health of elderly patients with CHD in rural areas can be improved by improving their self-efficacy.

Keywords: Rural; Elderly patients; Coronary heart disease; Self-efficacy; Mental health

1. Introduction

Coronary heart disease (CHD) is the most common cardiovascular disease. It affects the physical and mental health of elderly patients, especially those from rural areas, and brings heavy economic and disease burden to the family and society [1]. Research has shown that self-efficacy is the main factor affecting individual attitude, confidence, and behavior toward the disease, and it can affect the mental health of elderly patients with CHD through physiological processes [2]. The purpose of this study is to investigate the status quo of self-efficacy and mental health of elderly CHD patients in rural Hebei Province as well as

to analyze the relationship between the two, so as to provide a reliable basis for formulating measures to improve the mental health level of elderly patients with CHD in rural areas.

2. Research participants and methods
2.1. Participants
From June 2021 to December 2021, 480 elderly patients with CHD from rural areas, who had been discharged by the Department of Cardiology from three tertiary hospitals in three cities with different economic levels in Hebei Province for more than a year, were selected as the research subjects.

Inclusion criteria: (1) living in rural areas for ≥ 3 years; (2) diagnosed with CHD based on the diagnostic criteria of the International Society of Cardiology or via coronary angiography; (3) age ≥ 60 years old; (4) normal cognition and able to communicate; (5) informed consent given.

Exclusion criteria: (1) patients with severe visual and hearing impairments, who are unable to cooperate with the study; (2) patients with severe heart failure; (3) patients with severe arrhythmia, malignant tumors, or bone and joint diseases.

2.2. Methods
2.2.1. Data collection
This study adopted the multistage stratified cluster sampling method. First, three cities in Hebei Province were selected according to their economic conditions: Baoding (the economic level is the same as the average level of Hebei Province), Tangshan (the economic level is higher than that of Hebei Province), and Xingtai (the economic level is lower than the average level of Hebei Province) [3]. Following that, a first-class tertiary hospital in each city was selected, with a total of 532 patients screened and included through initial medical records. Data collection was carried out via telephone follow-up, and the relevant data of the patients were supplemented by consulting medical records. Cases of death (12 patients) and refusal of investigation (40 patients) were excluded by telephone interviews. There was a total of 480 successful telephone interviews, with an effective rate of 90.2%.

2.2.2. Research tools
(1) Self-designed demographic survey: To determine the demographics, gender, age, marital status, education level, living status, per capita monthly income of the household, and other information are included.
(2) General Self-Efficacy Scale (GSES) [4]: To evaluate the self-efficacy level, a total of 10 items, with each item having a 4-point Likert scale (no at all true = 1 point, hardly true = 2 points, moderately true = 3 points, exactly true = 4 points), adding up to a total of 40 points, are included. The higher the total score, the higher the self-efficacy level. The scale has good reliability and validity, with Cronbach's alpha = 0.870.
(3) Symptom Checklist-90 (Scl-90) [5]: To evaluate the mental health level with 90 items and nine domains: somatization, obsessive-compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. All items are rated on a 5-point Likert scale (not at all = 1, a little = 2, moderately = 3, very much = 4, extremely = 5). The higher the total score, the lower the overall mental health level. It has good reliability and validity, with Cronbach's alpha between 0.64 and 0.88.

2.3. Statistical analysis
Data analysis was performed with SPSS 25.0. General data were described in frequencies; self-efficacy and mental health levels were described in $\bar{x} \pm s$; Pearson correlation analysis was used to determine the

correlation between self-efficacy and mental health.

3. Results

3.1. Demographic data

Among the 480 elderly patients with CHD, 251 (52.3%) were male patients, and 229 (47.7%) were female patients; their age ranging from 60 to 85 years old, with a mean age of 71.18 ± 7.92; 339 (70.6%) patients were married, while 141 (29.4%) were divorced or widowed; the education level of 412 (85.8%) patients was of primary school level or lower, while that of 68 (14.2%) patients was of junior high school level or higher; the per capita monthly household income of 112 (23.3%) patients was below 1,000 yuan, that of 247 (51.5%) was 1,000-3,000 yuan, and that of 121 patients (25.2%) was above 3,000 yuan.

3.2. Self-efficacy

In this study, the lowest self-efficacy score was 7 points, while the highest was 30 points. The average score was 17.18 ± 4.68 points, which is significantly different from the international norm value (29.46 ± 5.33) [6] (t = -32.067, P = 0.000). The result was also compared with the norm value for adults in China (28.64 ± 5.21) [7], in which the difference was statistically significant (t = -28.783, P = 0.000). The results are shown in **Table 1**.

Table 1. Comparison of the subjects' self-efficacy with the international norm and national norm for adults

	Measured value (n = 480)	International norm (n = 17,553)	National norm for adults	t	P
Self-efficacy	17.18±4.68	29.46±5.33	—	-32.967	0.000
Self-efficacy	17.18±4.68	—	28.64±5.21	-28.783	0.000

3.3. Mental health

Table 2 shows that the overall average SCL-90 score of elderly patients with CHD in rural Hebei Province (148.64 ± 55.13) is higher than the national norm for adults [8] and the reference norm for ordinary elderly people [9]. Except for hostility and psychosis, the other dimensions were significantly higher than the national norm for adults (P < 0.05); except for psychosis, the other dimensions were significantly higher than the reference norm for ordinary elderly people (P < 0.05). The overall mental health level of the ordinary elderly was better than the national norm (P < 0.05). The results are shown in **Table 2**.

Table 2. Comparison of the SCL-90 scores of the subjects with the national norm for adults and reference norm for ordinary elderly people ($\bar{x} \pm s$)

Group	Total score	Somatization	Obsessive-compulsive disorder	Interpersonal sensitivity	Depression	Anxiety	Hostility	Phobic anxiety	Paranoid ideation	Psychosis
Elderly CHD patients in rural Hebei (n = 480)	148.64±55.13 ①②	1.93±0.81 ①②	1.81±0.63 ①②	1.82±0.61 ①②	1.67±0.60 ①②	1.55±0.55 ①②	1.44±0.46 ②	1.40±0.45 ①②	1.53±0.51 ①②	1.30±0.43
National adult norm (n = 1388)	129.96±38.67	1.37±0.48	1.62±0.58	1.65±0.61	1.50±0.59	1.39±0.43	1.46±0.55	1.23±0.41	1.43±0.57	1.29±0.42
Ordinary elderly reference norm (n = 24630)	118.11±34.23 ①	1.45±0.50	1.47±0.51	1.32±0.47	1.40±0.50	1.31±0.51	1.28±0.44	1.21±0.41	1.24±0.44	1.22±0.39

Note: ① Compared with the national norm for adults, P < 0.05; ② Compared with the reference norm for ordinary elderly people, P < 0.05

3.4. Relationship between self-efficacy and mental health

According to Pearson correlation analysis, the self-efficacy scores of elderly patients with CHD from rural areas in Hebei Province were negatively correlated with the total SCL-90 score and the score for each dimension ($P < 0.05$); that is, the higher the self-efficacy score, the higher the SCL-90 score, and the lower the total score and score for each dimension, the higher the mental health level. The results are shown in **Table 3**.

Table 3. Correlation analysis of the subjects' self-efficacy and mental health as well as the various domains of mental health (r)

Variable	Total score	Somatization	Obsessive-compulsive disorder	Interpersonal sensitivity	Depression	Anxiety	Hostility	Phobic anxiety	Paranoid ideation	Psychosis
Self-efficacy	-0.498**	-0.474**	-0.465**	-0.453**	-0.439**	-0.448**	-0.432*	-0.426*	-0.370*	-0.431**

Note: * $P < 0.05$; ** $P < 0.01$

4. Discussion

The self-efficacy level of middle-aged and elderly patients with CHD in this study was lower than the international norm and the national norm. In this study, 412 patients (85.8%) received primary school education or lower, and 112 patients (23.3%) have per capita monthly household income of less than 1,000 yuan, indicating that the vast majority of elderly patients with CHD have no source of income, and their families are not in good financial situation. The unique course of CHD does not only have a destructive impact on the patient's ability to work, but also contribute to the increased economic burden of patients and their families due to long-term medication and repeated hospitalizations. This causes patients to suffer both physically and mentally, resulting in the lack of confidence and hope for the future, in addition to low self-efficacy.

SCL-90 was compiled by an American psychologist in the 1970s. In 1996, the scale was used to study the mental health of the elderly in China. SCL-90 is suitable for evaluating the mental health of elderly people. In a study [9], 100 valid samples from 315 literatures that used SCL-90 to evaluate the mental health of elderly people over a period of 10 years from 2004 to 2013 and a mental health survey using SCL-90 on 24,630 elderly people were included. The results were meta-analyzed, and the norm was determined as a reference norm for the mental health of elderly people. The results of this study showed that the mental health status of elderly patients with CHD in rural Hebei Province was worse than the national norm for adults and the reference norm for ordinary elderly people, but the overall mental health level of the general elderly was better than the national norm ($P < 0.05$). This may be due to the fact that the rich social experience of the elderly plays a strong role in promoting their psychological adjustment; hence, the overall mental health level of elderly people without disease (ordinary elderly people) is relatively high. As the course of CHD is protracted, elderly people suffering from CHD often experience repeated attacks or progressive aggravation, which not only affects their quality of life, but also increases the psychological and economic burden of their family members, thus further affecting their mental health and resulting in stress effects, such as depression, anxiety, etc.

This study found that there is a significant negative correlation between self-efficacy and mental health as well as the score for each dimension ($P < 0.05$), which is consistent with the results of local and foreign research, indicating that self-efficacy is an important aspect that affects mental health. People's behavioral choices are expressed as avoiding tasks and situations beyond their ability to undertake and perform what can be accomplished. The higher the self-efficacy level, the more vigorous their efforts, and the more they can persevere. When perseverance is converted into actual gains, there will be more psychological satisfaction and a higher mental health level [10]. On the contrary, elderly patients with CHD in rural areas

with low self-efficacy cannot effectively cope with the stress from the disease and tend to experience negative emotions for a long time, which is not conducive to their mental health. Relevant departments can improve the self-efficacy of elderly CHD patients in rural areas through training, health education, and other means, thus ultimately improving their mental health.

Elderly patients with CHD from rural areas in Hebei Province are anxious and even feel helpless or fearful due to mental pressure. In addition, palpitations, chest discomfort, and pain caused by myocardial ischemia and hypoxia may increase the psychological burden of patients. The mental health level and self-efficacy of elderly patients with CHD in rural Hebei Province were found to be lower than the national norm. The higher the self-efficacy, the better the mental health. People with high self-efficacy are more likely to overcome difficulties and persist in self-discipline compared to those with low self-efficacy. They can generally cope with discomfort by having positive and optimistic attitudes, countering negative emotions, having confidence to overcome diseases, and also having a sense of happiness and satisfaction. Nursing staffs should be tolerant and understanding of their various psychological manifestations, showing sympathy and carrying out effective as well as reasonable guidance to help relieve tension, fear, and anxiety. Cultivating and improving the self-efficacy of elderly patients with CHD from rural areas is one of the effective ways to improve their mental health and prevent mental disorders.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Ma L, Wu Y, Chen W, 2019, Introduction to the Main Points of "China Cardiovascular Disease Report 2018". Chinese Journal of Hypertension, 27(8): 712-716.

[2] Willis E, 2016, Patients' Self-Efficacy Within Online Health Communities: Facilitating Chronic Disease Self-Management Behaviors through Peer Education. Health Commun, 31(3): 299-307.

[3] Ma J, Yu M, Zhao C, et al., 2020, Status and Influencing Factors of Self-Management of Patients with Coronary Heart Disease After Discharge in Rural Hebei. Modern Preventive Medicine, 47(18): 3375-3377.

[4] Liu J, Li X, Xu C, 2021, The Mediating Effect of Self-Efficacy in Family Intimacy and Adaptability and Health Promotion Behavior of AIDS Patients. General Nursing, 19(34): 4863-4866.

[5] Li S, Li Y, Xu Y, et al., 2021, Mental Health Status of Inpatients in General Hospitals and Its Influencing Factors. Nursing Research, 35(7): 1290-1294.

[6] Wang CK, Hu ZF, Liu Y, 2001, General Self-Efficacy Scale for Reliability and Validity. J Appl Psychol, 7(37): 37-40.

[7] Zhang Z, 2005, Behavioral Medicine Scale Manual, China Medical Electronic Audio and Video Publishing House, Beijing, 186-187.

[8] Jin H, Wu W, Zhang M, 1986, Preliminary Analysis of SCL-90 Assessment Results in Normal Chinese. Chinese Journal of Neuropsychiatric Diseases, 12(5): 260.

[9] Fang B, Gong Q, Liu C, et al., 2016, Meta-Analysis and Norm Determination of the Results of the SCL-90 Survey on Mental Health of the Elderly in the Past 10 years. Chinese Journal of

Gerontology, 36(12): 3038-3040.

[10] Zhang H, Wang Y, Tang N, et al., 2020, Mediating Role of Self-Efficacy and Self-Management Ability between Family Care and Quality of Life in Elderly Patients with Coronary Heart Disease in Rural Areas. Modern Preventive Medicine, 47(18): 3375-3377.