Relationships between Symptom Group and Quality of Life in Patients with Atrial Fibrillation: A Cross-Sectional Study

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ABSTRACT

Objectives: To investigate the symptoms of patients with atrial fibrillation, and to explore the types of symptoms and their correlation with quality of life. Provide a basis for the quality of life with atrial fibrillation. **Methods:** A cross-sectional study was conducted between January 2020 to September 2021 on patients recruited from a tertiary hospital in Chengdu. The Medical Outcome Study 36-item Short Form (MOS SF-36), University of Toronto atrial fibrillation Severity Scale and personal information questionnaires was used as survey measurement. Participants with a physician diagnosis of AF, documented on medical records, were included in this study. Data was collected through a survey that was distributed to all eligible patients through face-to-face way. **Results:** There were slightly more female (65.1%) than male participants, with a mean (SD) age of 73.65 (11.08) years. Two symptom clusters were evident, including Fatigue symptoms cluster(shortness of breath at rest, shortness of breath with activity, exercise intolerance, fatigue at rest) and cardiac symptoms cluster (palpitations, dizziness，chest pain），There was a negative correlation between quality of life and the two symptom clusters. Multivariate linear analysis showed that fatigue symptoms cluster and cardiac symptoms cluster could significantly predict the quality of life of patients(P<0.01). **Conclusion:** Two unique atrial fibrillation symptom clusters were identified in this study population，which seriously affect the quality of life of patients. Nurses should timely evaluate patients' symptoms and actively manage patients' symptom clusters, so as to effectively improve the quality of life of patients.

Keywords: Atrial Fibrillation; Symptom Cluster; Quality of Life

Introduction

Atrial fibrillation (AF) is a common clinical arrhythmia with the prevalence is closely related to hypertension, valvular disease, heart failure and coronary heart disease and a global prevalence of about 2.8% and over 33 million people suffering from AF.[1,2] The prevalence of AF is estimated to be 2-4% in developed countries.[3]Prevalence of AF increases dramatically with age, with a prevalence of 5.5% at age ≥65 and exceeding 15% at age ≥85. The overall prevalence of AF is expected to at least double by 2050.[4]AF has been shown that can increase the risk of ischemic stroke nearly five-fold

heart failure approximately 3-fold, and is associated with a greatly increased risk of mortality.[5]Globally, the proportion of healthcare spending conducive to the direct costs of AF from 0.28% to 1.01%. [6]A retrospective study found that AF accounts for an increasing proportion of hospitalizations for cardiovascular disease, and the symptoms are a major predictor of hospitaliaztion in patients with AF[7-8]

AF symptoms are an important but little is known regarding the precise mechanisms. AF symptoms vary widely among individuals, with some having severe symptoms and others having few or almost no clinical symptoms. Symptom management is the main goal of AF treatment and a major predictor of its hospitalization.[9] The goals of AF management are to reduce or eliminate symptoms and to prevent complications.[10]European Society of Cardiology issued the guidelines of atrial fibrillation management that proposed the pathway of atrial fibrillation better care (ABC),Among them, "B"emphasizes the patient-centered and symptom-oriented management concept, which is of great significance to clinical practice.[11]

In the past, the management was mainly focused on individual symptoms of patients with atrial fibrillation, but in fact, multiple symptoms often exist simultaneously in patients with AF, and there is a correlation between symptoms, which are also called symptom clusters. Symptom clusters are defined as groups of 2 or more symptoms that due to shared mechanisms, covariance, or effect on outcomes.[12]The variability of AF symptoms experienced could be explained by Symptom clusters, and it is beneficial to the choice better tailor their treatment.

Furthermore, studies have shown that, compared with a single symptom, symptoms within the symptom group have a synergistic effect, which increases the symptom burden of patients and reduces their quality of life,[13] and it is a significant negative impact on patients' functional status and quality of life.[14]With the shift in the nursing model, nursing staff is paying more attention to the psychological, social and spiritual aspects of patients, and improvement in quality of life has become the goal of patients' recovery while controlling their symptoms.Studies on symptom clusters in patients with AF have been conducted overseas, but fewer studies on symptom clusters in patients with AF have been conducted in China.There are similarities and differences in the results of existing foreign studies of symptom clusters in patients with AF. Therefore, this study investigates the types of symptom clusters in patients with AF in China and analyzes the correlation between symptom clusters and quality of life to provide reference for clinical implementation of personalized management of patients with AF.

Methods

This study was a cross-sectional survey study, and 272 patients with AF who were hospitalized in the cardiology department of a tertiary care general hospital in Chengdu, Sichuan Province from January 2020 to September 2021 were selected using a convenience sampling method. Inclusion criteria: patients diagnosed with AF based on ECG or ambulatory ECG; age >18 years, consciousness, no cognitive or speech impairment；patients were able to communicate verbally or in writing and voluntarily participated in this study；Exclusion criteria included transient AF (i.e. AF associated with acute myocardial infarction, valvular heart disease，pericarditis, recent cardiac surgery, or excessive alcohol)[15]；or a terminal disorder or malignant disease that required palliative care; participating in other studies.

Measurement of Variables

Clinical and Demographic Variables

The general demographic information was compiled by ourselves according to the purpose of the study and reference to relevant literature, and was modified through expert consultation and pre-survey.Contents include: (1) socio-demographic information, such as gender, marital status, occupational status, education level, etc. (2)Disease-related information: smoking history, type of AF, admission heart rate, etc.(3)The Charlson Comorbidity Index (CCI) [16]was first introduced by Charlson in 1987 and includes 19 underlying conditions, which are scored according to disease weights.It has been shown that the CCI score is the most widely used method to predict mortality and length of stay based on comorbidities, and that as the CCI score increases, the patient's prognosis becomes worse, and the length of stay and death rate increase accordingly[17,18].

Atrial Fibrillation Symptoms

This study used the University of Toronto AF Severity Scale (AFSS) [19]to assess patients' symptoms. AFSS is a 19-item survey composed of three sections:The first measures general life satisfaction and the global frequency, duration, and severity of AF episodes, the second measures healthcare utilization, and the third is a symptom Scale that Contains seven of the most common symptoms of AF (palpitations, shortness of breath at rest, shortness of breath with activity, exercise intolerance, dizziness, fatigue at rest, and chest pain),which can measure the frequency of the patient's symptoms over a 4-week period.Subjects respond on a 6-point scale (0 for no such symptoms, 5 for frequent occurrence of such symptoms), with a total score of 0 to 35.The internal consistency (Cronbach's α) for AF burden is 0.94.[20]In this study, the third part of the symptom scale of the University of Toronto Atrial Fibrillation Symptom Severity Scale was Chineseized and culturally adapted in consultation with experts from relevant cardiology departments to form a Chinese version of the AF Symptom Scale.

Quality of life

Quality of life were measured by Short-Form Quality of life Questionnaire-12（SF-12）[21]，The SF-12 Questionnaire is a simplified version of the AF-36 Questionnaire, which consists of 8 dimensions, ：physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE), and mental health (MH)，The subscales PF, RP, BP, and GH forms the physical component summary (PCS) whereas the subscales VT, SF, RE, and MH forms the mental component summary (MCS)[22]，The questionnaire was scored on a 5-point scale with a total score of 12 to 56, except for entries 2 and 3, which were scored on a 3-point scale, with the higher the score the better the health-related quality of life.The SF-12 questionnaire has good reliability and validity, and most studies on different populations suggest that the overall Cronbach's alpha coefficient of the SF-12 scale is 0.76-0.86, and the Cronbach's alpha coefficient of each dimension ranges from 0.7-0.778, so it has been widely used at home and abroad.[23]

Survey and Statistic Methodology

Patients newly admitted to the hospital with atrial fibrillation were selected in strict accordance with the inclusion and exclusion criteria, and the purpose, content, and significance of the survey were

explained to the patients to obtain their consent.The investigator combined the patient case data to fill in disease-related information.Basic demographic information was collected by face-to-face questioning, and the atrial fibrillation symptom questionnaire and quality of life questionnaire were filled in by the patients themselves. The method of filling in each questionnaire was explained to the patients with a uniform instructional language before the questionnaires were distributed to ensure that the patients could understand the items correctly.If the patient had difficulty reading and filling out the questionnaire, the researcher repeated the questions and options in a neutral tone, and the patient answered and the researcher assisted in filling them out. Immediately after all questionnaires were completed, the researcher checked the completion of the questionnaires and made up for omissions and obvious errors and corrected errors in a timely manner to ensure the validity of the information.

All survey data were entered using Excel, and data analysis was performed using SPSS 17.0. The general information profile of patients was statistically described using frequencies (n) and percentages (%), and normally distributed measures were expressed as ($\bar{x} \pm S$), and non-normally distributed dose data were expressed as M ($P_{25} \sim P_{75}$). The types of symptom clusters were determined by exploratory factor analysis, and the relationship between symptom clusters and quality of life was analyzed by Spearman correlation and linear regression. All analytical tests were two-sided with a test level of $\alpha = 0.05$, with $P < 0.05$ representing a statistically significant difference.

Results

Sample Characteristics

In this study, 285 questionnaires were distributed, 285 questionnaires were returned, the recovery rate was 100%, 13 questionnaires with logical errors and uncertainties were excluded, 272 valid questionnaires were returned, the effective rate was 95.44%. participants aged 44 to 93 (73.65 ± 11.08) years, with heart rates between 36 and 151 (87.65 ± 26.60) on admission; the CCI between 0 and 4. Other information is detailed in Table 1.

TABLE1.Demographic and Clinical Profile of Participants

item		N(%)
Gender	Female	177(65.07)
	Male	95(34.93)
Age(years)	≤44	3(1.10)
	45-59	49(18.01)
	60-74	64(23.53)
	≥75	156(57.35)
marital status	married	197(72.43)
	unmarried	75(27.57)
Degree of education	Primary and below	121(44.49)
	junior high school	76(27.94)
	High School or Technical School	52(19.12)
	College degree or above	23(8.46)
Occupation	On the job	23(8.46)
	Retirement	234(86.03)

	others	15(5.51)
Smoking history	yes	85(31.25)
	no	187(68.75)
	Paroxysmal	146(53.68)
AF Sub-Type	Persistent	94(34.56)
	Permanent	32(11.76)
Charlson Comorbidity Index	0	140(51.47)
	≧1	132(48.53)
	<60	19(6.99)
Admission heart rate	60-100	107(39.34)
	>100	146(53.68)

Incidence and Severity of Symptoms in Patients with AF

The results of this study showed that the top 2 symptoms with a high incidence of symptoms in 272 patients with AF were dizziness(61.40%) and palpitations(59.93%). According to the median (M) and interquartile range (P25~P75), the symptoms with higher symptom severity are palpitation 3.00(0.00~4.00) and exercise intolerance 3.00(0.00~4.00), Other information is detailed in Table 2

TABLE2.Incidence and severity of symptoms in patients with atrial fibrillation

Symptom Profile	Cases(n)	Symptom incidence [n(%)]	severity of symptoms [score，M（P25~P75）]
palpitations	272	163(59.93)	3.00(0.00~4.00)
shortness of breath at rest	272	121（44.49）	0.00（0.00～2.00）
shortness of breath with activity	272	158（58.09）	2.00（0.00～4.00）
exercise intolerance	272	161（59.19）	3.00(0.00~4.00)
dizziness	272	167（61.40）	2.00（0.00～3.00）
fatigue at rest	272	120（44.12）	0.00（0.00～3.00）
chest pain	272	161（59.19）	2.00（0.00～3.00）

symptom Clusters

Symptom clusters were extracted using the maximum variance orthogonal rotation method in Exploratory Factor Analysis (EFA) . The KMO test (KMO=0.846) and Bartlett's spherical test (P<0.01) indicated that there was a correlation between the variables .Thus, a factor analysis could be done. As can be seen from the gravel plot (Figure 1), the first two factors are on a relatively steep slope, and the slope becomes flat after the third factor starts, and the eigenvalue of the first two factors are greater than 1. Therefore, 2 factors can be extracted. The component loadings of each symptom in the symptom clusters were specified to be ≥0.5, and the results from Table 3 showed that the total variance contribution of the 2 symptom clusters was 79.63%. According to the composition of each

symptom cluster, they were named as fatigue symptom cluster (factor 1) and cardiac symptom cluster (factor 2), respectively. The fatigue symptom cluster included shortness of breath at rest, shortness of breath with activity, exercise intolerance, fatigue at rest, and the cardiac symptom cluster included palpitations, dizziness, and chest pain. (Table 3)
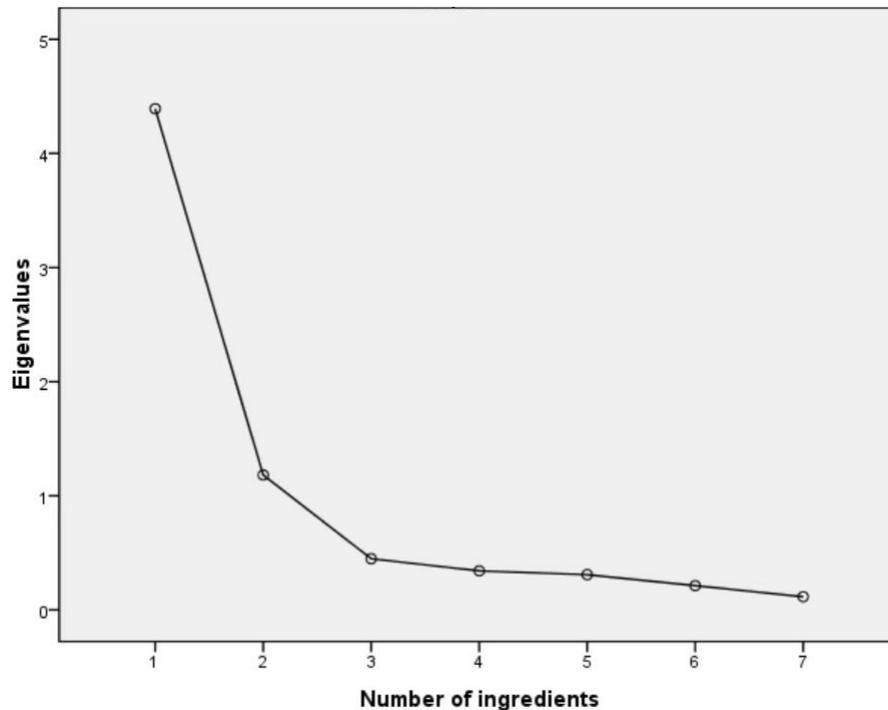

FIGURE 1: Scree plot

TABLE 3. Factor loadings matrix for each symptom group in patients with atrial fibrillation

Symptom Profile	Load of each component	
	Factor 1	Factor 2
palpitations		0.820*
shortness of breath at rest	0.856*	
shortness of breath with activity	0.848*	
exercise intolerance	0.818*	
dizziness		0.866*
fatigue at rest	0.822*	
chest pain		0.8838*
variance contribution rate (%)	43.27	36.36

marked with an asterisk (*) for p<0.05,

Quality of Life in Patients with AF

In this study, Kolmogorov smimov was used to test the normality of the scores of the quality of life, the physical component summary and the mental component summary in patients with AF and both obeyed the normal distribution (p>0.05)，The score is shown in the table 4 below.

TABLE 4.Quality of life scores in patients with AF

items	$\overline{x}\pm S$
physical component summary	13.16±3.72
mental component summary	14.47±3.02
Total score of quality of life	27.65±5.982

Relationship between Symptom Cluster and Quality of Life in Patients with AF

The results of univariate study showed that the fatigue symptoms cluster and cardiac symptoms cluster were negatively correlated with the physical component summary (r=-0.422, -0.446, p<0.01), with the mental component summary (r=-0.354, -0.349, p<0.01), and negatively correlated with quality of life (p<0.05),Other information is detailed in Table 5.

TABLE 5. Correlation between symptom group and quality of life in patients with atrial fibrillation

	Fatigue symptoms cluster	cardiac symptoms cluster	Total score of quality of life	physical component summary	mental component summary
Fatigue symptoms cluster	1				
cardiac symptoms cluster	0.590**	1			
Total score of quality of life	-0.439**	-0.451**	1		
physical component summary	-0.422**	-0.446**	0.913**	1	
mental component summary	-0.354**	-0.349**	0.866**	0.587**	1

The quality of life was the dependent variable. Multivariate linear analysis showed that fatigue symptoms cluster and cardiac symptoms cluster could significantly predict the quality of life of patients(P<0.01），the adjustment coefficient R2 is 0.244(P<0.01）.

TABLE 6. Multiple linear regression analysis of symptom cluster and quality of life

variables	partial regression coefficient	Standard error	Standardized regression coefficient	t	P
constant	31.380	0.512		61.294	<0.001
Fatigue symptoms cluster	-0.255	0.063	-0.265	-4.047	<0.001
cardiac symptoms cluster	-0.368	0.082	-0.295	-4.506	<0.001

R2=0.249，Adjusted R2=0.244，F=44.630，P<0.001

Discussion

Based on exploratory factor analysis, this study found that patients with atrial fibrillation had two major symptom groups. Compared with other symptom groups of cardiovascular diseases, AF symptoms cluster has certain uniqueness and common ground.The differences between the study results and previous foreign studies in the number and composition of symptoms may be caused by the study population , the assessment tools used and the statistical methods. Streur et al.[24] used a scale different from this study, which not only included the six common symptoms of patients with AF ， Participants could report other symptoms via free-text response.Although the scale used by Megan et al. [25] is consistent with the scale used in this study, the age of the study population and the proportion of each AF sub-type population are too different from that of this study.The methods used by streur et al. [24] and Megan et al. [25] to extract symptom groups are cluster analysis, while the method used in this study is exploratory factor analysis. The two methods have their own advantages. Exploratory factor analysis is to condense variables, while variable clustering is to classify variables [26].

Palpitations, chest pain and dizziness were classified as cardiac symptoms cluster. Tachycardia can lead to coronary insufficiency and decrease of left ventricular ejection fractions (LVEF),which will affect the blood supply of coronary artery and brain. Chest pain often occurs in patients with acute coronary syndrome. Foreign studies have shown that chest pain is one of the main symptom groups of coronary syndrome.[27] Similarly, chest pain often occurs during AF despite the absence of acute coronary syndrome.[28]Previous studies have shown that the perception of chest symptoms may be related to the stimulation of afferent nerves or abnormal functional regulation of the central nervous system during the onset of atrial fibrillation.[29] In this study, the incidence of dizziness, palpitation

and chest pain was the highest, 61.40%, 59.93% and 59.19% respectively.It is suggested that dizziness, palpitation and chest pain are the main reasons for patients with AF to come to the hospital. Furthermore, the symptoms with higher symptom severity are palpitation 3.00(0.00~4.00), and it indicates that palpitations are the most disturbing to patients in life. It is suggested that medical staff should recognize cardiac symptoms early and carry out intervention treatment as soon as possible.

Shortness of breath at rest, shortness of breath with activity, exercise intolerance and fatigue at rest were classified as fatigue symptoms cluster. The decrease of cardiac ejection fraction and the accumulation of blood in the venous system lead to pulmonary congestion and insufficient perfusion of the arterial system, resulting in the occurrence of fatigue symptoms. The AF cluster that shares the most similarities with other cardiovascular clusters is the tired cluster, which shares some symptoms with heart failure physical symptom clusters.[24]furthermore, fatigue symptom cluster at home and abroad are mainly reported in the study on the symptom cluster of patients with heart failure and ischemic coronary syndrome.[30,31,32] Patients' decreased cardiac function, insufficient peripheral blood supply and reduced blood supply of skeletal muscle are the main causes of fatigue. At the same time, patients with heart failure are often accompanied by cardiac arrhythmias, especially ventricular premature contraction and atrial fibrillation [33], which is similar to the physiological mechanism of fatigue symptoms in patients with atrial fibrillation.It is suggested that the medical staff should do a good job in health education in clinical work, stay in bed absolutely during the acute attack period, and carry out appropriate activities and rest according to their physical strength.

This study showed that the cardiac symptoms cluster and fatigue symptoms cluster of patients with AF were negatively correlated with quality of life (p<0.05). It indicates that the more serious the symptoms, the worse the quality of life. Freeman et al. [34] also showed that the severity of symptoms in patients with AF is closely related to their quality of life. The more serious the symptoms are, the greater the impairment of their quality of life. Studies have also shown that the discomfort of patients with AF caused by symptoms often leads to frequent medical treatment, which makes patients more likely to have anxiety and depression, and may further affect the quality of life of patients.[35]Atrial fibrillation itself does not directly endanger life, but its clinical symptoms at the time of onset can seriously affect the quality of life of patients [36]. Furthermore, symptoms such as palpitation, dizziness, fatigue and exercise intolerance will cause fatigue and discomfort, affect patients' self-care ability, normal work and social activities, and lead to the decline of patients' quality of life. With the change of medical model, the improvement of quality of life has become the focus of common concern of doctors and patients. In clinical work, we should pay attention to the evaluation of cardiac symptoms and fatigue symptoms of patients with AF, and take effective measures to reduce the trouble of symptoms, so as to improve the quality of life of patients.

Limitations

This study has several limitations. First, the sample of this study was selected from a single hospital. The source of the sample has certain limitations, and there may be selective bias.Second, for patients with reading and writing difficulties, the intervention of researchers may produce Hawthorne effect, which has a certain impact on the research results. Third, the symptoms reported in this study may not represent all possible symptoms of AF (eg, emotional and cognitive symptoms)[37]. Fourth, this study is a cross-sectional study. The symptom groups and quality of life of patients with atrial fibrillation may change dynamically over time. Further longitudinal studies should be carried out to explore the change process of symptom groups.

Conclusions

We identified 2 symptom clusters among participants with AF，demonstrating that AF symptoms do not always occur in isolation. Furthermore, it is also confirmed that the symptom clusters has a significant negative impact on the quality of life of patients. Scientific and effective management mode of AF symptom cluster and effective intervention strategy have a positive and important impact on improving the quality of life of patients.

Conflicts of Interest
There are no conflicts to declare.

References

[1] Ball J , Carrington M J , Mcmurray J J V , et al. Atrial fibrillation: Profile and burden of an evolving epidemic in the 21st century[J]. International Journal of Cardiology, 2013, 167(5):1807-1824.

[2] Chugh S S , Havmoeller R , Narayanan K , et al. Worldwide Epidemiology of Atrial Fibrillation: A Global Burden of Disease 2010 Study[J]. Circulation, 2014, 129(8):837-847.

[3]Briffa T , Hung J , Knuiman M , et al. Trends in incidence and prevalence of hospitalization for atrial fibrillation and associated mortality in Western Australia, 1995–2010[J]. International Journal of Cardiology, 2016, 208:19-25.

[4] Lowres N ， Neubeck L ， Redfern J , et al. Screening to identify unknown atrial fibrillation: A systematic review[J]. Thrombosis and Haemostasis, 2013, 110(1).

[5]Mozaffarian D, Benjamin EJ, Go AS, et al. Heart Disease and Stroke Statistics-2016 Update: A Report from the American Heart Association. Circulation 2016.

[6]Ball J, Carrington MJ, McMurray JJ, Stewart S. Atrial fibrillation: Profile and burden of an evolving epidemic in the 21st century. Int J Cardiol. 2013; 167(5):1807–1824.

[7]Chen Weiwei, Gao runlin, Liu Lisheng, et al. Summary of China cardiovascular disease report 2014.Chinese Circulation Journal ， 2014(07):5-10.

[8] Steinberg B A ， Kim S ， Fonarow G C , et al. Drivers of hospitalization for patients with atrial fibrillation: Results from the Outcomes Registry for Better Informed Treatment of Atrial Fibrillation (ORBIT-AF)[J]. Circulation, 2014, 167(5):735-742.

[9] Kirchhof P ， Benussi S ， Kotecha D , et al. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS[J]. European Heart Journal, 2016:ehw210.

[10] January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: A report of the american college of cardiology/american heart association task force on practice guidelines and the heart rhythm society. Circulation. 2014; 130(23):e199–267.

[11] Gerhard Hindricks, Tatjana Potpara, Nikolaos Dagres, et al, 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS): The Task Force for the diagnosis and management of atrial fibrillation of the European Society of Cardiology (ESC) Developed with the special contribution

of the European Heart Rhythm Association (EHRA) of the ESC, European Heart Journal, Volume 42, Issue 5, 1 February 2021, Pages 373–498.

[12] Kim H, McGuire DB, Tulman L, et al. Symptom clusters: concept analysis and clinical implications for cancer nursing. Cancer Nurs 2005.

[13] Aktas A . Cancer symptom clusters[J]. Current opinion in supportive and palliative care, 2013, 7(1)：38-44.

[14] Mccabe P J , Schumacher K , Barnason S A . Living with atrial fibrillation: a qualitative study.[J]. Journal of Cardiovascular Nursing, 2011, 26(4):336-344.

[15] Carrington MJ, Ball J, Horowitz JD, et al. Navigating the fine line between benefit and risk in chronic atrial fibrillation: Rationale and design of the standard versus atrial fibrillation spEcific managemenT studY (SAFETY). Int J Cardiol. 2013; 166(2):359–365. [PubMed: 22079383]

[16] Charlson M E , Pompei P , Ales K L , et al. A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation[J]. J Chronic Dis, 1987, 40(5):373-383.

[17] Poses R M , Mcclish D K , Smith W R , et al. Prediction of survival of critically ill patients by admission comorbidity[J]. Journal of Clinical Epidemiology, 1996, 49(7):743-747.

[18] Cui Yunliang, Wang Tao, Wu Xiangwei, et al. The use of Charlson weighted index of comorbidities scoring system to evaluate the impact of original diseases for prognosis in intensive care unit patients[J]. Chinese Critical Care Medicine, 2013, 25(2):115-118.

[19] Dorian P , Burk C , Mullin C M , et al. Interpreting changes in quality of life in atrial fibrillation: How much change is meaningful?[J]. American Heart Journal, 2013, 166(2):381-387.

[20] Dorian P, Paquette M, Newman D, et al. Quality of life improves with treatment in the Canadian Trial of Atrial Fibrillation. Am Heart J 2002.

[21] Ware J E , Kosinski M , Keller S D . A 12-Item Short-Form Health Survey: Construction of Scales and Preliminary Tests of Reliability and Validity[J]. Medical Care, 1996, 34(3):220-233.

[22] Tucker G , Adams R , Wilson D . New Australian population scoring coefficients for the old version of the SF-36 and SF-12 health status questionnaires[J]. Quality of Life Research, 2010, 19(7):1069-1076.

[23] Wang Haitang, Ren Limin, Liu Yao, et al. Evaluation and research status of SF-12 health survey scale[J]. Chinese Journal of General Practitioners, 2015, 14(7):574-576.

[24] Streur M , Ratcliffe S J , Ball J , et al. Symptom Clusters in Adults With Chronic Atrial Fibrillation[J]. The Journal of cardiovascular nursing, 2016, 32(3):1-8.

[25] Megan S , Ratcliffe S J , David C , et al. Atrial fibrillation symptom clusters and associated clinical characteristics and outcomes: A cross-sectional secondary data analysis[J]. European Journal of Cardiovascular Nursing, 2018:147451511877844-.

[26] Zhang Shanshan, Xu Xianggang, Meng Qingmao. Comparison between exploratory factor analysis and variable cluster analysis[J]. Statistical Education, 2003(6):15-17.

[27]Riegel B , Hanlon A L , Mckinley S , et al. Differences in mortality in acute coronary syndrome symptom clusters[J]. American Heart Journal, 2010, 159(3):392-398.

[28] Brown A M , Sease K L , Robey J L , et al. The risk for acute coronary syndrome associated with atrial fibrillation among ED patients with chest pain syndromes[J]. American Journal of Emergency Medicine, 2007, 25(5):523-528.

[29] Rienstra M , Lubitz S A , Mahida S , et al. Symptoms and Functional Status of Patients With Atrial Fibrillation: State of the Art and Future Research Opportunities[J]. Circulation, 2012.125(23):2933-2943.

[30] Devon H A , Vuckovic K , Ryan C J , et al. Systematic review of symptom clusters in cardiovascular disease[J]. European Journal of Cardiovascular Nursing, 2016, 16(1).6-17.

[31] Yi Yanfeng, Yuan Yue, song Hongxia,et al. Relationship between Symptom Cluster and Quality of Life in Patients with Heart Failure[J]. Journal of Nursing, 2018.25（1）:10-13.

[32]Xuan fanxin, Li Zheng, Kang Xiaofeng et al. Changes of heart failure symptom clusters during the course of disease：a longitudinal study[J]. Chinese Journal of Nursing , 2017, 52(12):1450-1456.

[33] Xuan fanxin. Changes of Heart Failure Symptom Clusters during the Course of Disease：A Longitudinal Study[D]. Peking Union Medical College，2015.

[34] Freeman J V , Simon D J N , Go A S , et al. Association Between Atrial Fibrillation Symptoms, Quality of Life, and Patient Outcomes Results From the Outcomes Registry for Better Informed Treatment of Atrial Fibrillation (ORBIT-AF)[J]. Circulation Cardiovascular Quality & Outcomes, 2015, 8(4):393-402.

[35] Fu Li. Effect of anxiety and depression on quality of life in hospitalized patients with atrial fibrillation[D]. capital medical university，2013.

[36] Shi Xue, Yang Wansong, Li Zhenlian, et al. Clinical analysis of 1294 patients with atrial fibrillation[J]. Journal of Tianjin Medical University, 2011(01):126-127.

[37] Walfridsson U, Arestedt K, Stromberg A. Development and validation of a new arrhythmia-specific questionnaire in tachycardia and arrhythmia (ASTA) with focus on symptom burden. Health Qual Life Outcomes. 2012;10: 44-7525-10-44.