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The Status Quo and Influencing Factors of Self-Management Behavior in Patients with Recurrent Gout in China: A Cross-Sectional Study

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Objective: To understand the status quo and influencing factors of self-management behavior in patients with recurrent gout, and to provide evidence for the development of targeted interventions to improve the self-management behavior of gout patients.

Methods: From October 2022 to July 2023, convenience sampling was used to conduct a questionnaire survey on 223 patients with recurrent gout who were admitted to the Department of Rheumatology and Immunology of the First Hospital of China Medical University. The cross-sectional study used a structured questionnaire (including information on Sociodemographic and Clinical Characteristics), Gout self-management Behavior Assessment scale, Gout Knowledge Measurement questionnaire, Chronic Disease self-efficacy Scale, Medical Coping Modes Scale, and Social Support Rating scale to investigate. SPSS26.0 software was used to analyze the data.

Results: The score of self-management behavior of 223 patients with recurrent gout was 41–180 (124.759±24.81). Multiple linear regression analysis showed that: Age, gout stage, awareness of gout knowledge, whether there were other chronic diseases, the pain degree of the last gout attack, medical coping style, education level, the number of gout attacks in the past year and self-efficacy were the main associated factors of gout patients' self-management. These variables explained 48.80% of the influencing factors of self-management ($P<0.001$).

Conclusion: At present, the self-management behavior of patients with recurrent gout is at an upper-middle level. To improve the self-management behavior of patients with recurrent gout, we should pay attention to the key groups such as young people, low education level and lack of gout knowledge. To improve the self-management behavior of recurrent gout patients by improving their disease perception, enhancing their self-efficacy and encouraging them to actively face the disease.

Keywords: gout, relapse, self-management, influencing factors

Gout is caused by disorders of purine metabolism and/or decreased excretion of Uric Acid (UA), and increased Serum Uric Acid (SUA) concentration, resulting in Mono Sodium Urate crystals (MSU) deposits in joints and (or) tendons, subcutaneous tissue, kidney and other non-articular structures, thereby inducing local inflammatory response and tissue destruction.[1] Its clinical features include hyperuricemia, acute gouty arthritis, tophus, gouty nephropathy, joint deformity and dysfunction, etc., involving multiple organs of the body. It can cause multi-organ and multi-system damage.[2] When gout attacks, patients often present with acute and severe pain in peripheral joints, and/or redness and heat pain and dysfunction that last for several days. With the progression of the disease, MSU deposition increases, and the incidence and severity of tophi increase, resulting in joint damage and deformation, even disability, which seriously affects the patient's mobility and quality of life.[3] In addition, gout patients often suffer from anxiety, depression and other psychological conditions.[4,5]

In recent years, with the development of economy, people's dietary structure and lifestyle have changed, and the global prevalence of gout has gradually increased. At present, the global prevalence of gout in different countries ranges from 0.1% to 6.8%, the number of patients with hyperuricemia in China has reached 170 million, and the prevalence of

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gout is 1.1%.[6] Studies have shown that the proportion of men with gout is greater than that of women worldwide,[6] and gout in China shows a trend of younger age.[7] The disease burden of gout is also on the rise,[8,9] and gout has become the second largest metabolic disease after diabetes. Among all forms of chronic arthropathy, gout is a disease with well-defined diagnostic criteria, and can be "cured", but the current situation of self-management behavior of gout patients around the world is not ideal.[10] Studies have shown that the recurrence rate of gout is as high as 63%.[3] In the Chinese health care system, gout management is mainly performed in tertiary hospitals, reflecting the limited rheumatologic specialization in primary care and the reliance of patients on acute-onset therapy rather than long-term urate-lowering therapy. Although the Chinese guidelines advocate the treatment to target strategy, the overall medication adherence of gout patients in the real world is only 47%.[11]

As a progressive disease, gout requires patients to actively, systematically and long-term self-management.[12] Self-management, as an important part of modern medical model, emphasizes the active participation and initiative of individual patients in disease management.[13] It refers to a series of self-management measures (was measured by the Gout Self-management Behavior scale developed by Yao Xinyu[14]) taken by patients with gout recurrence to prevent recurrence, control the development of the disease, improve health, and prevent the occurrence of complications, including compliance with treatment measures, healthy lifestyle, maintaining mental health, actively coping with the disease, and seeking social support. For patients with recurrent gout, self-management not only involves strict dietary control[15] (such as limiting the intake of high-purine foods and increasing the proportion of low-purine foods), but also includes regular physical exercise (to promote uric acid excretion and maintain a healthy body weight), regular health monitoring (such as uric acid level testing, and increasing the proportion of low-purine foods).[16–18] In addition, it is important to recognize and deal with abnormal conditions in a timely manner), rational drug use (to ensure that medication is taken on time and according to the amount, and to avoid arbitrary withdrawal or change of medication),[19,20] and mental health maintenance (to cope with anxiety, depression and other negative emotions caused by the disease).[18] Self-management as the cornerstone of gout control, while existing studies mainly focus on Western populations or single behavioral domains (such as medication adherence). A comprehensive and effective self-management program can significantly reduce the risk of gout recurrence, improve the prognosis of patients, and improve the quality of life.[15] In contrast, Western studies emphasize structured nurse-led programs and digital monitoring tools, while Chinese interventions remain doctor-centered with minimal psychosocial support.

Our previous qualitative interview showed that the self-management behaviors of patients with recurrent gout need to be improved, especially in the aspects of medical seeking behavior, medication compliance, daily management and emotional management.[21] However, from the perspective of disease prevention, in addition to improving the self-management behavior of gout patients, the intervention of the influencing factors of self-management behavior cannot be ignored. Key gaps remain: in the multidimensional drivers of recurrent gout self-management. At the individual level, Factors such as the patient's knowledge level, health beliefs, self-efficacy, economic conditions, and social support network may all have an important impact on self-management behavior.[22] In addition, macro-level factors cannot be ignored. Cultural background, social environment, medical resource allocation, and medical policy guidance may have indirect or direct effects on the self-management behavior of patients with recurrent gout.[19,23] The "two-pron-wise" scientific nursing intervention may be twice the result with half the effort in reducing the recurrence rate of gout patients. In our previous study, we revealed the behavioral preferences and potential influencing factors of gout patients' self-management behaviors through interviews, but the results were limited by sample size, and the prevalence or weight of these factors could not be determined.[21] This paper aims to comprehensively understand the current characteristics of self-management behavior in patients with recurrent gout through a large sample questionnaire survey, statistically analyze the influence strength of each factor, provide quantifiable evidence and population representation, and reveal its influencing factors and mechanisms. At the same time, this article will combine the relevant research results and clinical practice experience at home and abroad, and propose targeted and precise intervention strategies, in order to provide scientific guidance and support for the self-management of patients with recurrent gout. This not only helps to improve the self-management ability and health literacy of patients, but also provides a reference for medical institutions, policy makers and all walks of life to jointly promote the level of gout management and the improvement of patients' quality of life.

Objects and Methods

Subjects

From October 2022 to July 2023, convenience sampling was used to select 223 patients with recurrent gout in the ward and outpatient department of Rheumatology and Immunology of a Class iii Grade A hospital in Shenyang, Liaoning Province for questionnaire survey. Recurrent gout was defined as the number of gout attacks ≥1 in the last year. If the number of gout attacks > 1, the interval between any two attacks should be ≥7 days. The number of gout episodes was self-reported, and if patients had questions about the presence of an attack, discussion between patients and investigators was conducted to define the pain or swelling experienced as an attack. Inclusion criteria: ① meet the 2015 ACR guideline diagnostic criteria;[24] ② gout attack ≥1 time in the last year; ③ Age ≥18 years old, disease duration ≥1 year; ④ volunteer to participate in the study and sign the informed consent. Exclusion criteria: ① Unable to cooperate to complete the survey; ② patients with malignant tumor or severe heart, brain, liver or kidney dysfunction; ③ History of mental illness; ④ participating in other clinical trials affecting self-management behaviors. Sample size calculation: According to Kendall's empirical method,[25] it is generally believed that the sample size should be 5–10 times of the research factors in the multivariate analysis. In this study, there were 31 influencing factors of self-management behavior in patients with recurrent gout. Considering 10% invalid samples, the total required sample size was 171–341 cases, and 223 cases were finally included in this study. The study complied with the ethical guidelines of the 1975 Declaration of Helsinki, was approved by the hospital ethics committee (approval number: 2022–458).

Methods

This study was a cross-sectional survey study.

Research Tools

(1) The Structured Questionnaire (including information on Sociodemographic and Clinical Characteristics): Self-designed by the researcher, the content included general demographic information such as gender, age (years), BMI (kg/m^2), education level, marital status, work status, and family per capita monthly income (yuan). Family history, course of disease, gout stage, the number of gout attacks in the past year, the duration of the last gout attack, and the degree of pain in the last gout attack (measured by a 0–10 pain scale) were recorded.

(2) Gout Patient Self-Management Behavior Assessment Scale(GPSAS):[14] The scale was developed by Yao Xinyu based on the theory of three tasks and five skills of self-management, including 41 items (4 dimensions). Likert 5-point scoring method was used, "never" was 1 point, "rarely" was 2 points, "sometimes" was 3 points, "often" was 4 points, "always" was 5 points, and the total score was 205 points. Higher scores indicate better gout self-management behaviors of patients. The reliability of the scale was good (Cronbach's α coefficient was 0.962, the split-half reliability was 0.842, and the test-retest reliability after 2 weeks was 0.904). The Cronbach's α coefficient of the scale in this study was 0.921.

(3) Gout Knowledge Questionnaire (GKQ):[26] This questionnaire was compiled by Zhang Liyun et al, a Chinese scholar, with a total of 10 questions, including the pathogenesis of gout, symptoms and treatment of acute gout attack, management and prevention of chronic gout and complications of gout. Each item was correctly answered with 1 point, and a score ≥7 points was considered to be gout related knowledge. The GKQ's Flesch–Kincaid grade level is 4.7, and the Flesch reading ease is 81.4[22].

(4) Medical Coping Modes Questionnaire(MCMQ):[27] The Chinese version of MCMQ, translated and revised by Chinese scholar Jiang Qianjin et al, consisted of 20 items and 3 dimensions (confrontation, avoidance and resignation). Likert 4-point scoring method was used to calculate 1, 2, 3 and 4 points respectively from low to high according to the intensity of each coping event. Among them, 8 items (1, 4, 9, 10, 12, 13, 18, 19) were reverse scoring method. The total score of the scale ranged from 20 to 80, and the higher the score, the more frequently the patients used this coping style. The Cronbach's α coefficients of the three dimensions were 0.69, 0.60 and 0.76, respectively. The Cronbach's α coefficient of the scale in this study was 0.775.

(5) Self-Efficacy Scale for Chronic disease (SEMCD):[28] The scale was designed by Lorig et al, Stanford University, with a total of 6 items, which reflected the self-efficacy of patients with chronic diseases in many aspects,

including symptom management, role function, emotional control, and communication with doctors. Each item was scored on a scale of 1 to 10, with "level 1" indicating "no confidence at all" and "level 10" indicating "complete confidence". The average score of the six items reflected the level of self-efficacy, with higher scores indicating higher self-efficacy. The Cronbach's α coefficient of the scale was 0.87, and the test-retest reliability was 0.91. The Cronbach's α coefficient of the scale in this study was 0.947.

(6) Social Support Rated Scale (SSRS):[29] The revised 1990 version of social support scale compiled by Xiao Shuiyuan was adopted. This scale included 3 dimensions: objective support, subjective support and social support utilization, with a total of 10 items. The scale is scored as follows: Questions 1 to 4 and 8 to 10 were single choice questions, 1, 2, 3, 4 options were scored 1, 2, 3, 4 respectively. Question 5 was the total score of "A, B, C, D, E", from "none" to "full support" was scored 1, 2, 3, 4 respectively. Question 6 and 7 were multiple choice questions, "no source" was scored 0, and several sources were scored a few points. The total score of the scale was 66. The correlation coefficient between the three subscales and the total scale was 0.724–0.835, and the Cronbach's α coefficient was 0.780. The Cronbach's α coefficient of the scale in this study was 0.820.

Survey Methods

After obtaining the consent of the relevant person in charge of rheumatology and immunology ward and outpatient department, the paper questionnaire was distributed by the researcher himself. The purpose, significance, filling method and precautions of this study were explained to the respondents in uniform guidance language. All questionnaires were retrieved on the spot and were considered invalid if any items were left unfilled.

Statistical Analysis

SPSS 26.0 software was used for data entry and statistical analysis. The α value was 0.05 as the test level, and all P values were two-sided probability, and $P<0.05$ was considered statistically significant. The measurement data conforming to normal distribution were described by mean ± standard deviation. Frequency and percentage (%) were used to describe the count data. Two independent sample *T* test was used for comparison between groups, and analysis of variance of completely randomized design data was used for pairwise comparison. Pearson correlation analysis was used to determine the correlation between the influencing factors and the self-management behavior of patients with recurrent gout. Taking the total score of self-management behavior of patients with recurrence of gout as the dependent variable, stepwise linear regression analysis was used to explore the influencing factors of self-management behavior of patients with recurrence of gout.

Results

General Demographic Data of Patients with Recurrent Gout

In this study, a total of 240 questionnaires were distributed and 240 questionnaires were collected. Finally, 223 valid questionnaires were collected, with an effective recovery rate of 92.92%. There were 186 males (83.41%) and 37 females (16.59%), with an average age of (37.16±11.97) years. Other general data are shown in Table 1.

The Status Quo of Self-Management Behavior of Gout Recurrence Patients

The score of self-management behavior in patients with recurrent gout was 41–180 (124.75±24.81), of which the score of health seeking behavior was 13–61 (41.19±9.44), and the score of diet management behavior was 12–59 (36.92±8.36). The score of daily life management behavior was 9–42 (26.47±6.82), and the score of emotional management behavior was 7–35 (21.17±5.99). See Table 2 for details.

Univariate Analysis of Self-Management Behavior in Patients with Gout Recurrence

Univariate analysis showed that, The self-management behavior of patients with recurrent gout was statistically significant in marital status, education level, whether suffering from other chronic diseases, tophus, gout stage, course of disease, number of joints involved, number of attacks in the past year, duration of the last attack, blood uric acid value one month ago, pain degree of the last attack, and gout knowledge awareness ($P<0.05$). See Table 1 for details.

Table 1 The General Information and GPSAS of Patients with Recurrent Gout (N=223)

Characteristics	Number [n(%)]	GPSAS ($\bar{x} \pm s$)	*t/F*	*P*
Sex			−0.689	0.491
Male	186 (83.41%)	124.24±24.59		
Female	37 (16.59%)	127.32±26.13		
Age (year)			22.881	<0.001
<30	66 (29.60%)	111.61±23.15		
30–50	124 (55.61%)	126.76±24.04		
>50	33 (14.79%)	143.52±14.96		
BMI (kg/m^2)			1.180	0.318
<18.5	5 (2.24%)	106.8±14.10		
18.5–24.9	115 (51.57%)	126.62±25.10		
25.0–29.9	65 (29.15%)	123.78±25.71		
≥30.0	38 (17.04%)	123.13±22.98		
Marital status			4.000	0.008
Unmarried	50 (22.42%)	115.04±27.26		
Married	151 (67.71%)	126.85±23.47		
Divorce	19 (8.52%)	130.74±23.63		
Widowed spouse	3 (1.35%)	143.33±14.36		
Monthly household income per capita (yuan)			1.219	0.298
<5000	80 (35.87%)	122.20±27.72		
5000–10,000	105 (47.09%)	124.87±23.68		
>10,000	38 (17.04%)	129.82±20.86		
Education level (year)			8.525	<0.001
≤6	40 (17.94%)	111.2±27.34		
7–9	62 (27.80%)	123.05±22.69		
10–13	104 (46.64%)	128.00±23.89		
>13	17 (7.62%)	143.00±13.64		
Medical Insurance status			0.837	0.404
No	15 (6.73%)	129.93±24.56		
Yes	208 (93.27%)	124.38±24.84		
Place of residence			0.420	0.675
Rural	58 (26.01%)	125.93±27.48		
Urban	165 (73.99%)	124.34±23.87		
Employment			0.140	0.889
Unemployed	53 (23.77%)	125.17±27.42		
Employed	170 (76.23%)	124.62±24.02		
Family history			0.510	0.611
No	164 (73.54%)	125.26±23.71		
Yes	59 (26.46%)	123.34±27.80		
Tophi			−3.320	0.001
No	156 (69.96%)	121.22±25.93		
Yes	67 (30.04%)	132.99±19.81		
Stage of disease			18.429	<0.001
Acute stage	105 (47.09%)	134.66±20.62		
Intermission	115 (51.57%)	115.77±25.22		
Chronic stage	3 (1.34%)	122.67±11.93		
Disease duration (year)			8.565	<0.001
1	22 (9.87%)	113.64±32.50		
2	63 (28.25%)	118.84±23.07		
3–5	77 (34.53%)	123.04±24.17		
>5	61 (27.35%)	137.03±19.45		

(*Continued*)

Table 1 (Continued).

Characteristics	Number [n(%)]	GPSAS ($\bar{x}$ ± s)	*t/F*	*P*
Number of joints involved			7.614	0.001
1	67 (30.04%)	115.15±23.930		
2	83 (37.22%)	128.65±25.006		
≥3	73 (32.74%)	129.14±23.182		
Acute flares in preceding 1 year (time)			9.341	<0.001
1	22 (9.87%)	108.45±13.380		
2	58 (26.01%)	117.52±25.791		
3~4	68 (30.49%)	125.91±24.850		
≥5	75 (33.63%)	134.08±22.679		
Duration of most recent flare (day)			2.669	0.049
<3	30 (13.45%)	119.80±17.123		
3~4	76 (34.08%)	120.04±28.185		
5~6	51 (22.87%)	127.61±25.786		
>6	66 (29.60%)	130.23±21.648		
SUA (μmol/L)			11.674	<0.001
<374	56 (25.11%)	112.57±21.512		
374~452	55 (24.67%)	119.29±19.248		
453~520	56 (25.11%)	132.00±23.601		
>520	56 (25.11%)	135.05±27.529		
Degree of attack pain (point)			18.163	<0.001
<5	41 (18.38%)	105.37±19.217		
5	24 (10.76%)	114.00±22.921		
6~7	79 (35.43%)	127.85±22.987		
8~10	79 (35.43%)	134.99±23.016		
Comorbidity			−5.749	<0.001
No	132 (59.19%)	117.34±24.42		
Yes	91 (40.81%)	135.51±21.27		
Taking medicine			1.537	0.126
No	145 (65.02%)	126.62±24.34		
Yes	78 (34.98%)	121.28±25.45		
GKQ			−3.194	0.002
Unawareness	155 (69.51%)	121.31±24.37		
Awareness	68 (30.49%)	132.60±24.17		
MCMQ			5.538	0.005
Face	92 (41.26%)	128.41±22.68		
Avoid	57 (25.56%)	128.82±20.88		
Yield	74 (33.18%)	117.07±28.39		

Notes: BMI classification according to the WHO standards: https://www.who.int/data/gho/data/themes/topics/topic-details/GHO/body-mass-index?introPage=intro_3.html.

Abbreviations: BMI, body mass index; SUA, serum uric acid; GKQ, gout knowledge questionnaire; MCMQ, Medical Coping Modes Questionnaire; SEMCD,Self-Efficacy Scale for Chronic disease; GPSAS, gout patient self-management assessment scale.

Table 2 Total Score and Dimension Score of GPSAS in 223 Patients with Recurrent Gout (Score)

Item	Entry Equalization ($\bar{x}$ ± s)	Dimension Score ($\bar{x}$ ± s)	Minimum Value	Maximum Value	Number of Entries
GPSAS	3.04±0.61	124.75±24.81	41	180	41
Health care-seeking behavior score	3.17±0.73	41.19±9.44	13	61	13
Dietary management behavior score	2.99±0.70	36.92±8.36	12	59	12
Daily life management behavior score	2.95±0.74	26.47±6.82	9	42	9
Emotion management behavior score	3.02±0.86	21.17±5.99	7	35	7

Abbreviation: GPSAS, gout patient self-management assessment scale.

Only 16.14% of gout recurrence patients had a low level of self-efficacy, 34.98% had a medium level of self-efficacy, and 48.88% had a high level of self-efficacy. The results of correlation analysis showed that the level of social support was positively correlated with the score of self-management behavior (r=0.177), that is, the higher the score of social support, the higher the score of self-management behavior (Table 3).

Multiple Linear Regression Analysis of Influencing Factors of Self-Management Behavior in Patients with Gout Recurrence

The statistically significant variables in univariate analysis and correlation analysis were used as independent variables. According to the requirements of multiple linear regression for independent variables, dummy variables were set for multiple categorical variables (Table 4), and the total score of self-management behavior was used as the dependent variable to construct the equation. Stepwise regression method was used to construct a linear regression equation, in which the entry level α=0.05, the exclusion level α=0.10, meaningful variables were retained, and meaningless variables were eliminated (Table 5).

Table 3 Correlation Analysis of GPSAS, SEMCD and SSRS in Patients with Recurrent Gout

Item	GPSAS	Health Care-Seeking Behavior Score	Dietary Management Behavior Score	Daily Life Management Behavior Score	Emotion Management Behavior Score
SEMCD	0.350**	0.315**	0.195**	0.268**	0.403**
SSRS	0.177**	0.141*	0.016	0.186**	0.276**
Objective support	0.115	0.099	−0.006	0.144*	0.165*
Subjective support	0.094	0.079	−0.027	0.083	0.208**
Support availability	0.316**	0.239**	0.130	0.337**	0.369**

Notes: **means *P*<0.001, *means *P*<0.05.
Abbreviations: SEMCD, Self-Efficacy Scale for Chronic disease; GPSAS, gout patient self-management assessment scale.

Table 4 The Assignment of Independent Variable and the Setting of Dummy Variable in Regression Equation are Introduced

Independent Variable	Assignment Mode
Age (Based on "<30 years")	
30–50	<30 years=0, 30–50 years =1, >50 years =0
>50	<30 years =0, 30–50 years =0, >50 years =1
Marital status (Based on Unmarried)	
Married	Unmarried =0, Married =1, Divorce =0, Widowed spouse =0
Divorce	Unmarried =0, Married =0, Divorce =1, Widowed spouse =0
Widowed spouse	Unmarried =0, Married =0, Divorce =0, Widowed spouse =1
Education level (Based on "≤6 years")	
7–9 years	≤6 years=0, 7–9 years=1, 10–13 years=0, >13 years=0
10–13 years	≤6 years=0, 7–9 years=0, 10–13 years=1, >13 years=0
>13 years	≤6 years=0, 7–9 years=0, 10–13 years=0, >13 years=1
Comorbidity	No=0, Yes=1
Tophi	No=0, Yes=1
GKQ	Unawareness=0, Awareness=1
Stage of disease (Based on "Acute stage")	
Intermission	Acute stage=0, Intermission=1, Chronic stag=0
Chronic stage	Acute stage=0, Intermission=0, Chronic stag=1

(*Continued*)

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Table 4 (Continued).

Independent Variable	Assignment Mode
MCMQ (Based on "Face")	
Avoid	Face=0, Avoid=1, Yield=0
Yield	Face=0, Avoid=0, Yield=1
Disease duration (Based on "1 year")	
2 years	1 year=0, 2 years=1, 3–5 years=0, >5 years=0
3–5 years	1 year=0, 2 years=0, 3–5 years=1, >5 years=0
>5 years	1 year=0, 2 years=0, 3–5 years=0, >5 years=1
Number of joints involved (Based on "1")	
2	1=0, 2=1, ≥3=0
≥3	1=0, 2=0, ≥3=1
SUA (Based on "<374μmol")	
374–452μmol	<374μmol=0, 374~452μmol=1, 453~520μmol=0, >520μmol=0
453–520μmol	<374μmol=0, 374~452μmol=0, 453~520μmol=1, >520μmol=0
>520μmol	<374μmol=0, 374~452μmol=0, 453~520μmol=0, >520μmol=1
Acute flares in preceding 1 year (Based on "1 time")	
2 times	1 time=0, 2 times=1, 3–4 times=0, ≥5 times=0
3–4 times	1 time=0, 2 times=0, 3–4 times=1, ≥5 times=0
≥5 times	1 time=0, 2 times=0, 3–4 times=0, ≥5 times=1
Duration of most recent flare (Based on "<3 days")	
3–4 days	<3days=0, 3–4 days=1, 5–6 days=0, >6 days=0
5–6 days	<3days=0, 3–4 days=0, 5–6 days=1, >6 days=0
>6 days	<3days=0, 3–4 days=0, 5–6 days=0, >6 days=1
Degree of attack pain (Based on "<5 point")	
5 points	<5 points=0, 5 points=1, 6–7 points=0, 8–10 points=0
6–7 points	<5 points=0, 5 points=0, 6–7 points=1, 8–10 points=0
8–10 points	<5 points=0, 5 points=0, 6–7 points=0, 8–10 points=1
SEMCD	Enter as the original value
SSRS	Enter as the original value

Abbreviations: SUA, serum uric acid; GKQ, gout knowledge questionnaire; MCMQ, Medical Coping Modes Questionnaire; SEMCD, Self-Efficacy Scale for Chronic disease; GPSAS, gout patient self-management assessment scale.

Table 5 Stepwise Linear Regression Analysis of Influencing Factors of GPSAS in Patients with Recurrent Gout

	Non Standardized Coefficient		Coefficient of Standardization	t	*P*	95% CI
	B	SD	Beta			
(Constant)	88.176	5.765		15.295	0.001	(76.811, 99.541)
Stage of disease: Intermission	−7.270	2.592	−0.147	−2.805	0.006	(−12.379, −2.161)
SEMCD	0.474	0.116	0.207	4.092	<0.001	(0.246, 0.702)
Comorbidity	11.176	2.647	0.222	4.222	<0.001	(5.958, 16.393)
Degree of attack pain: 8–10 points	12.025	3.339	0.232	3.602	<0.001	(5.443, 18.607)
Degree of attack pain: 6–7 points	9.051	3.224	0.175	2.808	0.005	(2.696, 15.406)
GKQ	7.988	2.674	0.149	2.987	0.003	(2.716, 13.259)
MCMQ: Yield	−8.703	2.558	−0.166	−3.402	0.001	(13.745, −3.660)
Acute flares in preceding 1 year ≥5 times	6.809	2.610	0.130	2.609	0.010	(1.665, 11.954)
Education level: >13 years	16.451	4.868	0.176	3.379	0.001	(6.854, 26.048)
Education level: 10–13 years	7.708	2.579	0.155	2.989	0.003	(2.624, 12.792)
Age >50 years	8.006	3.772	0.115	2.122	0.035	(0.570, 15.443)
SUA >520 μmol/L	5.650	2.859	0.099	1.976	0.049	(0.014, 11.285)

Notes: R = 0.718, R^2 = 0.516, adjusted R^2 = 0.488, *F* = 18.652, *P*<0.001.

Abbreviations: SUA, serum uric acid; GKQ, gout knowledge questionnaire; MCMQ, Medical Coping Modes Questionnaire; SEMCD, Self-Efficacy Scale for Chronic disease; GPSAS, gout patient self-management assessment scale.

Discussion

The Self-Management Behavior of Gout Recurrence Patients is Not Good and Needs to Be Improved Urgently

Through the study of 223 patients with recurrent gout, it was found that the self-management behavior of patients with recurrent gout was poor, and the specific score was: The score of self-management behavior was 41–180 (124.75±24.81), of which the score of medical treatment behavior was 13–61 (41.19±9.44), the score of diet management behavior was 12–59 (36.92±8.36), and the score of daily life management behavior was 9–42 (26.47±6.82). The score of emotional management behavior was 7–35 (21.17±5.99), and the scores of all dimensions were lower than those of gout patients.[29] The health seeking behavior of patients with recurrent gout is poor, which is mainly reflected in the delay of seeking medical treatment and poor medication compliance through item comparison. Most of the patients with recurrent gout had a long course of disease, and 61.88% of the patients had a course of disease more than 3 years. Years of disease experience made them think that they had a certain grasp of the treatment of gout recurrence and did not need to go to the hospital for medical treatment. In terms of medication compliance, the study of Robinson and Keenan et al showed that the poor medication compliance of gout recurrence patients was mainly reflected in the limited number of patients receiving systematic ULT.[30,31] Even if they accepted ULT recommendations provided by doctors, it was difficult to adhere to the whole process, and most of them voluntarily gave up taking medicine after gout pain disappeared. On the other hand, some patients with gout recurrence do not know the method, dose and time of taking related drugs, leading to medication errors.[11] In terms of dietary management, most patients with gout recurrence believe that they can improve their condition by changing their dietary habits, such as eliminating high-purine diet and drinking, but it is difficult to do so in real life.[15] In China, participation in the liquor board is a common social activity, which can fulfill various social functions, including daily social interaction and business transactions, etc. These functions highlight the moral values and interpersonal relationships embedded in the Chinese culture of "liquor culture".[32] At the liquor board, due to the concept of "rites" in Chinese culture, it is difficult for them to refuse drinking even if they are sometimes reluctant, so they suspend their original meal plan during the liquor board. Therefore, the drinking culture in China poses additional difficulties and challenges for the dietary modification of patients with recurrent gout. Healthy lifestyle can help gout recurrence patients reduce gout recurrence, such as regular aerobic exercise and scientific weight control.[32] However, patients with recurrent gout reported difficulties in changing their lifestyle. In terms of exercise, some patients with gout recurrence do not exercise regularly due to laziness or lack of time[33] In addition, we have to face the fact that patients with recurrent gout have a significant decline in physical function, which directly leads to their inability to achieve regular exercise and even to go to the toilet independently, which is also one of the reasons for their lack of water intake. The results of this study showed that the performance of the recurrent gout patients in the emotional management behavior was not ideal. Only 41.26% of the recurrent gout patients adopted the confrontation coping style, 25.56% and 33.18% of the patients adopted the avoidance and resignation coping style, respectively. In addition, the self-management behavior of gout recurrence patients who adopt the resignation coping style will be lower than the confrontation coping style, which is similar to the research results of Daniel Selvadurai et al.[34] Severe joint pain caused by recurrent gout can cause anxiety in patients,[35] which will be gradually eliminated with the alleviation of pain. Therefore, improper emotional management in patients with recurrent gout may be related to the severity of gout and the severity of its impact on life.[36]

Influencing Factors of Self-Management Behavior in Patients with Gout Recurrence

Age

The results showed that the self-management behavior scores of gout recurrence patients over 50 years old were higher than those of patients under 30 years old, which was similar to the research results of Scheepers[37] et al. This may be related to the increase of patients' awareness of health care with the increase of age[38] They do not eat and drink as much as they did when they were young, so the diet management has improved. In addition, elderly patients with recurrent gout have more free time after retirement, so they have enough time to exercise, acquire self-management knowledge and follow doctor's advice to review on time, so their self-management level is relatively high.

Educational Level

The self-management behavior of recurrent gout patients with bachelor's degree, college degree, graduate degree or above is better than that of patients with other education levels, which is the different with the research results of Rulan Yin et al.[39] Recurrent gout patients with low education level have low learning ability, and it is difficult to obtain gout related knowledge through the Internet, books and other ways, and their cognition of gout is relatively weak. At the same time, low education level limits the understanding ability of gout knowledge in recurrent gout patients, and it is difficult to understand the importance of sustained ULT.

Whether Suffering from Other Chronic Diseases

Studies have shown that the number and type of comorbidities of gout patients are also one of the factors affecting the self-management behavior of gout patients.[40] In this study, the self-management behavior score of recurrent gout patients with other chronic diseases was 11.176 times higher than that of recurrent gout patients without other chronic diseases. Scheepers et al[37] also found that gout patients with different comorbidities had different treatment compliance, and gout patients with more comorbidities had better medication compliance. This may be related to the degree to which patients attach importance to their own health. Other chronic diseases may make patients with recurrent gout more serious than gout attack pain, so they will pay more attention to the management of their own health.

Gout Stages

The results of this study show that the self-management behavior of gout recurrence patients in the intermittent period is worse than that of patients in the acute period, which is different from the results of Yin Rulan,[39] and the reason may be that the subjects of the study are inconsistent. The subjects in this study were patients with recurrent gout, who had more experience with gout attacks and were therefore prone to develop negative coping attitudes. On the other hand, during the interview, it was found that the gout patients in the interictal period would temporarily forget that they were gout patients, and they preferred to enjoy their life like normal people, so they ignored the self-management of the disease.

Pain Level of the Last Gout Attack

The results of this study showed that with the aggravation of pain, the self-management behavior score of gout recurrence patients increased, which was similar to the research results of Jasvinder A Singh.[41] The more severe the pain of gout patients during the attack, the greater the pain of patients, which will have a certain warning effect on patients. In order not to experience this pain, the self-management behavior of gout patients will be improved for a period of time.

The Number of Gout Attacks in the Past year

Patients with recurrent gout who have more gout attacks in the past year have better self-management behavior. At this time, patients are often more serious, so they pay more attention to it and their self-management behavior is often better. Since the quality of life and health of patients have been seriously damaged at this time, it is suggested that medical staff should strengthen the treatment compliance management of patients in remission to avoid disease deterioration in the process of disease management.[34]

Awareness of Gout Knowledge

The lack of gout related knowledge in patients with recurrent gout can directly lead to their poor self-management behavior,[23] and can also indirectly affect their self-management behavior by reducing their self-management beliefs, thus having an important impact on the prognosis of gout and even the quality of life and social function of patients. The results of this study showed that only 30.5% of patients with recurrent gout were aware of gout related knowledge, and their lack of knowledge directly led to their lack of gout self-management. For example, patients with recurrent gout know that they should follow the principle of "low-purine" diet, but they do not know how to carefully and specifically choose the type and amount of food in daily life, which indicates that their disease knowledge is fragmented and immethodical. Therefore, they tend to blindly believe the information spread on the Internet or by patients, such as taking folk prescriptions or trying some diet treatments without being sure of the validity of the information. In addition, patients with recurrent gout have insufficient understanding of ULT and worry about the side effects and dependence of ULT, resulting in poor medication compliance.[39] This may be due to the lack of time for doctors to explain ULT or the

lack of related health education resources in medical institutions. Therefore, medical institutions can set up special nurses to take the responsibility of gout recurrence education, explain the necessity and benefits of ULT in patients with recurrent gout, and eliminate the concerns of patients with recurrent gout about the potential side effects of ULT.[42] It is also possible to make relevant education manuals or popular science videos to strengthen the knowledge of ULT in patients with recurrent gout.

Self-Efficacy

Self-efficacy refers to the confidence or expectation that individuals need to achieve their own behavioral goals in a specific field, that is, people's cognition and evaluation of their ability to complete a certain behavioral ability.[43] The results of this study show that compared with gout recurrence patients with low self-efficacy, patients with high self-efficacy have higher self-management behavior scores, which is similar to the research results of Jiangyun Chen.[44] Due to the characteristics of prolonged and recurrent gout, many patients have low confidence in the treatment and prognosis of gout, resulting in poor treatment compliance,[39] which is not conducive to the control of gout. Secondly, the lack of knowledge and mistakes of gout recurrence patients are the important reasons for their low self-management efficacy. The KAP theory points out that belief or attitude is the driving force for individuals to produce relevant behavioral intentions.[45] The higher the degree of confidence in self-management in patients with recurrent gout, the stronger the motivation for self-management, which triggers a high level of self-management. When patients with recurrent gout have a relevant benefit sense, their satisfaction with gout management will also increase. Therefore, medical staff can actively carry out gout management related lectures and activities, and use the Internet to manage and follow up recurrent patients regularly, so as to improve the cognition of patients with recurrent gout and enhance their confidence in controlling the disease through self-management, so as to improve their satisfaction with self-management results and promote patients with recurrent gout to actively learn gout knowledge. Adhere to scientific and effective self-management.

Medical Coping Style

The results of this study show that the resignation coping style can lead to a decrease in the self-management behavior score of patients with recurrent gout, indicating that the more negative the coping style is, the worse the self-management of patients with recurrent gout is. Therefore, medical staff should help patients with recurrent gout to establish a positive attitude to face the disease through health education, case example display, communication with patients and other means. Make patients fully aware of the advantages of positive coping mode on disease management, so as to improve their self-management behavior. In addition, because gout attack is often associated with "drinking, eating greasy food and bad living habits", patients with recurrent gout will have a strong "disease stigma".[46] In this study, patients with recurrent gout had a moderate level of social support (36.09±8.31), which was lower than that of gout patients.[5] This may also be one of the reasons why gout recurrence patients adopt a resignation coping style to the disease.[30]

Conclusions

The results of this study show that the self-management behavior of patients with recurrent gout is not ideal. The main influencing factors of the self-management behavior of patients with recurrent gout are age, education level, pain degree of the last gout attack, self-efficacy, whether there are other chronic diseases, the number of gout attacks in the past year, gout stage, medical coping style, and gout knowledge awareness. The self-management behavior of patients with recurrent gout can be improved by strengthening gout health education, improving disease perception of patients with recurrent gout, enhancing self-efficacy of patients with recurrent gout and encouraging patients with recurrent gout to actively face the disease.

Although this study strictly followed the sample size criteria for multivariate analysis and the data saturation sample principle to ensure the adequacy of the sample, the overall study population was only patients with recurrent gout in specific medical institutions, which may limit the applicability of the results to other Settings. Therefore, it is necessary to further expand the sample size and adopt large sample and multi-center study design in future studies to make the conclusion more generalized. Moreover, this study is a cross-sectional descriptive study, so the mechanism of the influence of related influencing factors on the self-management behavior of patients with recurrent gout is unknown,

which needs to be verified in future studies on self-management of patients with recurrent gout and longitudinal studies to supplement the existing research results.

Data Sharing Statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics Declarations

This study complied with the ethical guidelines of the 1975 Declaration of Helsinki. Written permission was obtained from the First Hospital Of Chinese Medical University Scientific Research and Publication Ethics Committee (Decision number: 2022–458, Decision date: 04.11.2022). The patients who participated in the study were informed about the purpose and process of the research, and written informed consent was obtained from the participants.

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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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Disclosure

The authors declare no competing interests.

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