

The Illness Perception and Health Promotion Behavior of Young and Middle-Aged Patients With Hyperuricemia and Gout in Northeast China_A Qualitative Study

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Research article

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Abstract

Background: Hyperuricemia has become a threat to human health and a disease easily overlooked by the patient. The majority of patients often have the wrong health attitude and lack of health promotion behaviors. In this study, we explore the inner experience of young and middle-aged patients with hyperuricemia and gout and describe their health promoting behaviors in Northeast China. In order to improve their cognitive level, disease management ability, and finally provide a theoretical basis for comprehensive intervention.

Methods: A qualitative research design was used to examine the illness perception and health promotion behavior of patients with hyperuricemia and gout in Northeast China. Thirteen young and middle-aged patients with hyperuricemia and gout were sampled with maximum variation in Daqing City and Haerbin City in Northeast China. The data analysis involved several levels of analysis consistent with qualitative research.

Results: The following themes were relevant to young and middle-aged patients with hyperuricemia and gout in Northeast China: "Perception of hyperuricemia and gout", "Health plan of hyperuricemia and gout", "Poor treatment compliance" and "Utilization medical and health resources".

Conclusions: The respondents' had insufficient cognition of hyperuricemia and low ability of health promotion. Medical staff should provide as much as possible to strengthen health promotion behavior of patients with interventions.

Background

Hyperuricemia (HUA) is a metabolic disease, which has become a threat to human health, can lead to gout, arthritis, even renal function damage, often accompanied by hyperlipidemia, hypertension, diabetes and coronary heart disease. According to reports since 2007, accounting for 10% (approximately 120 million) of Chinese people reported having hyperuricemia[1]. Data from 1985 to 2018 showed that the prevalence of hyperuricemia in adults of all ages in mainland China increased gradually[2]. The total prevalence of hyperuricemia in Northeast China and Heilongjiang province was 10.9% and 13.7%, respectively[3, 4]. In addition, at present, the onset of HUA tends to be younger[5]. Therefore, it is of great significance to pay attention to the blood uric acid level of young and middle-aged people for early identification, prevention and control of gout.

At present, hyperuricemia is characterized by high prevalence rate, low awareness rate, low treatment rate and high complication rate in China[6, 7]. Although most patients believe that lifestyle is the main risk factor of hyperuricemia and gout, they lack of awareness of the impact of continuously increased blood uric acid on bone joints, kidneys and cardiovascular system, especially in patients who have asymptomatic hyperuricemia, rather than gout[8]. Inaccurate lay views of an illness can lead to the adoption of unhelpful coping strategies and treatments, which will affect the prognosis of the disease and the quality of life of the patients [9]. Illness perceptions are key determinants of behavior directed at

managing disease [10]. A false perception of disease can lead to the patients neglect health problems and weaken treatment compliance and other health behaviors [11–13]. Finally, the risk of recurrence is increasing and wasting of health and social resources. Therefore, the disease cognition education of patients with hyperuricemia and gout is the key content of treatment management.

Health promotion behaviors are a group of behaviors manifested by individuals or groups and it's objectively beneficial to their own and others' health [14]. Palumbo showed that the body health, self-realization and self-satisfaction can be enhanced through health promotion behaviors, so as to improve the healthy life quality of individuals [15]. However, there're still many problems with health-promoting behavior in patients with hyperuricemia and gout. In the form of a healthy lifestyle (diet, exercise), treatment compliance, external resources utilization and other aspects. As a previous study described, rapidly increasing economic development has led to unhealthy lifestyles [16]. Sedentary lifestyle, alcohol consumption and insufficient intake of green vegetables and fruits in patients with hyperuricemia are closely associated with increasing blood uric acid [17, 18]. In addition, many patients fail to reach treatment target on account of inadequate adherence to treatment [19]. The main reasons are the same as the lack of educational resources for gout patients, except for the cognition of disease and drug beliefs [10, 20]. The health care system's emphasis on hyperuricemia and gout education, specialized training and/or continuing education in the prevention and management of gout, and continuing education and monitoring of patients with gout can also have influence on patients' health-promoting behaviors [21, 22].

Most studies of hyperuricemia have focused on epidemiology, etiology, intervention, while few have considered the health promotion attitude and behaviors of young and middle-aged patients with hyperuricemia and gout. China has started to attach great importance to the prevention of hyperuricemia, but there is also a lack of early health screening and management. The purpose of this study was to explore the inner experience of patients with hyperuricemia and gout and describe their health promoting behavior by using the method of qualitative study. In order to improve their cognitive level, disease management ability, enhance their quality of life and health outcomes, finally provide a theoretical basis for comprehensive intervention in Northeast China.

Methods

Study design

A phenomenological qualitative study was conducted and interviews and observations were used to collect data for conventional content analysis through a qualitative descriptive method conducted by the first author. Qualitative studies enable researchers to describe phenomenon in context using various data sources [23]. Qualitative research is inductive, whereby researchers draw from naturalistic and constructivist perspectives to describe informants' perceptions and experience of the world [24]. Content analysis can explain and classify textual data by considering individual cultural and contextual effects

on phenomena. The final products of data analysis for content analysis are classifications and themes [25].

Participants

This research adopts the convenience sampling method, and finally thirteen patients with hyperuricemia were sampled with maximum variation in Daqing City and Haerbin City in China. The inclusion criteria were having hyperuricemia and having experienced gout symptoms or not. Further information gathered from the patients interviewed included demographic background, age, gender, level of education and family income per month, symptoms of gout, location of first gout attack, acute attack in the last one year, complications.

All of the included patients with hyperuricemia were asked and agreed to participate in this research and all participants were written informed consent.

Data collection

The data collection was carried out from March to September 2018. Before the formal interview, the respondents should be fully informed about the purpose, basic steps and privacy protection of the research. Considering the disadvantages of simple structured interview, non-structured interview is integrated into the interview process. After establishing a trusting relationship with the respondents, it is adopted to start with the narration of the medical history and then incorporate the outline of the content required by the interview in the narration process. The interviewees' behaviors and expressions were recorded and observed in a timely manner with the consent of the respondents. After the interview, we returned the transcripts to the respondents, and they were asked to check whether the transcripts were consistent with their intention in order to improve the credibility of the results.

When information was repeated in the process of the interviews, the sample size was considered to have reached saturation. All patients with hyperuricemia spoke Chinese, and the researcher translated the interviews into English to obtain the results. The outline of the interview was as follows (Table 1)

Table 1 Outline of the interview

1.How did you feel after being diagnosed with hyperuricemia?
2.Please tell me what you know about hyperuricemia.
3.Please tell me how hyperuricemia affected you?
4.What measures did you take to promote health?
5.Please tell me utilization of health resources.
·How many times did you go to hospital a year?
·What reason prevented you from seeking your doctor's help?
·Please tell me your resources and access to health information.
6.What recommendations and needs do you have for local medical health resources?

Data analysis

After interview, the information was transcribed and analyzed by two researchers using a unified coding system.If there are disagreements, reread until a consensus is reached. Colaizzi's [24] 7-step analysis of phenomenological data was used in the analysis of the interview data, including :(1) Reading all records carefully;(2) Precipitation of significant statements;(3) Encode the recurring ideas;(4) Collect the encoded viewpoints;(5) Write detailed and omniscient descriptions;(6) Identify similar views;(7) Return to the interviewee for confirmation.After data analysis, it was found that although the experience of hyperuricemia patients was different, there were some common problems in health promotion behaviors status.

Ethical considerations

Consent for the study was obtained from the ethics committee of Daqing campus of Harbin Medical University. Before each interview, the researcher explained the purpose and content of the study to the respondents and promised confidentiality. The participants then agreed to participate in the research and signed the informed consent. Participants had the right to refuse to participate in the research at any time without reprisal.

Results

Among the 13 patients interviewed (12 males and 1 female), 2 patients had asymptomatic hyperuricemia and 10 patients had hyperuricemia with symptoms of gout. The age of the participants ranged from 33 to 53 years old (the mean age was 42 years old). All of the 13 patients had a college education or above. All of the participants were married, and 1 had experienced the death of a spouse. 1 people had a monthly family income less than 1000 RMB, 2 people had a monthly family income of 1000 ~ 1999 RMB, 4 person had a monthly family income of 2000 ~ 2999 RMB, and 6 person had a monthly family income of more than 3000 RMB. Location of first gout attack(patients with gout): 7 patients had toes (including 4

left first toe fingers, 2 right first toe fingers, and 1 left ring finger), 2 patients had dorsal foot and 2 patients had ankles. Acute attack in the last one year: Except for 2 patients without acute attack, all the other patients had attack. Complications: 10 patients with hyperlipidemia, 7 patients had hypertension, 2 patients had kidney stones, 2 patients had thyroid disease.(Table 2).

Table 2
Characteristics of participants

Characteristics	Number
Gender	
male	12
female	1
Age	
20–29	2
30–39	4
40–49	4
≥50	3
Educational level	
university	10
graduate	3
Marital status	
married	12
unmarried	0
Death of a spouse	1
Monthly family income	
≤1000 RMB	1
1000–1999 RMB	2
2000–2999 RMB	4
≥3000	6
Disease stage	
asymptomatic hyperuricemia	2
gout	11
Location of first gout attack*	

*:The patients who had gout

** :Some patients had 2 complications, such as both hyperlipidemia and hypertension

Characteristics	Number
toes	7
dorsal foot	2
ankles	2
Complications**	
hyperlipidemia	10
hypertension	7
kidney stones	2
thyroid disease	2
*:The patients who had gout	
**:Some patients had 2 complications, such as both hyperlipidemia and hypertention	

Data analysis led to the development of four themes and eleven subthemes. The themes were “Perception of hyperuricemia and gout”, “Health plan of hyperuricemia and gout”, “Poor treatment compliance” and “Utilization medical and health resources” (Table 3).

Table 3
Themes and subthemes

Theme	Subthemes
Perception of hyperuricemia and gout	Fall into the neglect
	Life In chaos
	Incomparable pain and distress
Health plan of hyperuricemia and gout	Lifestyle adjustment
	Insufficient health literacy capacity
Poor treatment compliance	False beliefs of disease
	Fear about drug reactions
	Incorrect induction of peer experience
Utilization medical and health resources	Lack of clear guidance from doctors
	Lose confidence in the health services
	Strong demand of professional information

Perception of hyperuricemia and gout

This theme includes three subthemes: fall into the neglect, life in chaos, incomparable pain and distress.

In the asymptomatic stage, patients tend to ignore their own health problems. They had to take treatment until they got symptoms (pain, etc.). It's unfortunate that the unpredictability of acute attacks leads to difficulties in future life planning or social activities, which seriously affects daily work and life planning.

Fall into the neglect

Most of the patients with hyperuricemia did not take attention of disease on account of gout symptoms were not obvious at the first onset. 8 patients had to go to see a doctor when they were painful seriously in joints. Although medical report was shown high blood uric acid for many years, there're 3 patients said that they were unclear the bad effects of disease, so they did not care about it. 2 patients were told they had hyperuricemia and gout by the researchers, refer to physical examination data.

One participant (N09) said, "My doctor told me I have hyperuricemia, it doesn't matter, cause I had no symptom or pain."

Another participant (N02) stated, "Simply, it doesn't feel life-threatening, so I don't pay much attention to it. Sometimes people around you get sick, and I may think of it."

The third participant (N11) said, "When I feel bad, I just take medicine. I think it doesn't really matter, as a result I didn't change my eating habits. To be honest, I really regret it."

Life in chaos

There's little impact on patients' lives at the asymptomatic stage of hyperuricemia was mentioned. However, at the symptomatic gout stage, their daily life, work and family relationships are all affected, which further causes patients to have negative experiences such as fear, guilt and confidence loss.

One participant (N08) said, "I can't bear! My life is in chaos! I couldn't get off my bed, walk, even work when the disease strikes. I had to ask for leave. I dare not to make a plan in advance, because I'm afraid I can't participate at that time. In addition, driving less than 5 hours to avoid recurrence."

Another participant (N07) stated, "It is not convenient to go to work! Although the company is very close to home, just a few minutes from home, I also have to drive to work. My wife often blamed me for not going out to dinner with her."

The third participant (N01) said, "I had to be taken care of, which was like a paralytic. Once there was no one at home, I crawled into the bathroom for an hour and forty minutes! My bedroom is about two meters away!"

The last participant (N13) said, "This malady tries me so much. I didn't use crutches this time, but I used crutches for the first time. My mom can't go to work for taking care of me, I feel very guilty."

Incomparable pain and distress

When gout attacks, the most salient experience is the indescribable pain that causes the sufferer great pain.

One participant (N04) said, "It's as if I could feel the pain with my own pulse, I can't sleep at night."

Another participant (N06) stated, "Even when lying still, the wind blows over, can aggravate this pain, because it is continuous pain in the morning and evening."

The third participant (N13) said, "I could feel the incomparable pain as soon as my foot touches the ground. I would like to chop off the foot that time. The worst time, I'm painful when lying in bed, let alone turning over, which giving me gyp! Terrible!"

Management plan of hyperuricemia and gout

This theme includes two subthemes: lifestyle adjustment, insufficient health literacy capacity. 11 patients said that they almost never went to a special doctor after the diagnosis. Most of the participants said the medical treatment effect was poor and they could only adjust their lifestyle by themselves, even though the results were also not ideal sometimes.

Lifestyle adjustment

Diet adjustment. All the 13 patients were aware of the positive effect of diet management on hyperuricemia or gout onset, but only 6 patients adopted behavior control. The main reasons for poor diet control were described by the patients as follows: (1) They felt that diet control had no effect; (2) It's hard to change the habit of eating meat, and low meat diet is easy to produce hunger, (3) Forget when there is no pain; (4) The temptation for others to eat; (5) Don't mind. The pain medication can relieve it.

One participant (N05) said, "Can diet alone lower uric acid? That's not realistic! You still have to take medication."

Another participant (N11) stated, "We must keep our diet and eat less red meat, but the habit is hard to change."

The third participant (N04) said, "Northeast people all like barbecue, especially friends dinner, there is no way to skip."

Alcohol and drinking water management. Only 3 patients gave up drinking beer, 6 patients only reduced the frequency and quantity of drinking beer, and 4 patients had little behavior control. The reasons for poor drinking habits control were described by the patients as follows: (1) 5 patients expressed their social needs and could not be excused; (2) 4 patients said that they would crave alcohol if they did not drink for a long time. In addition, there was insufficient awareness of drinking water. For example, 8 patients did not have good drinking habits and the amount of drinking water was obviously insufficient.

One sale post (N04) said, "I have many social intercourse unavoidably. It's disrespectful to the client if you don't drink, and I also have to drink."

Another participant (N03) stated, "If I don't drink, my head is full of pictures of alcohol. Crazy about wine! It's like you can't do anything well without taking a sip. You can't concentrate. I can't help it."

The third participant (N09) said, "Usually, I'm not so thirsty that I don't take the initiative to drink water, just a glass or two a day, which I don't think is a necessary thing. Drinking too much water is also easy to go to the toilet, very awkward."

Exercise. 4 patients took strenuous exercise. Such as: jump rope, playing basketball, volleyball and so on. 3 patients reported only occasional exercise, 6 patients reported almost no exercise. The significance of exercise for disease progression is not recognized.

One participant (N09) said, "When I was young, I played basketball games with my classmates and friends. Now I am too busy to do sports."

Another participant (N12) stated, "I know I have to control my diet. Can exercise help with this disease?"

Insufficient health literacy capacity

Patients with hyperuricemia and gout have poor health literacy about drug selection, such as insufficient knowledge of drugs, irregular medication channels and poor drug management ability. 12 patients were treated with colchicine and/or non-steroidal anti-inflammatory drugs at the time of acute attack. Only one patient received a combination of two hormones and non-steroidal anti-inflammatory drugs. Only 3 of the patients had been treated with uric acid lowering drugs. The choice of medication was relatively random: 2 patients explicitly refused to take the uric acid lowering medication prescribed by the doctor, 5 patients randomly selected some pain-relieving drugs from the network, drug store or their neighbors and colchicine was selected solely for treatment in 3 patients.

One participant (N06) said, "I finally have to buy specific drugs with unknown ingredients from the street store."

Another participant (N04) stated, "Someone told me his drug is very useful, so I went to his private clinics for quick pain relief and using some small folk remedies."

A third participant (N11) said, "When I surfed the Internet, I found some medicine may reduce uric acid, and then I went to the drugstore to buy. I think when there are no symptoms, it is not necessary to go to the doctor to prescribe medicine."

Poor treatment compliance

This theme includes three subthemes: false beliefs of disease, fear about drug reactions, incorrect induction of peer experience. Most patients have delayed diagnosis and treatment for as long as 2-8

years.

False beliefs of disease

The young patients were lack of understanding of disease. Moreover, they had a weak awareness of medical treatment in general. Some interviewees said the reason they delayed treatment is due to a misperception of the disease as tissue contusion or infectious arthritis. In addition, 4 interviewees have no idea about the disease, especially in the asymptomatic stage of hyperuricemia, the disease is considered to be harmless.

One participant (N09) said, "When I was young, I often ran and jumped, so I thought I sprained my ankle or bruised it. It took me 3 years to make a definite diagnosis."

Another participant (N02) stated, "At that time, I thought it was caused by going out for sightseeing. That time, I developed symptoms only after climbing the Great Wall, so I didn't pay attention to it. As a result, I didn't make a definite diagnosis until 4 years later."

A third participant (N10) said, "I didn't know what hyperuricemia or gout was at first, so I treated it purely as infectious arthritis, and it took about 8 years to make a definite diagnosis."

Fear about drug reactions

13 patients concerned about drug reactions, which reduced adherence to the drug. Most of them had adverse experiences of drug side effects so that were filled with fear of drug and reduced prescribing behavior of drug using.

"The side effect is so strong that I dare not to eat drugs usually. Once it appeared rash, and itching and clinking, especially uncomfortable."

One participant (N07) said, "One of my friends had liver damage after using drugs with drinking, so I have a lot of fear of taking it now."

Another participant (N12) stated, "Others told me the drugs hurt kidney function, or the other organs, I also dare not take medicine sometimes, although know the action of medicaments is more than side effect? "

Incorrect induction of peer experience

Some patients share their knowledge about the disease through the experience of friends, but their friends' experience of treatment failure and non-professional advice gave them wrong guidance.

One participant (N09) said, "A friend of mine has this disease. He said it takes a long time to treat. He did not persist in and told me that the drug treatment was not effective and that the disease could not be treated forever! When I heard this, I lost confidence in healing."

Another participant (N05) stated, "People around me also have gout, and they often tell me no one can be cured completely, medicine is useless."

A third participant (N13) said, "After I fell ill, I consulted with people around me. Everyone had different opinions. Some people said they should take some medicine, while the others said they shouldn't, because it doesn't work. I was confused what choice is correct! Is it true that medical treatment is useless?"

Utilization medical and health resources

This theme includes three subthemes: lack of clear guidance from doctors, lose confidence in the health services, strong demand of professional services. Very few patients could correctly and timely use medical and health resources.

Lack of clear guidance from doctors

11 patients said they did not know how to deal with the illness because their doctors provided unclear information, namely the mismatch between information provided and received. For example, the doctor did not tell the patient the specific treatment plan, but only emphasized the management of the acute phase and the improvement of lifestyle. Most of the patients felt that doctors had no effective solutions in a way or help them build the confidence to fight the disease. They were told the better way to defeat disease was rely on a good lifestyle. For example, one patient said he ate pickles and porridge when he had an attack, because the doctor told him to eat a light diet like a monk. The doctor's instructions were so general that the patient did not know the true meaning of a light diet. Only two of these patients were provided with a standard treatment regimen.

One participant (N01) said, "The disease depend on my attention was told by my doctor, and I must take some of this medicine. There were no other information I had got! "

Another participant (N07) stated, "The doctor gave me a prescription was prescribed to lower uric acid. It have little effect in a few days, my pain symptoms were more serious. I registered for more than an hour to see doctor, and it was finished in three minutes! No detailed instructions were given."

The third participant (N05) said, "Every time I see the doctor to prescribe that medicine, just a few kinds, colchicine, sodium bicarbonate tablets, and no specific questions about medication."

Lose confidence in the health services

The interview found that the patient had heard some invalid medical cases, which made the patient lose confidence in effective health management. The main reasons were mentioned as follows: (1) Inadequate utilization of health resources. In 13 cases, only 1 person went to the hospital regularly in detection of blood uric acid level, 1 person was on a regular basis testing with a simple uric acid detector at home (the rest of the 12 patients had a demand for simple machines—the main reason is that it's not convenient to

visit the doctor), just remaining 11 patients could be detected in the examination each year. (2) Primary health care systems, such as communities and health center, provide little and unclear information. (3) Patients pay little attention to physical examination result provided by primary health care and fail to prevent disease. (4) Inadequate health guidance and ineffective doctor-patient communication in the medical and health system.

One participant (N11) said, "Because I think the information you get from doctor is basically the same as what you get on the Internet. In fact, I feel that if you want to control this disease, the most important thing is to change your lifestyle. If you don't change your habits there is no use going to the hospital. What can be done?"

Another participant (N09) stated, "No matter hospital or community medical workers, no one told me the severity of the disease. All I knew was that uric acid should not be too high, but I did not know how much may conform to the standard."

The third participant (N13) said, "The onset of the disease is really painful, but who can help me? I just trust myself!"

Strong demand of professional services

All patients expressed that they were not very clear about the drug guidance, dietary details (such as the consumption of meat and soy products, the variety and amount of alcohol), and the choice of exercise mode, etc. At the same time, they all put forward strong demand for such information in the interview, hoping for authoritative and accurate therapeutic explanation and service. Secondly, patients expect to receive intelligent and convenient medical services, such as online consultation through mobile apps. Thirdly, the continuation of hospital service is necessary, such as community examinations and health guidance.

One participant (N03) said, "I really hope I would like to have access to relevant health guidance and services at home or in the community, rather than having to go to hospital for health information."

Another participant (N07) stated, "Recently, I have seldom checked for uric acid. If I don't feel well, I'll get checked. I consider buying a test instrument, because it is not convenient to go to the hospital after all... I really happy to see we patients have a disease consultation just at home, maybe use a mobile app?"

The third participant (N12) said, "I feel no theoretical support, the information is ambiguous, unreliable, very confused! I do not know whether it is right, if there is professional guidance would be best."

Discussion

This is the first qualitative study specifically aimed at exploring the inner experience of disease and health promotion behavior with hyperuricemia and gout.

Promoting disease cognition and strengthen disease education

In this study, more than half of the patients with hyperuricemia or gout didn't understand the disease pathophysiological process, and the severity of disease complications is not clear. Their awareness of the normal blood uric acid and the treatment target is low, even they couldn't tell the difference very well between gout anti-inflammatory analgesic drugs and uric acid reduction medicine.

Health attitude determines health behavior, which is the root reason of patients' poor health promotion behavior ability. Domestic studies have shown that the cognitive level of patients dealing with gout is insufficient, which is not only related to gender, education level, ethnicity, race, etc., but also related to the attention to the acute onset of gout by doctors and patients, who thought incorrect diet was the main reason of having gout one-sidedly [26]. A study also supported the underrecognition of hyperuricemia (the pathogenesis and influence factors of the disease) among medical personnel in primary health care system [27]. The neglect by disease managers could have a profound effect on the prognosis of disease. It is suggested that patients and medical workers should pay more attention to disease management, strengthening disease education and screening complications to help patients achieve healthy behavior changes are very necessary [28].

Optimizing the health service and improve patients' belief in treatment

In the interviews, when mentioning the utilization of health resources, nearly half of the respondents obtained the get disease-related knowledge from the internet or their peers around them, and they were unwilling to choose the community or hospital for treatment, the utilization of health resources was insufficient. This phenomenon is related to insufficient attention to the age trend of hyperuricemia younger and younger, low health literacy of patients, and insufficient confidence in the medical and health system. In this study, 5 respondents were misdiagnosed in the early stage of the disease, 5 respondents had delay of treatment, and 4 respondents did not receive enough medical support. Studies have found that more than half of the resources were written at a highly complex level, some content areas were lacking coverage, including comorbidity risks, uric acid target levels, and continuing allopurinol during acute attacks [29]. The lack of patients' belief in treatment is closely related to local health resource allocation and service quality. The health resources should support more specific information (risk of complications, uric acid levels, medication use during acute episodes, and other self-management methods). Therefore, it is an important task to optimize the management mode of health system and improve service capacity. Only systematic and standardized diagnosis, treatment and management of hyperuricemia and gout can maximize the prevention and control of diseases and complications.

Improving treatment compliance and health promotion ability

This study found that gout patients were at a low level of health promotion ability in lifestyle adjustment, access to health information, and interaction of social resources. Especially in terms of treatment compliance, self-management ability is poor. In the interviews, only 1 patient received standardized treatment, and most patients indicated that they had different degrees of poor medication compliance,

they only paid attention to the remission of symptoms during the acute attack period. A meta-analysis of 16 studies showed that the compliance of uric acid lowering drugs was 10-46% [30], while in this study, the compliance was only 8%, which may be related to the popularization of disease-related information, inadequate promotion of disease prevention, and insufficient attention to the disease. An innovative one-year nursing project targeting 126 patients with gout found that after 1 year of health education, improved clinical guidance from physicians, and enhanced visits to patients, 72% of patients achieved the serum uric acid target of $<0.36\text{mmol/L}$ [31]. Insufficient knowledge of disease prevention and health care will cause poor health attitude, and has affect on health promotion behaviors, making patients seldom take proactive preventive measures, thus delaying the best opportunity for disease prevention and treatment, increasing the incidence of complications, leading to a significant increase in the utilization rate of medical services and medical costs [32]. With the increase of gout patients year by year, nursing intervention of health promotion behavior training should be widely used. It has positive influence on disease prevention, screening, medical history collection, diagnosis and treatment, and long-term management.

Limitations

Firstly, the sample size is small. The research object of this study covers only two provinces in Northeast China and only one of the 13 participants is female. However, the most difference of her statements from other participants' was the influence on her appearance because of gout, such as the statement of "unable to wear high heels, which greatly affects her image". The other information provided was not significantly different from other participants. Secondly, because cultural differences exist between native English and Chinese speakers, the translation of the participants from Chinese to English is limitation of the research. Further enhancing of the theme extraction is indispensable. Therefore, the results can not necessarily be generalized to all patients with gout in China. Additionally, the education level of the population studied is above university level. However, it is worth pondering that even the middle-aged and young people with higher education level had such a low level of health promotion ability. It also confirms the importance and necessity of our next intervention.

Suggestions for future studies

Future studies may add quantitative approach to in-depth explore the factors that influence health-promoting behavior in patients with hyperuricemia and gout, and to develop interventions to improve health-promoting behavior.

Conclusions

The findings of the current study show that 13 young and middle-aged patients in Northeast China had insufficient cognition of hyperuricemia and low ability of health promotion. In the future work, medical staff should provide as much as possible to strengthen health promotion behavior of patients with interventions, families should also be urged supervision and understanding for patients, to provide a

good living environment for patients, at the same time, hospital staff and community health workers have the mission on providing personalized targeted health education for patients. Continuous care should be strengthened so that patients and their families can make the best utilization of medical resources and improve their health promotion behavior to improve self-management ability and quality of life.

Declarations

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Availability of data and material

The datasets generated and analysed during the current study are not publicly available due to participant confidentiality but are available from the corresponding author on reasonable request.

Authors' contributions

LL and LXF contributed the study design, conducted the interviews, analyzed the data, and led the drafting of the manuscript.

ZYQ, YF and LYR contributed to data analysis and drafting of the manuscript. All authors read and approved the final manuscript.

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Ethics approval and consent to participate

The study obtained the consent of the ethics committee of Daqing campus of Harbin Medical University, and written informed consent was obtained from each participant.

Consent for publication

Consent for publication has been obtained from patients to report individual patient data.

Competing interests

The authors declare that they have no competing interests.

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