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General practitioners' knowledge of gout and its management: a case study in Beijing

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Research

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Abstract

Background: The incidence of gout has increased rapidly in recent years, and the suspected lack of awareness of gout among general practitioners may lead to misdiagnosis and inappropriate treatment. *Aim:* To assess general practitioners' management of gout at community health service clinics in the Tongzhou district of Beijing, as well as the factors that contributed to optimal decision making. *Methods:* A survey based on current guidelines for assessment and management of gout was sent to 245 general practitioners at community health service clinics in the Tongzhou district of Beijing. The questionnaire included personal information of general practitioners and ten items that addressed knowledge of gout. Our questionnaire was self-administered and distributed electronically via WeChat, and data were collected on a platform called 'Wenjuanwang'. Statistical analysis was performed using SPSS version 19.0 software. *Results:* Totally, 216 general practitioners responded to the survey. About three-quarters (71.8%) reported having received Continuing Medical Education (CME) about gout. More than half (54.6%) reported an awareness of treat to target (T2T) for gout. However, the overall rate of good understanding of gout was only 6.5%, a basic knowledge of gout was 55.6%, and understanding about gout diagnosis and treatment was only 11.1%. The general practitioners' understanding of basic concepts related to gout indicated that CME could improve their understanding ($P < 0.05$). An analysis of the general practitioners' rate of comprehension of gout diagnosis and treatment showed that education level, CME, and familiarity with T2T could improve understandings of gout diagnosis and treatment ($P < 0.05$). *Conclusion:* There are serious deficits in understandings about gout among general practitioners in the Tongzhou district of Beijing. Quality CME is needed to improve Chinese general practitioners' management of gout.

Introduction

Gout is the most common type of inflammatory arthritis in many developed countries worldwide and is linked with multiple serious comorbidities (Khanna *et al.*, 2012a,b; Kuo *et al.*, 2015). Prior to the 1980s, gout was regarded as a rare disease in China (Fang *et al.*, 2006). Alongside, with the rapid development of China's economy, the prevalence of gout has increased markedly over the past three decades (Tang *et al.*, 2021). Three large cross-sectional studies conducted in coastal areas reported gout rates between 0.15% and 1.14%, with a 5:2 ratio of men to women (Nan *et al.*, 2006; Zeng *et al.*, 2003; Miao *et al.*, 2008).

Gout is caused by the crystallization of uric acid in the joints. The European League Against Rheumatism (EULAR) and American College of Rheumatology (ACR) guidelines emphasize that the treatment of gout requires both nonpharmacological and pharmacological modalities (Sheng *et al.*, 2017). It is recommended that all patients should receive counseling on appropriate lifestyle changes including weight loss, dietary modifications, and reduction of alcohol consumption. Urate-lowing therapy (ULT) is indicated in patients with an overload of uric acid such as tophi, recurrent acute attacks, or arthropathy (Zhang *et al.*, 2006). The goal of ULT is to achieve a serum uric acid (sUA) level target of a minimum of 6mg/dL or lower (Khanna *et al.*, 2012a,b). This strategy is known as "treat-to-target."

Suboptimal management of gout could be attributed partially to poor patient compliance (Zhang *et al.*, 2006; Sheng *et al.*, 2017). Patient education could improve disease management (Li *et al.*, 2013; Rees *et al.*, 2013). With the improvement of people's living conditions and the extension of life expectancy, gout and hyperuricemia have increasingly become common chronic diseases in the daily clinical practice of doctors, not only rheumatologists but also general practitioners and primary care doctors (Kuo *et al.*, 2015). Rheumatologists are generally well-informed (Li *et al.*, 2013), but physicians who are not rheumatologists have demonstrated a poor understanding about the management of gout. Several studies have evidenced that general practitioners poorly manage gout (Xiong *et al.*, 2019). Less than 50% of patients in these

studies were prescribed ULT and only 38% of patients on ULT had their urate levels monitored (Jeyaruban *et al.*, 2015). In China, when the condition of patients with gout worsens, they often consulted rheumatologists or general practitioners who are responsible for patient education.

CME is intended to update the professional knowledge, skills, and performance of medical providers (Bloom, 2005). Appropriate, adequate, and comprehensive CME is becoming increasingly necessary to maintain professional standards and fulfil the licensing requirements of general practitioners (Holm, 1998). In the past 2 decades, CME requirements for its 2 million physicians have been implemented in China (Miller *et al.*, 2015). CME is a welcomed step to improving the diagnosis and management of chronic conditions by general practitioners.

Questions that merit investigation are whether general practitioners in China possess an adequate understanding about gout. This study was designed to evaluate general practitioners' management of gout at community health service clinics in the Tongzhou district of Beijing and identify the factors that contributed to the best medical decisions for patients.

Methods

Subjects

A convenience sampling strategy was used to recruit general practitioners for this study. General practitioners were recruited from ten different community health service clinics in the Tongzhou district of Beijing. And a snowballing recruitment strategy was used, where participants were asked to provide contact details of other general practitioners who might be interested in participating (Noy, 2008). Practitioners who were listed as retired or in training were excluded. The Social Sciences Human Research Ethics Committee of Beijing Chaoyang Hospital, Capital Medical University, reviewed and approved this study.

Questionnaire

The self-administered questionnaire was designed to assess clinical knowledge and management of gout in practitioners. Questions were developed from current guidelines for the assessment and management of gout as well as the current European, American, and Chinese gout treatment recommendations (Khanna *et al.*, 2012a,b; Richette *et al.*, 2017; Chinese Rheumatology Association, 2016). Between September 2018 and June 2019, an online survey was available and participants were sampled. The survey was distributed through WeChat, and data were collected on a platform called 'Wenjuanwang'.

The structured questionnaire included broad demographic data to maintain anonymity and ten items (Q1–10) related to gout. The demographic data included gender, age, years that the doctors have practiced medicine, professional title, the number of gout patients seen per month, and previous CME on gout. Additionally, the questions examined familiarity with CME lectures or journal articles on gout, as well as awareness of gout quality of care indicators and treatment recommendations. The ten items were divided between knowledge of basic gout concepts (Q1–3) and diagnosis and treatment criteria (Q4–10). Correct responses to the first three questions were used as an indicator that the general practitioners possessed knowledge of basic gout concepts. Correct responses to questions 4 through 10 indicated a solid understanding of gout diagnosis and treatment criteria. The contents of the items were the following: etiology (Q1), gout attack symptoms (Q2), causes of gout attacks (Q3), management of acute attacks (Q4), urate-lowering drugs (Q5), optimal serum uric acid (sUA) levels (Q6), nonpharmacological treatment (Q7), duration of ULT (Q8), the prevention of attacks caused by ULT (Q9), and complications (Q10). The general practitioners needed an average of five minutes to finish the questionnaire. Each item was scored with 1 point for each correct response and 0 for incorrect responses. The participant was defined as having gout-related knowledge if he or she correctly answered seven or more items. Higher scores indicated a greater awareness.

The questionnaire was pre-tested with ten general practitioners and revised according to their feedback. Before sending out the questionnaire online, we invited five experts in rheumatology and five experts in general practice to evaluate the rationality of the content of the questionnaire and revised it according to their suggestions again. Furthermore, we tested the validity of the questionnaire, the reliability of the questionnaire was 0.87, and the retest reliability was 0.91. No personal information was collected from the respondents to assure confidentiality. The administration language was Chinese.

Analyses

Statistical analysis was performed using SPSS version 19.0 software. Initial analyses were performed using descriptive statistics. For categorical variables, proportions were calculated. We used χ^2 or Fisher's exact tests for discrete variables. The demographic characteristics were defined as predictor variables, which were included in the model if $P < 0.05$ and removed if $P > 0.10$, in accordance with the forward selection technique. The statistically significant level was 0.05 (two-tailed).

Results

A total of 245 general practitioners from the ten community health service clinics in the Tongzhou district of Beijing agreed to participate. In total, 216 practitioners completed the self- administered questionnaire. The response rate was 88.2%.The demographics and baseline characteristics for the respondents are shown in Table 1. The majority of the participants were female (62.5%) and held a professional title of resident or attending (86.1%). Approximately one-quarter (25.5%) of the general practitioners had been practicing for more than 20 years in a community health service clinic. About three-quarters of the participants (71.8%) indicated that they had received CME about gout. More than half (54.6%) reported a familiarity with gout-related T2T.

Only 6.5% (14/216) of practitioners demonstrated a good understanding of gout, derived by participants answering all questions correctly. Approximately half (55.6%) of the participants demonstrated a basic knowledge of gout, whereas only 11.1% (24/216) were aware of the criteria for diagnosis. The mean score of correct responses was 7.07 ± 1.89. The responses for each item are illustrated in Table 2.

The vast majority (96.3%) of the general practitioners chose excessively high levels of uric acid as the cause of gout (Q1). A total of 84.7% noted that painful swollen joints represented an acute symptom of gout (Q2). Two-thirds (67.1%) of the practitioners chose crystals as the cause of gout attacks (Q3).

For the management of an acute attack (Q4), most general practitioners (61.1%) indicated using NSAIDs in patients with no other medical condition as their preferred choice. Exercise was chosen by 11.6% of the general practitioners. 20.8% chose allopurinol, and 6.5% selected benzbromarone as their first line of treatment.

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Table 1. Basic information of 216 general practitioners

Characteristics	Number	Proportion (%)
Gender		
Male	81	37.5%
Female	135	62.5%
Age (years)		
20–29	51	23.61%
30–39	91	42.13%
40–49	55	25.46%
50–59	7	3.24%
≥60	12	5.56%
Professional title		
Resident	77	35.65%
Attending physician	109	50.46%
Associate Professor	29	13.43%
Professor	1	0.46%
Education		
College	35	16.2%
Bachelor's degree	157	72.69%
Master's degree	23	10.65%
Doctor	1	0.46%
Years in practice		
<5	37	17.13%
5–9	51	23.61%
10–14	51	23.61%
15–19	22	10.19%
≥20	55	25.46%
The number of patients seen per month		
<5	157	72.69%
5–9	35	16.2%
10–19	19	8.8%
≥20	5	2.31%
CME on Gout		
Yes	155	71.76%
No	61	28.24%
Aware of T2T on Gout		
Yes	118	54.63%
No	98	45.37%

*CME, continuing medication education; T2T, treat-to-target.

For the management of urate-lowering drugs (Q5), optimal serum uric acid (sUA) levels (Q6), and duration of ULT (Q8), the percentages of correct responses were 57.9%, 56.94%, and 41.7%, respectively. General practitioners were not well informed about the duration of ULT.

Totally, 52.8% of the general practitioners correctly indicated that daily colchicine or NSAIDs would be appropriate for the prevention of attacks induced by ULT (Q9).

A total of 89.8% of the participants responded correctly to the question on non-pharmacological treatment (Q7) and 66.2% responded correctly to the question on complications (Q10).

An examination of the general practitioners' familiarity with gout basic concepts demonstrated that CME could improve their knowledge. Women scored higher than men (Table 3).

An examination of general practitioners' understandings of gout diagnosis and treatment indicated that their level of education, experience with CME, and awareness of T2T could improve their knowledge of these areas. Women scored higher than men (Table 4).

Discussion

With the development of economy and the improvement of medical standard, the living standards of the residents in China have been increasing constantly. The prevalence and morbidity of gout have also been changing (Zhai *et al.*, 2005). Although the incidence of gout has increased, gout has high priority in CME for rheumatology doctors, but not yet for non-rheumatology doctors (Li *et al.*, 2013; Ogdie *et al.*, 2010). Despite the fact that general practitioners have been in the front lines of the diagnosis and management of the disease, previous studies on gout included low numbers of general practitioner respondents (Doherty *et al.*, 2012). General practitioners' knowledge of gout had not previously been examined in China (Fang *et al.*, 2006).To our knowledge, in the Tongzhou district of Beijing, China, our study was the first to examine general practitioners' knowledge and management of gout in community health service clinics.

Comparison with other studies

In our survey, the overall knowledge of gout among general practitioners was 6.5%, indicating 6.5% participants answered all questions correctly. The overall rate of basic understandings about gout was 55.6%, and the overall rate of knowledge about how to manage gout was only 11.1%. Our findings are consistent with other studies that have indicated that gout has not been optimally managed by general practitioners (Kennedy *et al.*, 2016).

General practitioners were more knowledgeable about the etiology of gout (96.3%) than about the symptoms of attacks (84.7%) or the causes of those attacks (67.1%). Our findings are consistent with one other study that indicated that acute and chronic gout were not optimally managed by primary care doctors (Spaetgens *et al.*, 2016).

A lack of understanding was demonstrated in the responses to the questions related to gout diagnosis and treatment criteria. Although guidelines represented a good starting point to improve the quality of care, doctors did not always adhere to or comply with established recommendations. The survey showed that 57.9% knew about urate-lowering drugs, 56.9% knew the optimal serum uric acid level, and 41.67% correctly believed that patients should remain on ULT for the rest of their lives.

Low levels of understandings about the treatment of gout in general practitioners were almost universal. A previous study demonstrated that only 9.6% of general practitioners in the United States were aware of the guidelines; they adhered to recommended treatment for acute, intercritical, and tophaceous gout in only 47%, 3.4%, and 12.5% of the cases, respectively (Harrold *et al.*, 2013).

Many gout patients have been attended to by general practitioners at community health service clinics. Numerous studies have demonstrated that only 25% to 33% of primary care

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Table 2. General practitioners understandings of gout

Gout-related knowledge	Number	Proportion (%)
Q1. What causes gout?		
a. Too little calcium	4	1.85%
b. Too much uric acid*	208	96.3%
c. An infection	4	1.85%
d. Diabetes	0	0
Q2: How do you know if you have an acute attack of gout?		
a. You have a painful swollen joint*	183	84.72%
b. You have a change in your blood test	20	9.26%
c. Your skin gets red and itchy	6	2.78%
d. You have a lump on your ear	7	3.24%
Q3: What causes attacks of gout in a joint?		
a. Bacterial	61	28.24%
b. Virus	7	3.24%
c. Crystals*	145	67.13%
d. Calcium	3	1.39%
Q4: Which is a good treatment during a sudden painful attack of gout in someone with no other medical condition?		
a. Exercise	25	11.57%
b. Allopurinol	45	20.83%
c. Nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen, naproxen, and indomethacin*	132	61.11%
d. Benzbromarone	14	6.48%
Q5: Lowering your blood uric acid can help prevent future gout. Which of these drugs can lower your blood uric acid?		
a. Allopurinol*	125	57.87%
b. Prednisone	15	6.94%
c. NSAIDs like ibuprofen, naproxen, and indomethacin	25	11.57%
d. Colchicine	51	23.61%
Q6: Which is the ideal serum uric acid level for optimal treatment of gout?		
a. Lower than 10 mg/dl	15	6.94
b. Lower than 8 mg/dl	39	18.06
c. Lower than 6 mg/dl*	123	56.94
d. Lower than 2 mg/dl	39	18.06
Q7: In order to reduce the serum uric acid, what can you do in addition to medications?		
a. Increase the amount of beer you drink	4	1.85%
b. Increase the amount of seafood you eat	10	4.63%
c. Eat more red meat	8	3.70%
d. Lose weight if you are overweight*	194	89.81%
Q8: If you are taking a urate-lowering drug, how long will you need to take this drug?		
a. 1 month	43	19.91%
b. 1 year	70	32.41%
c. 2 years	13	6.02%
d. Lifelong*	90	41.67%
Q9: When taking a drug to lower your blood uric acid levels, there can be a temporary increase in gout attacks. How can you prevent such attacks?		
a. Skip doses of the drug and restart	21	9.72%

(*Continued*)

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Table 2. (*Continued*)

Gout-related knowledge	Number	Proportion (%)
b. Drink less water	72	33.33%
c. Drink alcohol every day	9	4.17%
d. Take daily colchicine or NSAIDs*	114	52.78%
Q10: Which is a medical condition that is common in patients with gout?		
a. High blood pressure*	143	66.2%
b. Cancer	4	1.85%
c. AIDS	58	26.85%
d. Asthma	11	5.09%

***Correct answer**.

Table 3. Comparison of general practitioners' awareness rate of gout: basic concepts knowledge

Characteristics	Awareness[a]	Lack of awareness[b]	χ^2	P
Gender				
Male	40(33.3%)	41(42.7%)	2	0.157
Female	80(66.7%)	55(57.3%)		
Age (years)				
20–29	25(20.8%)	26(27.1%)		
30–39	54(45%)	37(38.5%)		
40–49	32(26.7%)	23(24%)	2.171	0.704
50–59	3(2.5%)	4(4.2%)		
≥60	6(5%)	6(6.2%)		
Professional title				
Resident	37(30.9%)	40(41.7%)		
Attending	63(52.5%)	46(47.9%)	3.943	0.267
Associate Professor	19(15.8%)	10(10.4%)		
Professor	1(0.8%)	0(0%)		
Education				
College	16(13.4%)	20(20.8%)		
Bachelor's degree	90(75%)	66(68.8%)	2.898	0.408
Master's degree	13(10.8%)	10(10.4%)		
Doctor	1(0.8%)	0(0%)		
Years in practice				
<5	20(16.7%)	17(17.7%)		
5–9	27(22.5%)	24(25%)		
10–14	28(23.3%)	23(24%)	0.78	0.941
15–19	14(11.7%)	8(8.3%)		
≥20	31(25.8%)	24(25%)		
The number of patients seen per month				
<5				
5–9	88(73.3%)	69(71.9%)		
10–19	21(17.5%)	14(14.6%)	1.301	0.729
≥20	9(7.5%)	10(10.4%)		

(*Continued*)

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Table 3. (*Continued*)

Characteristics	Awareness[a]	Lack of awareness[b]	χ^2	P
	2(1.7%)	3(3.1%)		
CME on Gout				
Yes	85(70.8%)	70(72.9)	11.667	<0.001
No	35(29.2%)	26(27.1%)		
Aware of T2T on Gout				
Yes	69(57.5)	49(51%)	0.04	0.841
No	51(42.5%)	47(49%)		

*CME, continuing medication education; T2T, treat-to-target.
[a]Correct responses to the first three questions(Q1–3).
[b]The responses to the first three questions(Q1–3) are not entirely correct.

Table 4. Comparison of general practitioners' awareness rate of gout: diagnosis and treatment criteria knowledge

Characteristics	Awareness[a]	Lack of awareness[b]	χ^2	P
Gender				
Male	8(33.3%)	73(38%)	0.2	0.824
Female	16(66.7%)	119(62%)		
Age (years)				
20–29	5(20.8%)	46(24%)		
30–39	13(54.2%)	78(40.6%)		
40–49	5(20.8%)	51(26.6%)	2.974	0.562
50–59	1(4.2%)	5(2.6%)		
>60	0(0%)	12(6.2%)		
Professional title				
Resident	5(20.8%)	72(37.5%)		
Attending	14(58.4%)	95(49.5%)	3.222	0.359
Associate Professor	5(20.8%)	24(12.5%)		
Professor	0(0%)	1(0.5%)		
Education				
College	4(16.6%)	31(16.1%)		
Bachelor	18(75%)	139(72.4%)	9.089	0.028
Master	1(4.2%)	22(11.5%)		
Doctor	1(4.2%)	0(0%)		
Years in practice				
<5	3(12.5%)	34(17.7%)		
5–9	6(25%)	45(23.4%)		
10–14	7(29.2%)	44(22.9%)	5.5	0.239
15–19	5(20.8%)	17(8.9%)		
≥20	3(12.5%)	52(27.1%)		
The number of patients seen per month				
<5				
5–9	16(66.6%)	141(73.5%)		
10–19	4(16.7%)	31(16.1%)	2.664	0.446
≥20	4(16.7%)	15(7.8%)		

(*Continued*)

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Table 4. (*Continued*)

Characteristics	Awareness[a]	Lack of awareness[b]	χ^2	P
	0(0%)	5(2.6%)		
CME on Gout				
Yes	19(79.2%)	136(70.8%)	124.457	<0.001
No	5(20.8%)	56(29.2%)		
Aware of T2T on Gout				
Yes	60(53.6%)	58(55.8%)	74.881	<0.001
No	52(46.4%)	46(44.2%)		

*CME, continuing medication education; T2T, treat-to-target.
[a]Correct responses to questions 4 through 10.
[b]The responses to questions 4 through 10 are not entirely correct.

physicians monitored serum urate levels in patients receiving ULTs (Owens *et al.*, 2008; Nasser-Ghodsi and Harrold, 2015). Therefore, it would be unlikely that general practitioners treated to a target serum urate level as recommended by the guidelines (Spaetgens *et al.*, 2016; Jeyaruban *et al.*, 2016).

Serum urate elevations of >6.8 mg/dL under normal physiologic conditions could lead to monosodium urate crystallization (Rees *et al.*, 2013). Evidence has suggested that patients who were never on ULT, or on doses that were inappropriately low, would be at a greater risk of flares, tophi, and structural damage, and functional limitations (Kuo *et al.*, 2015). Our survey showed that 56.9% of the practitioners were familiar with the optimal serum uric acid level.

In our survey, education, CME, and awareness of T2T may improve gout diagnosis and treatment. One previous study indicated that patient's perception of gout was related to patient education (Edwards, 2011). Providing patients with education about gout has shown to enhance medication adherence and self-management, but needs improvement (Fields and Batterman, 2018).

Study implications

CME is a requirement for practising professionals in many countries including China to maintain medical knowledge and skills (Tang and Ma, 2010). In China, due to the short history of primary care development, the education levels of general practitioner differ (Wong *et al.*, 2017). Although China's general practice education system has been established, there are still a series of problems, such as imperfect personnel training system, low quality of CME, and imbalance of personnel training structure (Xiao *et al.*, 2021). Due to the support of national policy and the shortage of general practitioners in China, general practitioners are more likely to obtain professional titles than specialists (Lian *et al.*, 2019).

Appropriate CME on ULTs and T2T could better prepare and inform general practitioners for the management of gout and leading to better patient outcomes. However, only half of the participants believed there was a need for T2T in gout management, coupled with the evidence that existed of patients' failure to comply (Neogi and Dalbeth, 2018; Perez-Ruiz *et al.*, 2018), represents an area that demands greater attention. Community doctors are in great need of high quality CME.

Limitations and strengths

Certain biases in our study should be noted. The study only included general practitioners; a broader range of health professionals and patients could have provided more comprehensive findings. Furthermore, there were more female than male general practitioners in China; however, the rate of awareness could not be explained by gender differences. The level of community health care clinics is different in Beijing. Because this method of convenience sampling cannot be used in every study, the ability to extend and apply the findings to other settings and populations could be limited. To our knowledge, in the Tongzhou district of Beijing, our study was the first to examine general practitioners' knowledge and management of gout in community health service clinics.

Conclusion

Our study evaluated general practitioners' knowledge and management of gout at community health service clinics in the Tongzhou district of Beijing. The results indicated a poor understanding of the diagnosis and treatment of gout. This lack of understanding likely resulted in inadequate clinical decisions. In particular, there was little understanding regarding the duration of ULT. Further education should focus on general practitioners and emphasize the use of urate-lowering drugs, treatment duration, the target sUA level, and prophylaxis against acute attacks. More education is needed to improve the awareness of gout, promote change, and better control and manage gout.

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Conflicts of interest. None.

Ethical standards. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guidelines on human experimentation of the ethical of Beijing Chaoyang Hospital, Capital Medical University, and with the Helsinki Declaration of 1975, as revised in 2008.

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