

Knowledge and Attitudes of Gout Patients and Their Perspectives About Diagnosis and Management: A Cross-Sectional Study in Saudi Arabia

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Abstract

Background Gout is a chronic non-communicable disease that might lead to multiple systemic complications if it is left untreated. The knowledge and attitudes among patients towards the diagnosis and management of gout are important indicators in determining the prognosis and predicting sequelae of the disease. This cross-sectional survey aimed to assess the knowledge, perspectives, and attitudes of patients diagnosed with gout toward the disease pathology, diagnosis, and treatment. Methodology An observational cross-sectional study was conducted at university clinics and local health facilities in central Riyadh, Saudi Arabia. Two-hundred thirteen patients diagnosed with gout were selected by non-random, non-probability convenience sampling and invited to voluntarily participate in this survey. A structured questionnaire, which was written in Arabic and pre-tested in a previous pilot study, was distributed to and collected from the participants between April 2022 and August 2022. The data were entered into an Excel (version 2010) spreadsheet. Pearson chi-square analysis was used to determine associations between dependent variables. Statistical significance was defined as a P-value <0.05. Results The study included 109 patients (51.2%) [?]51 years of age with uncontrolled gout (more than two attacks), 38% of whom were males. The variation in body mass index was not statistically significant (P=0.384). The proportions of patients with diabetes mellitus, hypertension, dyslipidemia, and osteoarthritis were significantly different between patients with uncontrolled vs. controlled gout (P=0.041). There were significant differences between patients with uncontrolled vs. controlled gout in terms of age at diagnosis and the interval between symptom onset and rheumatologist consultation (P=0.043, P=0.043, and P=0.027, respectively). Conclusion Patients were adequately informed about gout and its treatment. Gout control was significantly associated with patients' knowledge levels, patient age, and gout therapy. There were no associations between patients' primary complaints and gout status at the time of diagnosis

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Abstract Background Gout is a chronic non-communicable disease that might lead to multiple systemic complications if it is left untreated. The knowledge and attitudes among patients towards the diagnosis and management of gout are important indicators in determining the prognosis and predicting sequelae of the disease. This cross-sectional survey aimed to assess the knowledge, perspectives, and attitudes of patients diagnosed with gout toward the disease pathology, diagnosis, and treatment. **Methodology** An observational cross-sectional study was conducted at university clinics and local health facilities in central Riyadh, Saudi Arabia. Two-hundred thirteen patients diagnosed with gout were selected by non-random, non-probability convenience sampling and invited to voluntarily participate in this survey. A structured questionnaire, which was written in Arabic and pre-tested in a previous pilot study, was distributed to and collected from the participants between April 2022 and August 2022. The data were entered into an Excel (version 2010) spreadsheet. Pearson chi-square analysis was used to determine associations between dependent variables. Statistical significance was defined as a P-value <0.05. **Results** The study included 109 patients (51.2%) [?]51 years of age with uncontrolled gout (more than two attacks), 38% of whom were males. The variation in body mass index was not statistically significant (P=0.384). The proportions of patients with diabetes mellitus, hypertension, dyslipidemia, and osteoarthritis were significantly different between patients with uncontrolled vs. controlled gout (P=0.041). There were significant differences between patients with uncontrolled vs. controlled gout in terms of age at diagnosis and the interval between symptom onset and rheumatologist consultation (P=0.043, P=0.043, and P=0.027, respectively). There were significant associations between annually recurring attacks of gout after treatment and (1) the chief complaints at the time of diagnosis (P=0.022), (2) the gout medication used after diagnosis (P=0.012), (3) the types of diagnostic tests undertaken (P=0.042), (4) the presence or absence of nutritionist consultations for gout-related advice and treatment (P=0.037), and (5) the presence or absence of a doctor's advice regarding the treatment of acute gout attacks (P=0.043). No significant associations were determined between annual gout recurrences after treatment and (1) whether patients had discussions with their doctors about adopting a healthy lifestyle (such as eating moderate amounts of red meat, legumes, and shrimp to reduce the levels of uric acid in their blood) (P=0.048) or (2) patients' satisfaction with support from family and friends (P=0.032). **Conclusion** Patients were adequately informed about gout and its treatment. Gout control was significantly associated with patients' knowledge levels, patient age, and gout therapy. There were no associations between patients' primary complaints and gout status at the time of diagnosis. **Key words:** Gout, patient perspectives, knowledge, attitudes

Introduction

Gout has long been recognized as being among the most common chronic inflammatory joint diseases. It is also well established that men are far more likely than women to develop gout,² which is characterized by elevated serum uric acid levels (hyperuricemia), with values as high as 6.8 mg/dl. Urate crystals are formed as a result of rising blood uric acid levels, which also increases the risk of kidney stone development. Gout can occasionally be accompanied by tophi, which can eventually cause gouty arthritis.³ Along with a few

other symptoms, acute gout can cause intense pain, swelling, and discomfort around the joints. Inter-critical gout refers to the asymptomatic intervals between gout attacks. The word "podagra," which describes a condition wherein the first metatarsophalangeal joints are impacted by urate crystals—causing severe pain—is commonly used to describe acute gout. Additionally, clearly apparent indicators of flare-ups accompany severe gout symptoms.³ This includes severe inflammation that causes discomfort and pain that lasts for around 5–10 days. Asymptomatic hyperuricemia, however, persists for years in association with intermittent flare-ups. On the other hand, the crystals can show signs of proliferation coupled with inflammation and excruciating pain, which finally enters a stage when tophi and chronic gout will occur. Tophi can be seen in a variety of body sites, including articular spaces, cutaneous tissues, and bones.^{4, 5} People with gout may have discomfort that interferes with daily tasks, with mobility impairments that may be temporary or permanent. Quality of life is thereby significantly impacted. Stroke, diabetes, myocardial infarction, and hypertension, among other conditions, are highly associated with gout.⁷ The incidence and prevalence of gout have been rising at increasingly rapid rates over the past several years.⁸ Further research is needed to determine the incidence of the condition and how it varies geographically in relation to other risk factors, particularly in emerging nations. Previous research has shown that patients often receive minimal instruction on modifying their lifestyles and adhering to their medication.^{9, 10} This study examined gout with the goal of assessing the knowledge of gout among patients in the Kingdom of Saudi Arabia. Recent literature searches revealed no published studies of this nature. According to the research, a sizable portion of patients is unaware of the disease's fundamentals, including the value of medication adherence and lifestyle changes. A greater understanding of these concerns will facilitate efforts to improve gout-related knowledge and quality of life among patients.

Methodology

This was a descriptive, cross-sectional study with a sample size of 213 participants. Data were gathered between April 2022 and August 2022. The questionnaire used for data collection was straightforward, understandable, and indicative of the study's objectives. Before the data were collected, all of the patients received a briefing about the study's objectives. The University of . . . institutional review board granted ethical approval in November 2021 (Ref: REC-HSD-99-2021). Gout patients with blood uric acid levels >6 mg/dl and who resided in Saudi Arabia met the study's inclusion criteria. Patients with chronic illnesses other than gout were excluded. The questionnaire, which was written in Arabic and pre-tested in a previous pilot study, was organized into several sections. The questionnaire's Cronbach's alpha value of 0.72 indicated its reliability. The questionnaire and its sections were based on previous research.^{9,10} The first section was where patients indicated their consent and willingness to take part in the study. The second section captured the following demographic details: gender, age, and marital status. The third section collected clinical data from gout patients. Weight, uric acid levels, prior gout episodes, number of affected joints, management, and medication were all taken into consideration. Uric acid levels were extracted from the patients' diagnostic laboratory reports. The fourth section evaluated the patients' general understanding, beliefs, and practices related to gout. Overall, there was a low rate of missing data (<3.8%). We excluded missing values from the analysis. Cronbach's alpha was calculated to assess the reliability of the data regarding the gout patients' perspectives on their disease and treatments in Saudi Arabia. Initial analyses were performed using descriptive statistics. The continuous variables, like height, weight, and year, were analyzed as categorical variables for easy comparisons, wherein category-specific proportions were calculated. We used the chi-square test or Fisher's exact test for discrete variables. Specifically, we identified patients with "uncontrolled gout," which we defined as "those patients reporting two or more chronic symptoms that required medical care," and controlled gout—"those patients reporting one or no chronic symptoms." Adult patients currently diagnosed with gout and receiving medical treatment in the Kingdom of Saudi Arabia were eligible for inclusion. As this was an observational, cross-sectional study, we also examined the relationship between demographic information and participants' perceptions of their disease and the effects of treatment, as well as the patients' knowledge about gout and the management of gout. SPSS Statistics

for Windows, version 22 (IBM Corp., Armonk, NY, USA) was used to analyze the data. Frequencies, percentages, and standard deviations were determined. Pearson chi-square analysis was used to determine associations between dependent variables. Statistical significance was defined as $P < 0.05$.

Results

Demographic and Clinical Characteristics Two-hundred thirteen questionnaires were completed by adult patients currently diagnosed with gout and receiving medical treatment in the Kingdom of Saudi Arabia (Table 1). Patients [?]51 years of age had the most frequently recurring attacks of gout after starting treatment—109 (51.2%) of them with uncontrolled gout attacks and 55 (25.8%) with controlled gout. Among patients 20–50 years of age, 18 (8.5%) had uncontrolled gout attacks, and 22 (10.3%) had controlled gout ($P=0.002$). Among male and female patients, 80 (37.6%) and 51 (23.9%) individuals, respectively, indicated that they had uncontrolled gout, compared with 57 (26.8%) and 25 (11.7%) who had controlled gout ($P=0.231$). One hundred twenty (56.3%) and 78 (36.6%) patients from Saudi Arabia had controlled and uncontrolled gout, respectively, while eleven (5.1%) and four (1.9%) patients of other nationalities had controlled and uncontrolled gout, respectively ($P=0.432$). Seventy-nine (37.1%) and 123 (57.7%) patients with body mass index (BMI) values between 25 and 30 had controlled and uncontrolled gout, respectively, compared with three (1.4%) and five (2.3%) patients with BMIs <25 ($P=0.384$). Likewise, 32 patients with obesity (15.0%) had uncontrolled gout (the highest proportion among the various groups of patients with comorbidities), followed by 23 patients with dyslipidemia (10.8%). The chronic disease associated with the highest proportion of controlled gout was hypertension ($n=31$, 14.55%), followed by the "others" category ($n=21$, 9.9%) ($P=0.041$). In terms of educational level, the highest proportions of uncontrolled and controlled gout were among participants with bachelor's degrees as their highest level of education ($n=67$, 31.5% and $n=38$, 17.8%, respectively). Patients with secondary school certificates as their highest educational level were next, with 24 (11.3%) and 17 (8.0%) participants indicating that they had uncontrolled and controlled gout, respectively ($P=0.341$). In terms of employment status, participants with full-time jobs ($n=48$, 22.5% and $n=55$, 25.8%, respectively) had the highest proportions of uncontrolled and controlled gout, followed by retired and unemployed patients ($n=5$, 11.7% and $n=15$, 7.0%) ($P=0.052$). *Table 1. Demographic and Clinical Characteristics*

Variable	Category	How many recurring attacks of gout annually in your case "after" you started treatment?	How many recurring attacks of gout annually in your case "after" you started treatment?	P-Value
		UNCONTROLLED	CONTROLLED	
		>2 attacks	<2 attacks	
Age	<20	1 (0.5%)	4 (1.9%)	<0.002
	20-40	18 (8.5%)	22 (10.3%)	
	41-50	3 (1.4%)	1 (0.5%)	
Sex	[?]51	109 (51.2%)	55 (25.8%)	0.231
	Male	57 (26.8%)	80 (37.6%)	
Nationality	Female	25 (11.7%)	51 (23.9%)	0.432
	Saudi	78 (36.6%)	120 (56.3%)	
BMI	Non-Saudi	4 (1.9%)	11 (5.1%)	0.384
	BMI less than 25	5 (2.3%)	3 (1.4%)	
	BMI of 25 to 30	123 (57.7%)	79 (37.1%)	
	BMI above 30	3 (1.4%)	0 (0.0%)	

Variable	Category	How many recurring attacks of gout annually in your case "after" you started treatment?	How many recurring attacks of gout annually in your case "after" you started treatment?	
Chronic diseases (patients were prompted to select all that applied):	DM	12 (5.6%)	10 (4.7%)	
	HTN	12 (5.6%)	21 (9.9%)	
	Obesity	32 (15.0%)	11 (5.1%)	
	Dyslipidemia	23 (10.8%)	14 (6.6)	<0.041
	OA	1 (0.5%)	5 (2.3%)	
	No chronic illnesses	12 (5.6%)	17 (8.0%)	
Education level	Other	12 (5.6%)	31 (14.55)	
	Bachelor	67 (31.5%)	38 (17.8%)	
	Diploma	11 (5.2%)	9 (4.2%)	
	Master	9 (4.2%)	6 (2.8%)	
	PhD	3 (1.4%)	2 (0.9%)	
	Secondary	24 (11.3%)	17 (8.0%)	0.341
	Non-Education	2 (0.9%)	3 (1.4%)	
	Professor	1 (0.5%)	1 (0.5%)	
	Others	7 (3.3%)	3 (1.4%)	
	Full-time	55 (25.8%)	48 (22.5)	
Job status	Non-employed	25 (11.7%)	15 (7.0)	
	Part-time	7 (3.3%)	4 (1.9%)	0.052
	Retired	17 (8.0%)	8 (3.8)	
	Student	17 (8.0%)	4 (1.9%)	

Time of Diagnosis and Medical Personnel Who Diagnosed the Patients

In terms of duration of disease, patients diagnosed >1 year before the survey (n=111, 52.1% and n=68, 31.9%, respectively) had similar proportions of uncontrolled and controlled gout to patients diagnosed with gout <1 year prior (P=0.632). The largest proportion of patients was diagnosed with gout between the ages 25 and 60 years, with 100 (46.9%) and 63 (29.6%) having uncontrolled and controlled gout, respectively, followed by the 15- to 25-year age group (n=24, 11.3% and n=16, 7.5%, respectively) (P=0.043). Family physicians were the providers who most frequently diagnosed gout in this sample (n=39, 18.3% and n=32, 15.0%, respectively, for uncontrolled and controlled gout), followed by rheumatologists (n=36, 16.9% for uncontrolled gout) and orthopedic surgeons (n=18, 8.5% for controlled gout) (P=0.027). Also, 29 (13.6%) and 49 (23.0%) patients with uncontrolled and controlled gout were currently experiencing gout attacks when they completed the survey (P=0.532) (Table 2). *Table 2. Time of Diagnosis and the Medical Personnel Who Diagnosed the Patients*

Questionnaire prompt	Response options	How many patients
How many years ago were you diagnosed with gout?	Less than 1	20 (9.4%)
How old were you when someone diagnosed you with gout?	1 or more	111 (52.3%)
	15-25	24 (11.1%)
	25-60	100 (46.6%)
How much time elapsed between the onset of symptoms and your diagnosis of gout (months)?	>60	7 (3.3%)
	1-3 months	41 (19.1%)
	3-6 months	45 (21.0%)
	6-12 months	32 (15.0%)
	>12 months	13 (6.1%)
Rheumatologist		36 (16.7%)
<hr/>		
Who diagnosed you with gout?	Internist	17 (8.0%)
	Family physician	39 (18.3%)
	Orthopedic surgeon	23 (10.8%)
	Unknown	14 (6.6%)
	Other	2 (0.9%)
Rheumatologist		12 (5.6%)
Family physician		32 (15.0%)
Orthopedic surgeon		18 (8.5%)
Unknown		9 (4.2%)
Other		1 (0.5%)

Clinical Picture, Investigations, and Management

Sixty-two (29.1%) and 95 (44.6%) patients complained of joint pain in the uncontrolled and controlled gout groups, respectively, compared with 12 (5.6%) in the uncontrolled group who had asymptomatic high uric acid levels and 12 (4.7%) in the controlled-gout group who had other symptoms at the time of diagnosis ($P=0.022$). In terms of medications, allopurinol was the most frequently reported drug used to treat both uncontrolled and controlled gout ($n=28$, 13.1% and $n=21$, 9.9%, respectively), followed by colchicine ($n=24$, 11.3% and $n=19$, 8.9%, respectively) and probenecid ($n=15$, 7.0% and $n=14$, 6.6%, respectively) ($P=0.012$). Twenty (9.4%) and 19 (8.9%) patients with uncontrolled and controlled gout had undergone thyroid function testing and determination of C-reactive protein levels, respectively, followed by 13 (6.1%) and 12 (5.6%) patients in the uncontrolled and controlled groups, respectively, who indicating having had complete blood count and renal function tests, respectively ($P=0.042$). Sixty-six (31.0%) and 32 (15.0) patients with uncontrolled and controlled gout, respectively, indicated having visited a nutritionist to treat gout, while 65 (30.5%) and 50 (23.5%) patients with uncontrolled and controlled gout, respectively, had not consulted a nutritionist ($P=0.037$). One hundred eighteen (55.4%) and 74 (34.7%) patients with uncontrolled and controlled gout, respectively, had spoken with their doctors about minimizing consumption of foods that contain high levels of uric acid (such as red meat and legumes), compared with 9 (4.2%) and 12 (5.6%) who had not ($P=0.532$) (Table 3). *Table 3. Clinical Picture, Investigations, and Management*

Questionnaire prompt	Response options	How many patients
How many recurring attacks of gout annually in your case "after" you started treatment?	None	9 (4.2%)
	Other	6 (2.8%)
	No	10 (4.7%)
Have you visited a nutritionist to treat gout?	No	65 (30.5%)
	Yes	50 (23.5%)

None	9 (4.2%)	4 (1.9)	
Yes	66 (31.0%)	32 (15.0)	<0.037

Medical Education and Lifestyle Programs

One hundred ten (51.6%) and 71 (33.3%) patients with uncontrolled and controlled gout, respectively, indicated having spoken with their doctors about the ideal level of uric acid in the blood that should be achieved after treatment for gout, compared with 21 (9.9%) and 11 (5.2%) patients who indicated that they had not had such a discussion with a doctor (P=0.213). One hundred (46.9%) and 58 (27.2%) patients with uncontrolled and controlled gout, respectively, indicated having discussed with their doctors how to treat acute gout attacks, compared with 11 (5.2%) and 13 (6.1%) who had not had such discussions with their doctors (P=0.043). Ninety-eight (46.0%) and 47 (22.1%) patients with uncontrolled and controlled gout, respectively, had spoken with their doctors about medications that can lower the levels of uric acid in the blood, compared with 33 (15.5%) and 35 (16.4%) who indicated not having had such discussions with their doctors (P=0.049). Thirty-five (16.4%) and 22 (10.3%) patients with uncontrolled and controlled gout, respectively, used analgesics and increased their fluid intake to treat acute gout attacks, followed by 32 (15.0%) and 19 (8.9%) who indicated using colchicine and analgesics (P=0.731). Ninety-four (44.1%) and 54 (25.4%) patients with uncontrolled and controlled gout, respectively, had discussions with their doctors about how long they should continue taking treatment, compared with 15 (7.0%) and 15 (7.0%) who had not had such discussions with their doctors (P=0.354). Ninety-eight (46.0%) and 47 (22.1%) patients in the uncontrolled and controlled gout groups indicated having spoken with their doctors about adopting healthy lifestyle choices, such as eating moderate amounts of red meat, legumes, and shrimp to reduce the levels of uric acid in their blood (in addition to taking medication), compared with 33 (15.5%) and 35 (16.4%) who indicated not having had such discussions with their doctors (P=0.048). Thirty-five (16.4%) and 61 (28.6) patients with uncontrolled and controlled gout, respectively, had spoken with their doctors about smoking cessation, compared with 63 (29.6%) and 54 (25.4%) who had not spoken with their doctors about smoking cessation (P=0.563). Forty-one (19.2%) and 50 (23.5%) patients with uncontrolled and controlled gout, respectively, spoke with their doctors about losing weight and following a healthy lifestyle, compared with 61 (28.6) and 61 (28.6) who indicated not having had such discussions with their doctors (P=0.754). Thirty-two (15.0%) and 43 (20.2%) patients with uncontrolled and controlled gout, respectively, considered minimizing their consumption of red meat as a lifestyle measure to control gout, compared with 22 (10.3%) and 23 (10.8%) who indicated considered increasing fluid intake and decreasing seafood consumption (P=0.375) (Table 4). *Table 4. Medical Education and Lifestyle Programs*

Questionnaire prompt	Response options	How many recurring attacks of gout annually in your case "after" you started treatment?	How many recurring attacks of gout annually in your case "after" you started treatment?	P-Value
		UNCONTROLLED >2 attacks	CONTROLLED <2 attacks	

Questionnaire prompt	Response options	How many recurring attacks of gout annually in your case "after" you started treatment?	How many recurring attacks of gout annually in your case "after" you started treatment?	
Have you discussed with your doctor about not eating excessively foods that contain high levels of uric acid, such as: meat, legumes?	No	9 (4.2%)	12 (5.6%)	
	Yes	118 (55.4%)	74 (34.7%)	0.532
Have you discussed with your doctor the ideal level of uric acid in the blood that should be achieved after treatment <i>for gout</i> ?	No	21 (9.9%)	11 (5.2%)	
	Yes	110 (51.6%)	71 (33.3%)	0.213
	No	11 (5.2%)	13 (6.1%)	<0.043
Have you discussed with your doctor how to treat acute gout attacks?	Yes	100 (46.9%)	58 (27.2%)	
Have you discussed with your doctor medications that can lower the level of uric acid in the blood?	No	33 (15.5%)	35 (16.4%)	
	Yes	98 (46.0%)	47 (22.1%)	<0.0489
What do you do to treat acute gout attacks (you can choose more than one option)?	More fluids	31 (14.6%)	22 (10.3%)	
	Pai killers	35 (16.4%)	19 (8.9%)	

Have you discussed with your doctor how to treat acute gout attacks?	Yes	100 (46.9%)	58 (27.2%)	
	Colchicine	32 (15.0%)	15 (7.0%)	0.731
	Steroid	13 (6.1%)	16 (7.5%)	
	Others	20 (9.4%)	10 (4.7%)	
Have you discussed with your doctor how long you should continue taking the treatment?	No	15 (7.0%)	15 (7.0%)	
	Yes	94 (44.1%)	54 (25.4%)	0.354
Have you discussed with your doctor about adopting a healthy lifestyle such as eating moderate amounts of red meat, legumes and shrimp, to reduce the level of uric acid in the blood in addition to medication?	No	33 (15.5%)	35 (16.4%)	
	Yes	98 (46.0%)	47 (22.1%)	<0.0489
Have you discussed with your doctor about stopping smoking?	No	63 (29.6%)	54 (25.4%)	
	Yes	35 (16.4%)	61 (28.6)	0.563
Have you discussed with your doctor about losing weight and following a healthy lifestyle?	No	61 (28.6)	61 (28.6)	
	Yes	41 (19.2%)	50 (23.5%)	0.754
	less red meat consumption	32 (15.0%)	43 (20.2%)	

Have you discussed with your doctor how to treat acute gout attacks?	Yes	100 (46.9%)	58 (27.2%)	
Which of the following lifestyle measures should you take to control gout? (You can choose more than one option)	Less sea food	16 (7.5%)	23 (10.8%)	
	Less legumes and beans	12 (5.6%)	19 (8.9%)	0.375
	More fluid	22 (10.3%)	12 (5.6%)	
	Stop smoking	12 (5.6%)	3 (1.4%)	
	Sports	8 (3.8%)	4 (1.9%)	
	weight loss	5 (2.3%)	2 (0.9%)	

Satisfaction With Healthcare Services

Seventy-three (34.2%) and 36 (16.9) patients with uncontrolled and controlled gout, respectively, were very satisfied with the health services provided to them, 45 (21.1%) and 24 (11.3%) were satisfied, and fewer were dissatisfied (P=0.375). Fifty-seven (26.8%) and 32 (15.0%) patients with uncontrolled and controlled gout, respectively, were satisfied regarding their ability to carry out the demands and chores of daily life since diagnosis, compared with 41 (19.2%) and 22 (10.3%) who were very satisfied (P=0.051). Forty-five (21.1%) and 25 (11.7%) patients with uncontrolled and controlled gout, respectively, were satisfied with the health services provided to them since their diagnosis (P=0.154). Eighty (37.6%) and 35 (16.4%) patients with uncontrolled and controlled gout, respectively, were satisfied with the support they received from family and friends, compared with 29 (13.6%) and 22 (10.3%) who were very satisfied (P=0.032) (Table 5). *Table 5. Satisfaction With Healthcare Services*

Questionnaire prompt	Response options	How many recu
How satisfied are you with each of the following: [The health service provided to you]	Very Dissatisfied	UNCONTROLLED >2 attacks 0 (0.0%)
	Dissatisfied	6 (2.8)
	Neutral	7 (3.29%)
	Satisfied	45 (21.1%)
	Very Satisfied	73 (34.2%)
How satisfied are you with each of the following: [Ability to carry out the demands and chores of daily life since diagnosis]	Dissatisfied	11 (5.2)
	Neutral	22 (10.3%)
	Satisfied	57 (26.8%)
	Very Satisfied	41 (19.2%)
How satisfied are you with each of the	Very Dissatisfied	1 (0.5%)
	Dissatisfied	12 (5.6%)
	Neutral	32 (15.0%)

following: [Sleep <i>quality</i>]	Satisfied	45 (21.1%)	25 (11.8%)
How satisfied are you with each of the following: [Support from family and friends]	Very Dissatisfied	1 (0.5%)	0 (0.0%)
	Dissatisfied	9 (4.2%)	7 (3.2%)
	Neutral	12 (5.6%)	18 (8.2%)
	Satisfied	29 (13.6%)	22 (10.0%)
	Very Satisfied	80 (37.6%)	35 (15.9%)

Table 6 summarizes the patient quality-of-life assessment. One hundred nine patients (51.2%) were very satisfied regarding the effects of gout management on their job performance, work life, and careers. Fewer patients (n=34, 16%) indicated dissatisfaction in this regard, and 113 (53.10%) indicated satisfaction. One hundred thirty patients (53.10%) were satisfied with the health services provided to them since they were diagnosed with gout. Thirty-four patients (61.1%) were satisfied with their sleep quality, compared with 28 (13.20%) who were dissatisfied. One hundred sixty-six patients (78.90%) were satisfied with family and friends' support, compared with 17 (8.00%) who were dissatisfied. Overall, the quality-of-life assessment was statistically significant ($P < 0.001$). Table 6. Patient Quality of Life Assessment About Gout

Questionnaire prompt	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
How satisfied are you with the effects of gout on your job performance, work life, and career?	1 (0.5%)	12 (5.6%)	22 (10.3%)	69 (32.4%)	109 (51.2%)
How satisfied are you with the effects of gout on demands and chores of daily life since your diagnosis?		34 (16%)	66 (31%)	50 (23.5%)	63 (29.6%)
How satisfied are you with your sleep quality?	1 (0.5%)	27 (12.7%)	55 (25.8%)	70 (32.9%)	60 (28.2%)
How satisfied are you with your support from family and friends?	1 (0.5%) (0.1%)	16 (7.5%) 18 (7.00%)	30 (14.1%) 1507.1%)	51 (23.9%) 61 (33.5%)	115 (54%) 125 (64%)
How satisfied are you with health service provide for you?					

Ninety-eight patients (46%) sought the advice of a nutritionist regarding their gout, and 115 (54%) did not.

One hundred ninety-two patients (90.1%) had discussed with doctors about minimizing their consumption of foods with high levels of uric acid, while 21 (9.9%) had not. One hundred thirty-three patients (62.4%) had spoken with their doctors regarding the treatment of acute gout attacks, while 46 (21.6%) had not. One hundred sixty-six patients (77.9%) had spoken with their doctors about medications that can lower the levels of uric acid in the blood and how to prevent gout attacks, while 47 (22.1%) had not. One hundred eighty-one patients (85%) had spoken with their doctors about the ideal levels of uric acid in their blood that should be achieved after treatment for gout, while 32 (15%) had not. One hundred fifty-eight patients (74.2%) had spoken with their doctors about adopting healthy lifestyle choices, such as eating moderate amounts of red meat, legumes, and shrimp, to reduce the levels of uric acid in their blood (in addition to taking medication), while 24 (11.3%) had not. Eighty-four patients (50%) had spoken with their doctors about smoking cessation, and 84 (50%) had not (Table 7).

Table 7. Patient Management of Gout

Questionnaire prompt

Have you ever sought a nutritionist's for advice regarding gout?

Have you discussed with your doctor about not eating excessively foods that contain high levels of uric acid, such as: meat,

Have you discussed with your doctor how to treat acute gout attacks?

Have you discussed with your doctor about medications that can lower the level of uric acid in the blood?

Have you discussed with your doctor about the ideal level of uric acid in the blood that should be achieved after treatment

Have you discussed with your doctor about how long you should continue taking the treatment?

Have you discussed with your doctor how to prevent gout attacks?

Have you discussed with your doctor about adopting healthy lifestyle choices, such as eating moderate amounts of red meat

Have you discussed with your doctor about stopping smoking?

Discussion

Our study provides information on patient knowledge and perceptions regarding gout management. Several deficits in knowledge were identified in the study sample, including in the quality assessment of knowledge about gout, information about gout, and demographic information.¹¹ However, the deficits were greater in those with uncontrolled gout. Thirty-one percent of patients reported having uncontrolled gout, and 69% of patients reported having controlled gout. Males were more likely than females to be affected by uncontrolled gout. This result was consistent with the study by Richette et al. (2018) in France; with a 62-item questionnaire and 246 patients, the study also showed that gout status had no association with gender.¹² In our study, age had a significant association with gout status: there were more cases of gout as age increased; this result contradicts those of the study by Richette et al. (2018). In another study by Gaffo (2018) and the Global Health Living Foundation in Jordan (with a sample of 103 patients, 41 with flare-ups and 62 without flare-ups), it was shown that the incidence of gout among the patients was associated with age.¹³ Nationality had no association with gout status in our study. However, educational status was significantly associated with gout status, as patients with bachelor's degrees had the highest incidence of gout compared with others.¹⁴ Job status was significantly associated with gout status. Patients with full-time employment were more susceptible to gout than retirees, those with part-time jobs, or students without jobs. Physicians and patient height were not significantly associated with gout status. BMI had a significant association with gout status in this sample, with a high BMI being a risk factor and a low BMI being protective. Several factors may contribute to the patient knowledge deficits and the incorrect medication beliefs identified here.¹⁵ Most of the patients had been diagnosed with gout less than 3 years before completing the survey, and duration of disease was associated with gout status. Patients with longer intervals since diagnosis were less susceptible to gout flare-ups compared with those who had more recent diagnoses. The majority of patients had been diagnosed with gout between the ages of 25 and 64 years. Patients who had been diagnosed between 25 years and 64 years of age were less susceptible to gout flare-ups

compared with those diagnosed outside of this interval. The majority of patients had three to six gouty attacks per year, but the frequency of such attacks had no association with the patients' gout statuses at the time of survey completion. Most patients had one to two gouty attacks per year, and this status had a significant association with the patients' gout statuses at the time of survey completion. We found that knowledge and medical beliefs had significant impacts on gout status. For the treatment of acute gout, there are individualizable treatment strategies. Paracetamol, ibuprofen, and colchicine are considered among the most effective drugs to treat gout attacks; it is also important to increase fluid intake. There was a significant association between patients' knowledge about drugs for treating gout attacks and their gout status. Overall, patients in the study sample considered all of the well-established lifestyle measures to control their gout. Patients with controlled gout considered a reduction of meat and bean consumption as the second-line lifestyle measure to control gout, while patients with uncontrolled gout considered exercise and weight loss as the second-line lifestyle measures. Notably, there was no significant association between patients' implemented lifestyle measures in treating gout and their gout statuses.¹⁶In the quality-of-life assessment, patients were very satisfied in terms of their job performance, work lives and careers, daily demands and chores, health services, sleep quality, and support from family and friends. There was a significant association between the patients' quality-of-life assessments related to gout and their gout statuses. The opposite was found in a study conducted in Australia,¹⁷ which demonstrated gout to have a significant impact on patients' lives; the findings suggested that the patients' primary concerns were poor mobility and the pain associated with gout flare-ups. The study report also covered the social impacts of gout and its negative effects on productivity. Our study indicated different ways by which patients manage their gout: 46% of patients sought advice from a nutritionist, 90.1% spoke with doctors about minimizing the consumption of foods that contain high levels of uric acid (such as meat and legumes), and 62.4% spoke with their doctors about how to treat acute gout attacks. About three-quarters of patients (77.9%) spoke with their doctors about medications that can lower uric acid levels in the blood and how to prevent gout attacks, and 85% of the patients spoke with their doctors about the ideal levels of uric acid in their blood that should be achieved after treatment for gout. Nearly three-quarters of participants (74.2%) spoke with their doctors about adopting healthy lifestyle choices, such as eating moderate amounts of red meat, legumes, and shrimp to reduce the levels of uric acid in their blood (in addition to taking medication), and 50% of the patients spoke with their doctors about smoking cessation to manage acute gout. Management perceptions were significantly associated with gout status.

Conclusion

There was adequate knowledge about gout and management among patients. Knowledge, patient age, and management of gout had significant associations with gout status among these patients. Most of the patients had been diagnosed between the ages of 25 and 44 years. Patients' chief complaints at the time of diagnosis had no associations with their gout statuses.

Conflict of Interest

Authors reported no conflict of interest.

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Ethical Approval

This research had ethical approval from Prince Sattam bin Abdulaziz University Deanship of Scientific Research, Research Ethics committee in Health and Science Disciplines. Approval number (REC-HSD-99-2021)

Authors Contribution

AAK conceived and designed the study, conducted research, provided research materials, and commenced at writing initial and final draft of the article. AAB, AMM, AMA, RAA, ASA, TDA, NAA , AAA collected , organized , analyzed and interpreted data. Also, they provided logistic support. ALL authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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