Awareness of Gout and Hyperuricemia in a Sample of the Adult Population in Iraq

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ABSTRACT

Background: Gout is the most common type of inflammatory arthritis in men and postmenopausal women. The incidence and prevalence of hyperuricemia and gout were increased all over the world even among developed countries.
Materials and methods: A cross-sectional study was conducted at the Rheumatology Unit of Baghdad Teaching Hospital in Medical City, Baghdad, Iraq from October 2020 to April 2021. A total of 247 subjects were included in the study. Data were collected using a pre-constructed data collection sheet by face-to-face individual interviews. The sheet includes demographic characteristics, gout-related questions regarding the etiology, suspected predisposing agents, complications, diagnostic methods, food-related, clinical manifestations among studied cases, and attitudes of the gout patients among the study sample.
Results: Of 247 subjects, there were 67.2% (n = 166) males, 27.9 (n = 69) from the age group 40-49 years, 36.4% (n = 90) from Baghdad city, 25.5% (n = 63) university graduates, 19.9% with good income, 70.5 (174) employed, 221 (89.5%) married, 85% (n = 210) non-smokers, and 8.9% (n = 22) with family history of gout. Overall, 59 (23.9%) of the participants had a high level of awareness whereas low awareness levels accounted for 41.3% (n = 102). The awareness level showed a statistically significant association with education level, occupation, economic status, smoking habit, family history of gout, and patients with gout (P-value < 0.05).
Conclusion: There was a high proportion (41.3%) of the participants with a low level of awareness about gout and hyperuricemia. The awareness level among the participants was related to the education level, occupation, economic status, smoking habit, family history of gout, and patients with gout.
Keywords: Gout; Hyperuricemia; Awareness; Adult population.

INTRODUCTION

Hyperuricemia is usually defined as the accumulation of serum uric acid beyond its solubility limit or a serum uric acid level exceeding 6.8 mg/dL. The normal reference interval of uric acid in human blood is 1.5 to 6.0 mg/dL in women and 2.5 to 7.0 mg/dL in men. When the blood level of urate reaches or exceeds its physiologic limit of solubility, supersaturation of urate in the serum (and other extracellular spaces) results. It may crystallize into monosodium urate (MSU) in the tissues and cause gout [1, 2].

Gout is the most common type of inflammatory arthritis in men and postmenopausal women, characterized by deposition of monosodium urate crystal in and around joints as a result of hyperuricemia. It is a disease of both metabolism and inflammation [3]. Both the incidence and prevalence of gout appear to be increasing, and increasing prevalence is likely due to some factors such as longevity, comorbidities, and environmental exposures that also influence serum urate level [3]. For men, prevalence steadily increases with age, and for women, prevalence increases after menopause [4]. Although gout prevalence has increased in both sexes, women are less likely to have gout than men [5]. This gap between

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genders decreases with age and womens risk of developing gout goes up during menopause (estrogen seems to have protective effects)[3]. Because gout is associated with metabolic syndrome-related comorbidities such as obesity, hypertension, abnormal lipid metabolism, and impaired glucose tolerance (metabolic syndrome more in gouty patients) [6], the prevalence is likely to continue to rise.

Many risk factors for the development of gout have been established, including hyperuricemia (hyperuricemia is considered the most important risk factor for the development of gout), dietary factors, alcohol consumption, and metabolic syndrome [3]. Elderlies, male gender, post-menopause female, and some genetic conditions are important biologic variables. Associated comorbidities which can be associated with gout include obesity, chronic renal problems, hypertension, cardiac failure, and other cardiovascular diseases. Medications in chronic use as diuretics, Angiotensin-converting enzyme inhibitors, beta-blockers, and low-dose aspirin can even result in hyperuricemia and gout [3, 7]. Familial aggregation of gout was reported, and that gout is twofold higher among first-degree relatives [8]. Diet, like high purine foods found in red meat, seafood, and beer, in addition to high intake of sugar-sweetened beverages is associated with increased serum urate levels and gout among the general population. On the other hand, the intake of low-fat dairy, coffee, and vitamin C are associated with lower serum urate levels and reduced the incidence of gout [9, 10]. To improve quality of life and to decrease the impact of gout, individuals who are diagnosed with gout or hyperuricemia should receive adequate education regarding the nature of the disease, predisposing, dietary and lifestyle factors, and its management. Therefore, this study aimed to assess the awareness of gout and hyperuricemia in a sample of the adult population in Iraq.

MATERIALS AND METHODS
Study design

This cross-sectional study was conducted at the Rheumatology Unit of Baghdad Teaching Hospital in the Medical City, Baghdad, Iraq from October 2020 to April 2021.

Study sample

Subjects were randomly selected from different Iraqi governorates who attained the Baghdad Teaching Hospital in the Medical City. The inclusion criteria were subjected to those older than twenty years and agree to answer the questionnaire after explaining to them the objective of this study.

Male individuals younger than 20 years of age, females younger than 45 years, and those who were not accepted to participate in the current study were excluded.

Data collection

The study protocol was approved by the Review Board of the College of Medicine, Baghdad University. Oral informed consent was obtained from each participant and data were collected using a pre-constructed data collection sheet by face-to-face individual interviews with a purposive sample. The data collection sheet includes demographic characteristics (age, gender, marital status, education level, smoking, income, and family history). Gout-related questions include; suspected etiologies, risk factors, complications, diagnosis, food intake, clinical manifestations, and attitudes of the gout patients.

Scoring system and level of awareness

Twenty-four questions of the questionnaire regarding awareness will be given 1 point for correct answer and 0 points for incorrect, missing, or don't know the answer. Therefore, the total maximum awareness score is 24. Any participants gain a score ranging from 0-11 classified as low, 12-16 moderate, and 17-24 high level of awareness.

Total awareness level = Total participants awareness score/total maximum awareness score×100%.

Scoring system and level of attitude

Ten questions of the questionnaire regarding attitude will be given 1 point for the "Yes" and a zero point for the "No" answer. Therefore, the total maximum attitude score is 10. Any patient gains a score > 5 classified as a negative attitude and ≥ 5 positive attitude.

Total attitude level = Total patient's attitude score/total maximum attitude score×100%.

Statistical analysis

The data were entered and analyzed using the Statistical Package for the Social Sciences (IBMSPSS version 24). Data were summarized as frequency and percentages and mean ± SD in appropriate tables and figures. An independent t-test was used to compare between continuous variables. The association was considered statistically significant when the P-value < 0.05.

RESULTS

Out of 247 subjects, there were 166 males (67.2%) with a male/female ratio of 2.05/1. The age of the participants ranged from 20 to 70 years. The participants were mostly from the age group 40-49 years (n=69, 27.9%), other than Baghdad governorates (n=157, 63.6%), illiterate (n=81, 32.8%), employed (n=174, 70.5%), married (n=221, 89.5%), middle economic status (n=108, 43.7%), non-smokers (n=210, 85%), and with family history of gout (n=225, 91.1%) (Table 1).

Score and level of awareness

The overall awareness score was 11.96 ± 6.16 and ranged from 0−24. The highest number of the participants was with a low (n = 102, 41.3%) and the lowest with a high (n = 59, 23.9%) awareness level (Figure 1).

Association of the awareness level with some related variables

The awareness level showed a statistically significant association with education level, occupation, economic status, smoking habit, family history of gout, and patients with a gout of the participants (P-value < 0.05). While there was no such association regarding the age and gender of the participants (Table 2).

Responses regarding etiology and predisposing factors

The highest proportion of the participants (67.6%) was agreed that the older individuals are most likely to have high uric acid and the least proportion (42.9%) were agreed with that gout results from urate crystal deposition in the joints (Figure 2).

Table 1. The demographic characteristics of the 247 participants.

Independent variables	Categories	Number	Percentage
Age groups (in years)	< 30	35	14.2
	30 − 39	49	19.8
	40 − 49	69	27.9
	50 − 59	56	22.7
	≥ 60	38	15.4
Gender	Female	81	32.8
	Male	166	67.2
Residence	Baghdad	90	36.4
	Others governorates	157	63.6
Education	Illiterate	81	32.8
	Primary school	50	20.2
	Secondary school	53	21.5
	College or higher	63	25.5
Occupation	Employed	174	70.5
	Housewife	61	24.7
	No work	8	3.2
	Student	4	1.6
Marital status	Married	221	89.5
	Single	26	10.5
Economic status	Low	90	36.4
	Middle	108	43.7
	Good	49	19.9
Smoking	No	210	85
	yes	37	15
Family history of gout	No	225	91.1
	Yes	22	8.9

Table 2. The association of the awareness level with some related variables in 247 participants.

Variables	Awareness score (Mean ± SD)	P-value
Age groups (years)		
< 30	12.66 ± 6.36	0.517
30 − 39	12.98 ± 6.11	
40 − 49	11.75 ± 5.81	
50 − 59	11.64 ± 5.87	
≥ 60	10.84 ± 7.10	
Gender		
Male	12.36 ± 6.21	0.149
Female	11.15 ± 6.03	
Education		
Illiterate	8.96 ± 6.15	0.0001
Primary school	10.62 ± 5.23	
Secondary school	12.36 ± 5.84	
College or higher	16.54 ± 4.14	
Occupation		
Employed	12.94 ± 6.07	0.038
Housewife	10.12 ± 6.18	
No work	12.63 ± 6.3	
Student	15.75 ± 5.06	
Economic status		
Low	9.56 ± 5.89	0.0001
Middle	12.07 ± 6.01	
Good	16.14 ± 4.57	
Smoking		
No	11.51 ± 6.31	0.007
Yes	14.49 ± 4.56	
Family history of gout		
No	11.67 ± 6.19	0.018
Yes	14.91 ± 5.09	
Patient with gout		
No	11.58 ± 6.29	0.009
Yes	14.7 ± 4.34	

Responses about complication and diagnosis of gout

Figure 3 shows the percentages of the participants about the diagnostic tools and complications of gout.

Awareness about diet consumption

Two-thirds of the participants were believed that red meat increases gout. However, only 44.5% of them were agreed that individuals with gout or hyperuricemia can eat chicken meat (Figure 4).
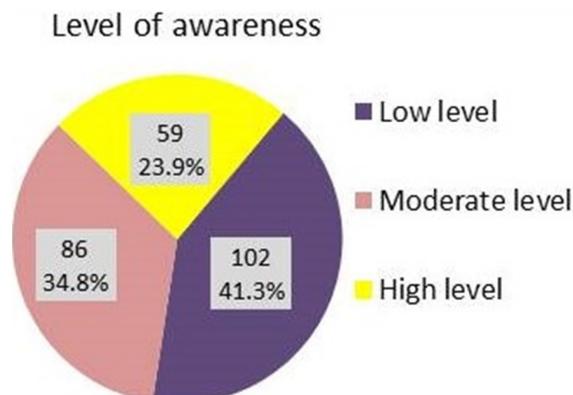

Figure 1. The proportions of the awareness level of the 247 participants.

Awareness of signs and symptoms

The majority of the participants (72.5%) knew that gout can cause acute pain. While only 33% of them knew that gout may be asymptomatic (Figure 5).

The attitude of the patients with gout

Of the 247, thirty (12.2%) subjects reported having gout. Seventy percent of them had had no information about the effect of NSAIDs or colchicine for an acute attack. While an only quarter of the patients had had information about the normal level of uric acid in the blood (Figure 6).

Attitude score and level of attitude of gouty patients

The overall attitude score was 3.8 ± 2.2 and ranged from 1-9. The present study showed that only 26.7% of the participants had a positive attitude.

DISCUSSION

Numerous studies have highlighted that gout exerts an enormous impact on individuals physically, psychologically, socially, and financially, causing poor quality of life [11, 12].
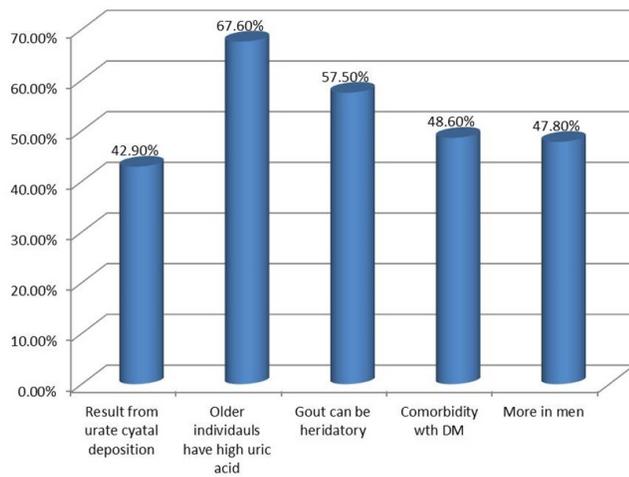
**Figure** 2. Responses of the 247 participants regarding etiology and predisposing factors.
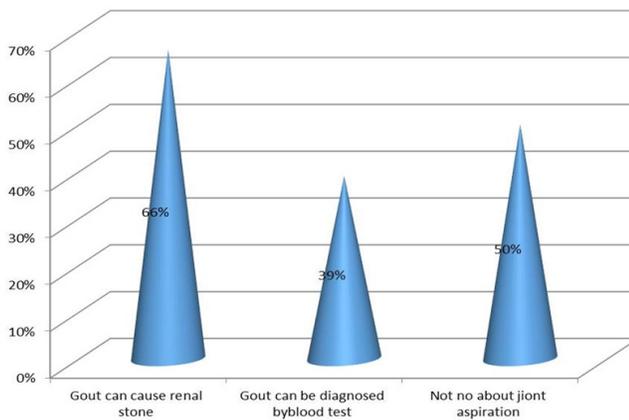
Figure 3. Responses of the 247 participants about the complications and diagnosis of gout.
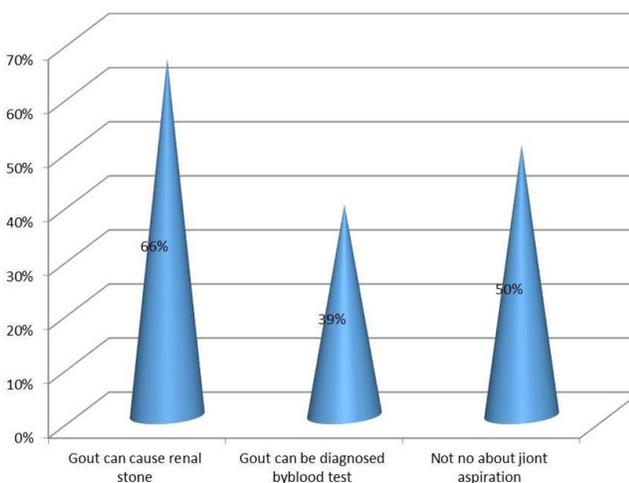
Figure 4. Awareness about diet consumption of the 247 participants.
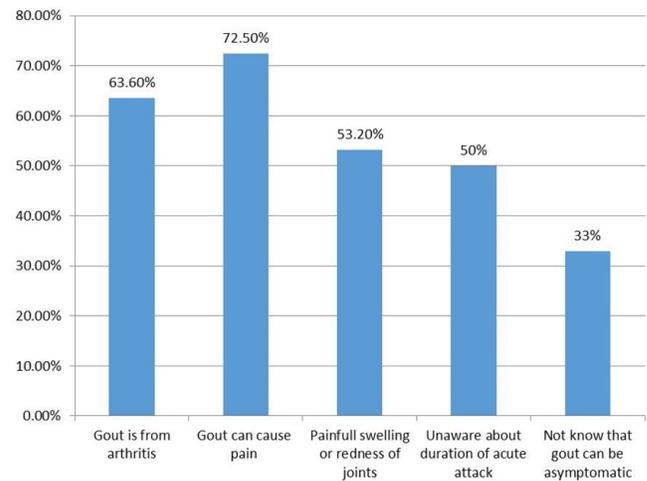
Figure 5. Awareness regarding signs and symptoms.
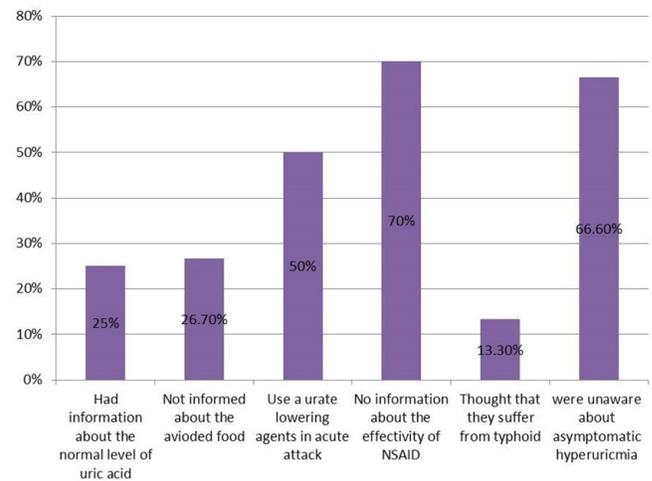
**Figure** 6. The attitude of gouty participants of the 247 participants.

To overcome this challenge, effective education about hyperuricemia and gout regarding etiology, predisposing, and lifestyle factors as well as management is needed and this fact is supported by many studies in the literature. Our findings were comparable with the study by Atalla et al. [13] who reported that male subjects and those who have had a high level of education, and those with good income were had sufficient knowledge.

Forty-two point nine percent of our subjects were agreed with the role of crystal deposition as a result of high serum uric acid that causes gout attacks. Several studies have reported increased both incidence and prevalence of hyperuricemia and gout with increasing age (significant correlation between serum uric acid and increased age). This may be explained by hormonal effects or environmental influences (lifestyle factors) or as a result of comorbidities like hypertension, hyperlipidemia, and renal issues [3, 7]. In the present study, two-third of the subjects were aware that older individuals are more likely to have high uric acid or be affected by gout than young.

Fort-seven point eight percent of our responders were believed that men were more likely to develop gout at a younger age than women. A previous study by Zhu et al. reported that the prevalence of gout was high in males and increased in both sexes with increasing age [14]. The prevalence in women increases steadily after menopause due to the role of estrogen which may have a protective effect against serum uric acid [3, 4, 14].

In recent years, there has been an increase in the prevalence of hyperuricemia due to adult lifestyle-associated factors, together with hypertension, diabetes, and dyslipidemia. A review study by Kuwabara reported that the relation between hyperuricemia and these comorbidities remains controversial as hyperuricemia is known to be an independent risk factor for these conditions [15]. However, about 50% of our participants were agreed with these facts.

A retrospective cohort longitudinal study in the US explained the association between weight gain and the increased risk of gout. The study concluded that gaining weight over adulthood was associated with an increased risk of gout and recommended maintaining non-obese weight and weight loss across adulthood. Therefore, weight reduction is necessary for the prevention and treatment of gout in adult life [16]. In our study, the majority of the participants disagreed or responded by I don't know when asked about this point and regarded to have low awareness.

Dietary factors like high purine foods found in red meat and seafood and intake of sugar-sweetened beverages are reported to increase the serum urate levels and the development of gout. Other epidemiologic studies have reported that there was a relationship between some types of food and uric acid levels, specifically red meat and seafood consumption [10, 17]. In this current study, 65.5% of the participants had had information that red meat and seafood consumption in high amounts may lead to increasing gout attacks, which was approximate to the results of a recent study [13]. On the other hand, the intake of low-fat diets, coffee, and vitamin C are associated with lower serum urate levels and in reduction of gout development. In a review of lifestyle factors that may increase the serum uric acid and risk of gout, and how to improve their side effects. However, the mechanisms of how coffee can lower serum uric acid are not clear from those observational studies, though chlorogenic acid, a polyphenol abundant in coffee, may play an important role. Chlorogenic acid has been shown to have antioxidant properties and inhibit the activity of xanthine oxidase [18]. In our study, 30.8% of the subjects were regarded as aware of this fact, this finding was similar to a study from Qatar who found that < 30% of their participants agreed with this information [19].

Alcohol is recognized as a risk factor for increased uric acid and gout flare. Besides, alcohol consumption, regardless of its type, can trigger gout attacks. Thus, individuals with established gout and pre-existing risk factors should limit all types of alcohol intake to prevent gout episodes [20, 21]. In the present study, 24.7% of the subjects agreed or have an idea that alcohol consumption can trigger or increase gout attacks. This finding was non-concordant with another study already showing half of the participants were believed that diet and drinking habits were the main contributing causes of gout [22].

Certain medications like thiazide diuretics, low-dose aspirin, and chemotherapy can drive up uric acid levels. In a review about drug-induced hyperuricemia, the authors reported that these medications and other certain drugs present an emergent and increasingly prevalent problem in clinical practice [23]. In our study, the participants, when asked about this fact, about two-thirds of them either disagreed or responded by don't know.

Nephrolithiasis (NL) is one of the recognized complications of hyperuricemia and gout. NL is composed of uric acid and is considerably more common in patients with gout, which is at least partly explained by increased urine levels of uric acid. A large cohort case-control study conducted in Sweden showed an increased risk of NL by 60% in the cases when compared to controls [24]. Our study reported that two-third of the subject had sufficient knowledge about this association. This finding was much higher than the previous similar studies [13, 19].

Fifty-three point two percent of the participant were agreed that gout can be recognized by painful swelling or redness of the joints, fever, and systemic symptoms. Thirty-three percent of them were agreed that gout may be asymptomatic. And about 50% were agreed that a gout attack can last for 5 to 10 days. Our findings were somewhat higher than those encountered by another study [25].

In Western countries, the prevalence of gout ranges from 3% to 6% in men and 1% to 2% in women, and globally, the prevalence ranges from 0.12% to 11.7% [4]. In this study, the participants who reported having gout were only 12%. However, this doesn't reflect the actual prevalence of hyperuricemia in the general population. Although gout prevalence has increased in both sexes, men are more likely to have gout than women [5].

In our study, women constituted exactly 50% of the total number who reported having gout. This finding was reasonable as the age of all female subjects included in this study was ≥ 45 years. This finding was concordant with a previous study [3] who reported that the gap between genders decreases with age and women's risk of developing gout goes up during menopause (estrogen seems to have protective effects).

The statistical results of these subjects showed only 26.7% knew the normal level of the serum uric acid and 26.7% of them reported they have had been informed by a treating physician or pharmacist about a diet that should be avoided. Lastly, the majority of the gout participants were considered unaware or have insufficient knowledge regarding pharmacological therapy as demonstrated by the results especially during acute attacks and if asymptomatic hyperuricemia needs treatment or not. Our findings were approximate and comparable to what was reported by other studies [19, 26] regarding knowledge about pharmacological therapy.

Collectively, the overall attitude (have sufficient knowledge or not) in the current study revealed that 26.7% of the gouty participants had a positive attitude.

RECOMMENDATIONS

1. To promote public awareness about gout and hyperuricemia. Besides, there is a need to introduce gout education regarding risk and predisposing factors through official media (educational medical programs) and social media.
2. Caregiver providers (physician, pharmacist, and even nurses) should be encouraged to provide more information about gout and hyperuricemia especially for individuals with gout or at risk for developing gout.
3. Providing information regarding the short-term and long-term effects of urate-lowering medications and education on the impact of dietary factors on triggering an attack.

CONCLUSION

It was observed that some of the study participants were somewhat aware of some aspects of hyperuricemia and gout disease especially those with higher education levels, good economic status, and those with a family history of gout. On other hand, there were several lower educational knowledge among participants in this study including food triggers, risk factors, complications, method of diagnosis, and treatment (especially the use of urate-lowering medications) particularly in a participant that reported having gout.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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