Knowledge and Awareness Level among Adults in Saudi Arabia, Regarding Gout Risk Factors and Prevention Methods

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Abstract

Gout is a common form of chronic inflammatory arthritis and is linked to a lower quality of life. It appears as a severe pain in onset along with swelling, redness, and warming most commonly in the first metatarsophalangeal joint. Its incidence has increased significantly in the last few years. The main aim of this study is to assess the knowledge and awareness level of adults in Saudi Arabia, regarding Gout risk factors and prevention methods. A cross-sectional study was carried out on the adult population in the Kingdom of Saudi Arabia from January 2022 to November 2022. Data were collected from 384 participants at least. Using an anonymous self-administered online questionnaire for data collection, that includes questions about sociodemographic features, gout etiology, risk factors, complications, diet consumption and its relation to Gout, and gout signs and symptoms. Data were analyzed by Statistical product and services solutions (SPSS) software ver.21. The study included 1208 participants, 56.4% of them were females and 43.6% were males. 52.6% of participants aged between 21- 30 years old. 14% of participants had gout. 28% of study participants had poor awareness about gout, 42% had moderate awareness and 30% had good awareness. The overall level of awareness about gout was insufficient among the general population in Saudi Arabia. There was a significant association between the awareness scores of participants with gender and residence region.

Keywords: Gout, Knowledge, Awareness, Risk factors, Saudi Arabia

INTRODUCTION

Gout or disease of kings is a common form of chronic inflammatory arthritis caused by increased uric acid level causing crystallization of uric acid in tissues and joints which lead to severe pain and causing comorbidities [1]. Gout has several risk factors such as hypertension, and type 2 diabetes which leads to hyperuricemia by decreasing renal urate excretion, and some medications such as diuretics [2]. It manifests as severe joint pain abrupt in onset along with swelling, redness, and warming in the joint most commonly in the first metatarsophalangeal joint. Characterized by joint deformity and tophus deposited subcutaneously [3]. previously, Gout was considered a benign disease and thought to be linked to overeating and excessive alcohol intake [4]. The gout incidence and prevalence rate have increased since the last few years significantly. The prevalence has multiplied over the past 20 years in the United States (US) and Europe [5].

In 2020, research conducted in a northern border province, in Saudi Arabia, found that there is a high level of awareness among the general public (91%) was aware that consuming meat raises the risk of getting gout, but there are a few key risk factors that require additional community education [6]. Another study in 2020 conducted in Taif city, Saudi Arabia, estimated that most of the participants (69.3%) appeared to be familiar with the signs and causes of gout disease. but some people and those with low incomes and education levels was having less awareness [7].

In 2021, a study was conducted in Riyadh City, Saudi Arabia, and found that most of the participants (73.2%) appeared to

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be aware of the symptoms and causes of gout disease. And there was a significant relationship between age, marital status, occupation, education, as well as having gout disease in terms of awareness [8]. Also in the same year, research done by Osama Daifallah in Egypt, reported that the general public's degree of knowledge of gout was insufficient. Age, gender, marital status, and level of awareness all had a significant relationship [9]. Globally, gout incidence has increased [10]. With increased incomes and resources, the way of life of Arab individuals has moved towards a more western lifestyle with more consumption of meat in recent years; as a result of this hyperuricemia, gout Obesity, hypertriglyceridemia, and diabetes incidences have all grown up, especially in developing states [11].

Among the few existing studies in KSA none of them cover the populations of many cities, they were only focused on one city. Also, most of the studies in KSA about hyperuricemia and gout have centered on epidemiology, etiology, and intervention, while only a few have considered the knowledge, awareness, and prevention of patients in their twenties and thirties with hyperuricemia and gout. Acute and chronic gout prevention has the likelihood of lowering not only the suffering associated with gout but also lowering associated health care costs. In addition, a higher level of public knowledge and awareness of preventable measures helps to reduce the burden on the community. Therefore, this study aims to assess public knowledge, awareness about hyper-uricemia and gout-related factors, and prevention methods. Also, to measure the prevalence of Gout disease among people in Saudi Arabia in 2022.

MATERIALS AND METHODS

Study Design

This is a descriptive observational cross-sectional survey that was conducted on the adult population in the Kingdom of Saudi Arabia in 2022.

Study Setting

This study was conducted in Saudi Arabia which contains 13 provinces, and a population is about 36 million. The study will include the adult population of Saudi Arabia who agreed to answer the electronic survey which was conducted between January 2022 – November 2022.

Inclusion and Exclusion Criteria

We will include in this study all Saudi adults male and female aged between 18 years and 65 years willing to participate and complete the questionnaire. All non-Saudi individuals were excluded from this study, as well as all individuals who are younger than 18 years and all individuals who are older than 65 years.

Sample Size

This formula was used to determine the sample size:

$$n = \frac{z^2 p q}{d^2} \tag{1}$$

Where:

- 1. n is the sample size.
- 2. z is a standard normal distribution (1.96 to a confidence level of 95%)
- 3. p is the anticipated population proportion, which is estimated to be 50% because this is the safest choice since the sample size required is largest when P=50%.
- 4. d is the absolute precision required on either side of the anticipated population proportion (in percentage points).

After we use this formula the required sample size is:

$$n = \frac{1.96^2(0.5)(0.5)}{0.05^2} = 384$$
(2)

Method for Data Collection and Instrument (Data Collection Technique and Tools)

Data was collected for the study from Saudi adults by using an anonymous self-administered online questionnaire that was translated into the Arabic language by the research team and reviewed by the supervisors, designed for the study purpose.

The questionnaire was uploaded through Google forms and was sent to a random sample of people living in Saudi Arabia; inviting them to participate, after mentioning the objective of the study. The questionnaire contained 35 questions covering the areas as follows:

- 1. Biodata (age, gender, Nationality, Place of residence, Marital status, Level of education, Occupation).
- 2. gout etiology, risk factors, and complications.
- 3. Diet consumption and its relation to Gout.
- 4. gout signs and symptoms.

We include (I don't know) as an answer choice for a better assessment of the actual knowledge.

The questionnaire reference: [8, 11]

Scoring System

Accurate answers were given a 1 score, and (inaccurate/ I don't know/missing) answers were given a 0 score. Participants were classified into 3 categories: Scores below 8 of 24 were considered as poor awareness, while who scores 8-15 were considered moderate awareness, and who scores 16-24 as high awareness. Additionally, the relation between the demographic data of participants, and their level of awareness was determined at a significant level.

Pilot Test

The questionnaire was distributed to above 15 individuals and asked to fill it. This was done to measure the understanding of the questionnaire and the feasibility of the study. The final data of the study doesn't include the pilot data of the study.

Analyzes and Entry Method

The data collected was analyzed using SPSS® software (Statistical product and services solutions) for Windows®

ver.21. Data was cleaned and entered into SPSS and analyzed for frequency, means, and CHI square or t-test for significance. For all statistical tests, the level of significance shall be fixed at p less than 0.05.

RESULTS AND DISCUSSION

The study included 1208 participants, 56.4% of them were females and 43.6% were males. 52.6% of participants were aged between 21- 30 years old, 14.3% were aged between 31-40 years old, and 13.7% aged less than 20 years old. 94.3% of participants were Saudi. 39.5% of participants were married and 55.5% were single. 60.6% had a bachelor's degree as illustrated in **Table 1. Figure 1** shows that 14% of participants had gout.

		Devenueter	No. 0/	
participa	ants	(n=1208)		
Table	1.	Sociodemographic	characteristics	of

Parameter		No.	%
	less than 20	166	13.7
	21 - 30	635	52.6
A	31-40	173	14.3
Age	41 -50	151	12.5
	51-60	68	5.6
	more than 60	15	1.2
Condon	Male	527	43.6
Gender	female	681	56.4
Nationality	Saudi	1139	94.3
Nationality	Non-Saudi	69	5.7
	Unmarried	671	55.5
Marital status	married	477	39.5
	absolute	37	3.1
	Widower	23	1.9
	Southern area	232	19.2
	Eastern Province	221	18.3
Region	The northern area	260	21.5
	Western Region	253	20.9
	Central Region	242	20.0
	primary	25	2.1
	Average	40	3.3
Educational level	secondary	253	20.9
	BA	732	60.6
	diploma	111	9.2
	Postgraduate	47	3.9
	employee	414	34.3
Occupation	student	494	40.9
Occupation	Unemployed	249	20.6
	Retired	51	4.2

Table 3. Participants' knowledge of gout (n=1208)



Figure 1. Presence of gout among study participants

As illustrated in **Table 2**, 15.3% of participants have a chronic disease (54.1% of them had diabetes, 29.7% had hypertension, 10.3% had heart disease and 5.9% had kidney disease). 52.9% of participants are obese.

 Table 2. Co-morbid diseases among study participants

 (n=1208)

· · ·			
Parameter		No.	%
Hove a shuania diasaa	Yes	185	15.3
Have a chronic disease	No	1023	84.7
	Hypertension	52	29.7
If was what is it?	Diabetes	98	54.1
II yes, what is it?	Heart disease	14	10.3
	Kidney disease	8	5.9
How obsity	Yes	313	25.9
nave obesity	No	895	74.1

In **Table 3**, 31.9% of participants reported that gout can be hereditary. 33.9% reported that gout causes kidney stones. 37.7% reported that hyperlipidemia increases the risk of gout. 48.8% reported that hyperlipidemia increases the risk of gout. 36.3% reported that diabetes increases the risk of gout. 48.9% reported that lack of movement increases the risk of gout. 53.1% reported that losing body weight can help reduce gout. As for symptoms, 63.3% of participants reported that gout causes redness and swelling of the joints. 29.1% of participants reported a relationship between drinking coffee or decaffeinated coffee and lower levels of uric acid in the blood while 34.5% reported that vitamin C has a role in lowering uric acid levels.

Sie 3. Faiticipants knowledge of goot (II-1200)			
Parameter	Agree	Disagree	Don't know
Gout occurs when uric acid crystals build up in the joints	624	51	533
	51.7%	4.2%	44.1%
Older adults are more likely to develop gout than children	714	113	381
	59.1%	9.4%	31.5%
Gout can be hereditary	385	294	529
	31.9%	24.3%	43.8%
Men are more likely to develop gout at a younger age than women	473	161	574
	39.2%	13.3%	47.5%

People with a low level of uric acid are more likely to develop gout	318	322	568
	26.3%	26.7%	47.0%
Hypertension increases the risk of gout	456	152	600
	37.7%	12.6%	49.7%
Hyperlipidemia increases the risk of gout	589	107	512
	48.8%	8.9%	42.4%
Diabetes increases the risk of gout	439	174	595
	36.3%	14.4%	49.3%
Taking certain medications increases the risk of developing gout	463	153	592
	38.3%	12.7%	49.0%
Lack of movement increases the risk of gout	591	139	478
	48.9%	11.5%	39.6%
Losing body weight can help reduce gout	641	112	455
	53.1%	9.3%	37.7%
Gout causes kidney stones	409	131	668
	33.9%	10.8%	55.3%
Gout can be diagnosed through blood tests	633	103	472
	52.4%	8.5%	39.1%
Consuming red meat and seafood helps reduce gout attacks	296	523	389
	24.5%	43.3%	32.2%
The consumption of cream and whole milk has nothing to do with gout	405	231	572
	33.5%	19.1%	47.4%
Patients with gout can eat a small amount of poultry and chicken meat	650	149	409
	53.8%	12.3%	33.9%
A gout patient can eat a large amount of complex starches, such as whole grains	397	232	579
	32.9%	19.2%	47.9%
A gout patient should increase the amount of fluids and water consumed daily	765	62	381
	63.3%	5.1%	31.5%
There is a relationship between drinking coffee or decaffeinated coffee and lower levels of uric acid in the blood	352	164	692
	29.1%	13.6%	57.3%
Vitamin C has a role in lowering uric acid levels	417	123	668
	34.5%	10.2%	55.3%
The signs and symptoms of gout always come on suddenly and are severe	520	181	507
	43.0%	15.0%	42.0%
Gout causes severe pain in the joints	765	72	371
	63.3%	6.0%	30.7%
Gout causes redness and swelling of the joints	693	78	437
	57.4%	6.5%	36.2%
A gout attack can last from five to ten days	468	96	644
	38.7%	7.9%	53.3%

Figure 2 shows that 28% of study participants had poor awareness about gout, 42% had moderate awareness and 30% had good awareness.



Figure 2. Awareness scores about gout among study participants (n= 1208)

		ŀ	Awareness scores			
		Moderate awareness	Poor awareness	Good awareness	(N=1208)	P valu
	Loss than 20	48	71	47	166	
	Less than 20	14.1%	13.9%	13.1%	13.7%	
	20- 30	189	260	186	635	
	20- 50	55.6%	51.1%	51.8%	52.6%	
	31-40	44	69	60	173	
	51 10	12.9%	13.6%	16.7%	14.3%	0.681
	41-50	43	67	41	151	01001
Age		12.6%	13.2%	11.4%	12.5%	
	51-60	13	34	21	68	
		3.8%	6.7%	5.8%	5.6%	
	more than 60	3	8	4	15	
		0.9%	1.6%	1.1%	1.2%	
	Male	166	204	157	527	
Gender		48.8%	40.1%	43.7%	43.6%	0.042
	Female	174	305	202	681	
		51.2%	59.9%	56.3%	56.4%	
	Saudi	323	475	341	1139	
Nationality		95.0%	93.3%	95.0%	94.3%	0.465
, and the second s	Non-saudi	17	34	18	69	
		5.0%	6.7%	5.0%	5.7%	
	South	113	80	39	232	
		33.2%	15.7%	10.9%	19.2%	
	East	41	96	84	221	
		12.1%	18.9%	23.4%	18.3%	
Residence region	North	61	106	93	260	0.001
		17.9%	20.8%	25.9%	21.5%	
	West	83	108	62	253	
		24.4%	21.2%	17.3%	20.9%	
	Central Region	42	119	81	242	
		12.4%	23.4%	22.6%	20.0%	
	Widowed	7	12	4	23	
		2.1%	2.4%	1.1%	1.9%	
	Single	199	279	193	671	
Marital status	8	58.5%	54.8%	53.8%	55.5%	0.553
	Married	123	201	153	477	
		36.2%	39.5%	42.6%	39.5%	
	Divorced	11	1/	9	37	
		3.2%	5.5%	2.5%	3.1%	
	Primary	6	5	14	25	
	-	1.8%	1.0%	3.9%	2.1%	
	Preparatory	13	18	9	40	
		3.8%	5.5%	2.5%	3.3%	
	Secondary	/8	21.80/	64 17 90/	253	
Educational level	-	22.9%	21.6%	17.8%	20.9%	0.219
	Bachelor	201	500	225	/32	
		59.1%	00.1%	62.7%	60.6%	
	Diploma	30	48	33	111	
	-	8.8%	9.4%	9.2%	9.2%	
	Master	12	∠1 / 10/	14	4/	
		3.3%	4.170	3.9%	3.9%	
	Student	131	211 41 50/	152	494	
		38.3%	41.3%	42.3%	40.9%	
Work	No work	81 22.90/	111 21 90/	5/ 15.00/	249	A 100
W OFK		23.8%	21.0%	15.9%	20.6%	0.198
	Retired	12	4.20/	1/	51	
	Em-1	3.3%	4.3%	4./%	4.2%	
	Employee	110	105	133	414	

34.1%	32.4%	37.0%	34.3%

A high amount of uric acid in body fluids causes gout, an inflammatory disorder of the joints. The presence of monosodium urate crystals in the joints, which trigger the inflammatory response, is predisposed by hyperuricemia. While some dietary components are linked to decreased risk of gout, there are several factors that are linked to an increased risk of gout development. Recent data on the prevalence and incidence of gout range from 1% to 6.8% and 0.58 to 2.89 per 1,000 person-years, respectively, depending on the population studied and the methodologies used [12]. In our study, 14% of study participants are diagnosed with gout.

According to our study results, 28% of study participants had poor awareness about gout, 42% had moderate awareness and 30% had good awareness. Better awareness levels were reported in another study in Saudi Arabia that reported that participants' awareness of gout disease was assessed. 73.2% of the participants were recognized with a good level of awareness. 82.6% of the participants heard about gout disease [8]. A study conducted in Taif city, Saudi Arabia found that most of the participants were aware of the disease, representing 69.3% of individuals who heard about gout disease [7]. In a Qatari study on population, knowledge found that only 31% of the Qatari population was well knowledgeable about the symptoms and etiology of gout disease [11].

Amongst the symptoms of gout disease, pain in the joints is the most selected representing 71.4% of the participants, followed by swelling around the joints 53.4%, redness 17.8%, and heat 7.4% [8]. 63.3% of our study participants reported that gout causes severe pain in the joints while 57.4% reported that gout causes redness and swelling of the joints. These findings are at least partly in line with a previous finding that 40% of respondents from the Saudi study identified redness as a symptom of gout disease, whereas 35.49% identified swelling and 10.70% declared additional pain as a symptom of gout disease. Only 0.56% of respondents said that vomiting is a symptom of this disease [7]. Another study reported that 76% of the subject has been classified in the inadequate knowledge category when considering their knowledge in term of gout symptoms. To this selected knowledge, only 23% of participants agree that the signs and symptoms of gout almost always suddenly and acutely, 41% agree that gout causes acute pain in joints, 35% agree that gout causes redness and swelling of the joint, and 9% of participants agree that a gout attack can last for 5 to 10 days [13]. In an Egyptian study, (69.6%) of participants know that gout led to joint pain and swelling while few of the participants think it doesn't (3.2%) with no statistically significant difference between participants with regard to education, occupation, marital status, and residence [9]. While in Alshammari et al., (28%) agree that the signs and symptoms of gout almost always suddenly and acutely, 36% agree that gout causes acute pain in joints, 33% agree that gout causes redness and swelling of the joint [14].

Several studies have suggested that hyperuricemia is associated with many diseases, including diabetes mellitus, hypertension, stroke, dyslipidemia, chronic kidney disease, cardiovascular events, and heart failure. In our study, 37.7% reported that hypertension increases the risk of gout. 48.8% reported that hyperlipidemia increases the risk of gout. 36.3% reported that diabetes increases the risk of gout. 33.9% reported that gout causes kidney stones. This was comparable to a study where the majority of participants made up 51% of respondents who were unaware of the close connection between kidney complications from gout and gouty arthritis [8]. Knowledge gaps were discovered regarding the causes of gout, urate-lowering therapy, and the possibility of curing the disease in the study by Deprouw et al. [9] to explore partners' and nurses' knowledge and representations of gout. According to a previous finding, 41.86% of participants in the Atalla et al. [7] study believed that gout disease might lead to renal complications, while 26.91% said that gout disease does not cause renal complications, and 31.23% were unaware of the connection between gout disease and renal complications.

According to the results of other research, gout risk factors included diabetes, hypertension, hyperinsulinemia, obesity, high triglyceride and cholesterol levels, and hypertension and hyperinsulinemia [15, 16]. The mechanism by which more body fat raises serum uric acid, however, is not fully understood in the body of extant literature. The most likely mechanism by which fat influences gout is that visceral fat accumulation causes a rise in free fatty acids and tumor necrosis factor-alpha (TNF-), together with a decrease in adiponectin concentration, which in turn causes a reduction in renal excretion of uric acid [17].

Meat consumption and unhealthful eating patterns have been linked to the pathogenesis of hyperuricemia. Contrarily, it has been demonstrated that increased consumption of low-fat dairy products, whole grains, coffee, nuts, vegetables, and legumes reduces the risk of hyperuricemia; as a result, these foods are frequently advised in the management of hyperuricemia and gout. In our study, 29.1% of participants reported a relationship between drinking coffee or decaffeinated coffee and lower levels of uric acid in the blood while 34.5% reported that vitamin C has a role in lowering uric acid levels. Results of a previous showed that 81% of the participants think that there is a strong relationship between gout and eating meat while 1.8% did not. Considering meat consumption and poor dietary habits are significant risk factors, these findings showed a good level of awareness among most of the participants. A lower percentage was reported by Atalla et al. [7] who stated that almost 69.3% of participants declared an association of the disease with meat consumption.

The healthcare industry has been evolving over the past few decades, moving away from the idea that patients are passive

users of knowledge and expertise from health professionals and toward a more collaborative approach. It is now accepted that patients can actively manage their health care and illnesses. All educational services provided to patients, including elements of therapeutic education, health education, and health promotion, are together referred to as population or patient education [18].

CONCLUSION

The overall level of awareness about gout was insufficient among the general population in Saudi Arabia. There was a significant association between the awareness scores of participants with gender and residence region. It is necessary to educate the Saudi people about the gout disease through campaigns, media, social media, and seminars to increase and spread public knowledge of this condition. The risk factors, symptoms, and predisposition factors for gout may be the main topics of this instruction.

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ETHICS STATEMENT: Ethical approval was obtained from the research ethics committee of Jazan University (application number: REC-44/04/374). Informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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