



*Original Research Article*

# Awareness of Gout disease among Saudi adult population in Riyadh City

Received 23 May, 2021

Revised 4 June, 2021

Accepted 12 June, 2021

Published 3 September, 2021

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Gout is a painful chronic inflammatory disease that causes swelling, redness, and tenderness in the joints. It typically affects the big toe. Despite the fact that it is a serious condition, the level of attention is extremely low. Gout is the most common type of inflammatory arthritis, and it can have a negative impact on one's quality of life. The purpose of this study is to assess gout disease knowledge among male and female adults in Riyadh, Saudi Arabia, in 2020. In this cross-sectional study, 500 participants were randomly selected (50% were males, 50% were females), and data were collected using a pre-tested electronic questionnaire. The study's findings indicated that adults in Riyadh city were sufficiently aware of gout disease, with 73.2% of participants having a good level of awareness. 10.4% of the participants had previously been diagnosed with gout disease, and they frequently rely on starches and legumes (17.6%), chickens (16.4%), and vegetables and fruits (12.8%) for their diet. Our findings show that as one gets older and more educated, one's level of awareness rises. Adults in Riyadh, Saudi Arabia, were sufficiently aware of the gout disease. And the majority of the participants appeared to be aware of the symptoms and causes of gout disease. There was a significant relationship between age, marital status, level of education, occupation, and participants with gout disease.

**Keywords:** Gout awareness, Riyadh city, adult population.

## INTRODUCTION

Gout is one of the most frequent form of inflammatory arthritis. Gout is caused by uric acid crystallization in the joints and is frequently linked with hyperuricemia. (CDC, 2020) The big toe joint is commonly affected by this ailment. One or more recurrent attacks of acute inflammatory arthritis, as well as chronic pain, are among the clinical manifestations. Chronic arthropathy, and accumulation of urate crystals in the form of tophaceous deposits.

The study aims to identify the knowledge about Gout Disease among male and female adult people in Riyadh city and to spread the awareness of Gout disease and

knowledge about its symptoms and causes and its relationship with chronic disease or obesity. Our research focuses on adult persons in Riyadh, Saudi Arabia, who are aware of Gout Disease.

There was study done in Taif in Saudi Arabia. The goal of that study was to determine the level of awareness of Gout Disease among the adult population in Taif, as well as the level of perception of Gout Disease among the general population of Saudi Arabia and the relationship between level of awareness and socio-demographic data. From August to November 2019, a study was conducted on both genders in Taif, Saudi Arabia. Electrons have been pre-

tested.

Results showed that there was less awareness in single individuals and those who had low income and education level. Most of the participants were aware of the disease. Almost 69.3% of participants declare association of the disease with meat consumption. 112 participants stated that changing lifestyle, medication, and stopping meat intake would be the best treatment for Gout disease. The limitations of the study was the sample was taken only from Taif city, (Atalla et al., 2020).

The prevalence of gout and hyperuricemia in middle-aged and elderly people was studied by Zhang, Qingxi MM in Tibet. Deposition of monosodium urate crystals in synovial fluid and tissue is characteristic for gout. The main cause of gout was hyperuricemia, although not every person with hyperuricemia will suffer from gout. The study was a cross-sectional survey for the middle-aged population. Professional interviews collected the data from local health stations by 3 direct interviewing, height and weight were measured. The prevalence of gout was 0.30%, and 1.8% for hyperuricemia, with most men (Zhang et al., 2020).

Another cohort study focuses on the relationship between vegetarian diet and gout by Tina H.T Chiu was published in 2019 with the Title "Vegetarian diet and risk of gout in two prospective cohort studies". The researchers used two separated cohort studies. The sample chosen by volunteering, from the Tzu Chi Foundation, are non-smokers and quit alcohol drinking. One third of the sample population were strict vegetarians. Cohort 1 group registered 6002 about a quarter of them came to the hospital for a checkup. As for the cohort 2 group, there were 12062 volunteers from the Tzu Chi community. The results show that vegetarians in both cohort 1 and cohort 2 had a low prevalence of elevated fasting glucose and diabetes respectively. Also, vegetarians in group 1 have low rates of high blood pressure and hyperuricemia. In both groups, a vegetarian diet was highly associated with a low risk of gout Chiu et al., 2020).

A cross-sectional study was published in March 2019 they used standard methods to assess the influence of personal characteristics, lifestyle, and cardiometabolic status on SUA levels for patients who visit primary care in Southern Nigeria. The study enrolled between hyperuricemic 79 (42 Males, 32 Females) and normouricemic 80 (39 Males, 41 Females) with the same geodemographic area. The measurement of BP, BMI, and lipids level before the uric acid was taken; the study shows an obvious relation and higher odds for hyperuricemia among married couples (Edet, 2019).

A relationship between serum uric acid and hypertension were identified through a cross-sectional study that was made in Bangladesh.

They suggested an association of serum uric acid "SUA" with hypertension among Bangladeshi adults, the samples were obtained from 140 males and 115 females. The prevalence of hypertension and prehypertension was significantly higher in males than in females. They found

an increased SUA level in both genders so there's a significant association between high SUA level and hypertension. Moreover, both studies agreed on the relation of the SUA levels changes with gout diseased or hypertensive participants (Ali et al., 2019).

A close relationship between fat accumulation and gout/hyperuricemia was observed, a case-control study in Korea (2015) by Jennifer Lee suggests that there is an association between visceral fat accumulation rather than subcutaneous fat with metabolic abnormalities and hyperuricemia among male patients with gout disease. This was investigated by 103 male patients with primary gout and 204 healthy individuals. There is a significant relation between hyperuricemia, gout disease, and metabolic syndrome which increases the risk of cardiovascular disease and diabetes type two (Lee et al., 2015).

A prospective cohort study was done in (2008) examined 11,351 men with a high cardiovascular risk profile by the Multiple Risk Factor Intervention Trial (MRFIT). Based on the American Diabetes Association (ADA) criteria, incident diabetes was identified. The relative risk (RR) for incident type two diabetes was estimated by using Cox proportional hazards modeling. This study shows that high cardiovascular risk profile patients with gout disease present a high risk of type two diabetes. Outcomes suggest aggressive management of diabetes risk factors in men patients with gout disease (Choi et al., 2008).

Complications of Gout and its prevention as well as comorbidities have been discussed also in many articles.

There was a strong association between gout disease and Hyperuricemia with hypertension. Several clinics and laboratory evidence suggest that Hyperuricemia can promote hypertension directly even if gout disease is not present. Second, in patients that suffer from metabolic syndrome where they have an increased chance of getting a high incidence of gout disease. Consequently, patients with Hyperuricemia have a high incidence of insulin resistance. There was one study mentioned that patients with gout disease have a 35% more chance in comparison with people without gout (Zhong, 2019).

Third, Hyperuricemia and gout with cardiovascular disease. There is an increase in the risk of getting Atherosclerosis in patients with gout disease compared with general populations. Fourth, Hyperuricemia and gout with chronic kidney disease (CKD) which is considered as the major comorbidities in patients with Hyperuricemia and gout. Hyperuricemia is a risk factor for getting CKD and there are relations with the rapid progression of CKD. Fifth, several studies noted that there was association between gout and Hyperuricemia with inflammatory reactions and gouty crystal deposits in the cornea and sclera and iris. Retinopathy also usually associated with chronic uncontrolled gout (Stamp and Chapman, 2013).

The prevalence of Gout According to recent studies increased over the past 2 decades. This paper will be focusing on the awareness of gout disease among adults

**Table 1.** Socio-demographic Information of the participants (n=500)

<b>Gender</b>	<b>Male</b>	<b>250</b>	<b>50%</b>
	<b>Female</b>	<b>250</b>	<b>50%</b>
<b>Age (Years)</b>	<b>18 - 29</b>	<b>216</b>	<b>43.2%</b>
	<b>30 - 39</b>	<b>88</b>	<b>17.6%</b>
	<b>40 - 49</b>	<b>105</b>	<b>21%</b>
	<b>≥ 50</b>	<b>91</b>	<b>18.2%</b>
<b>Nationality</b>	<b>Saudi</b>	<b>483</b>	<b>96.6%</b>
	<b>Non-Saudi</b>	<b>17</b>	<b>3.4%</b>
<b>Marital status</b>	<b>Single</b>	<b>201</b>	<b>40.2%</b>
	<b>Married</b>	<b>286</b>	<b>57.2%</b>
	<b>Divorced</b>	<b>11</b>	<b>2.2%</b>
	<b>Widow/er</b>	<b>2</b>	<b>0.4%</b>
<b>Level of Education</b>	<b>Elementary</b>	<b>2</b>	<b>0.4%</b>
	<b>Intermediate</b>	<b>9</b>	<b>1.8%</b>
	<b>Secondary</b>	<b>104</b>	<b>20.8%</b>
	<b>University</b>	<b>352</b>	<b>70.4%</b>
<b>Occupation</b>	<b>Others</b>	<b>33</b>	<b>6.6%</b>
	<b>Student</b>	<b>134</b>	<b>26.8%</b>
	<b>Employed</b>	<b>223</b>	<b>44.6%</b>
	<b>Unemployed</b>	<b>83</b>	<b>16.6%</b>
	<b>Retired</b>	<b>60</b>	<b>12%</b>

in Riyadh city.

## METHODOLOGY

A cross-sectional study was conducted in Riyadh city, Saudi Arabia to measure the awareness of Gout among male and female adults in Riyadh, Saudi Arabia from 2020 to 2021. The study population included 500 Saudi participants who agreed to answer the electronic survey, 250 male and 250 female adults aged between 18 to 50 years old from Riyadh, Saudi Arabia. Participants were divided into four main categories as following: obese with chronic disease, obese without chronic disease, nonobese with chronic disease, and healthy individuals. An electronic questionnaire was distributed around Riyadh city among participants using social media applications. All male and female healthy Saudi adults, and all non-Saudi individuals were excluded from the study, as well as Saudi young less than 18 years old and elderly participants above 50 years old. Data were obtained by the usage of electronic valid questionnaires aimed to measure the awareness of Gout among male and female adults, then it was distributed to all participants in our targeted population. The questionnaire was first pre-tested to measure the validity and reliability. Answers were divided based on the same four categories, 500 answers from Saudi male and female adults, both groups were compared based on their knowledge about gout disease.

The statistics that were used in this research for data analysis include frequencies and percentages. It was collected from an electronic questionnaire then analyzed by SPSS version23 (statistical package for social science).

The level of awareness of gout disease was assessed using a scoring system. A score of 1 was given to correct

responses, and 0 was used for incorrect/do not know responses. Participants were categorized into two categories: Scores less than 5 out of 10 were considered as poor awareness, while scores equal to or greater than 5 were considered as good awareness.

Furthermore, the relationship between demographic characteristics of participants, and their level of awareness was determined at a significant level .

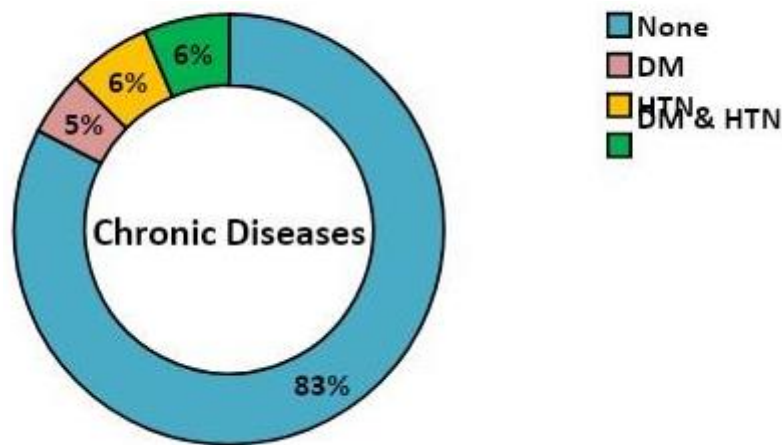
**Ethics and human subject protection:** This study was approved by IRB committee

## RESULTS

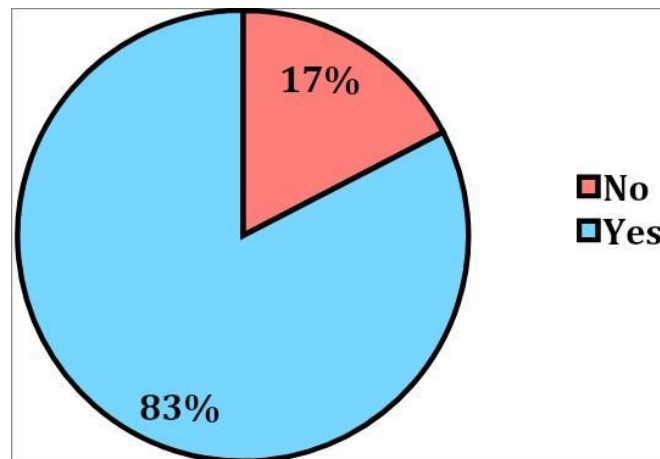
### Study response

In this study data was collected from 500 adult participants, the socio-demographic characteristics are shown in (Table 1). It was found that 250 (50%) were males while 250 (50%) were females. The age distribution revealed that most of the participants (43.2%) were in the age group of (18-29) years and (21%) were in the age group of (40-49) years. Most of the participants were Saudi nationals (96.6%). 286 (57.2%) of the participants were married, 201 (40.2%) were single while a few were divorced (2.2%) or widowed (0.4%).

The participant's level of education ranged from elementary education to university education, from maximum to minimum 352 (70.4%) university education, 104 (20.8%) secondary school education, 9 (1.8%) intermediate school education, and 2 (0.4%) elementary school education while 33 (6.6%) had other educational levels. Besides, 223 (44.6%) of the participants have an occupation while 83 (16.6%) have not, 134 (26.8%) were



**Figure 1:** The distribution of the participants according to their history of chronic diseases



**Figure 2:** The distribution of the respondents according to their awareness of Gout Disease

students and 60 (12%) were retired.

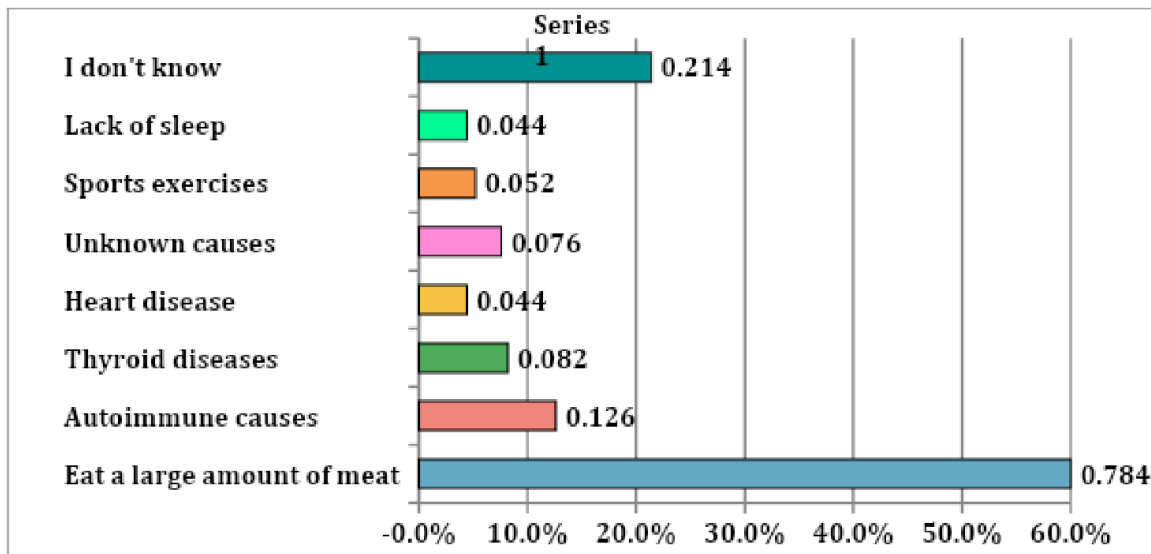
About the history of chronic diseases, 413 (82.6%) of the participants had no chronic diseases, while 31 (6.2%) had hypertension, 24 (4.8%) had Diabetes Mellitus, and 32 (6.4%) had both as illustrated in Figure 1. Besides, 164 (32.8%) of the participants suffer from obesity "overweight" while 336 (67.2%) were not.

To assess the awareness of gout disease among Saudi adult people in Riyadh city while focusing on the aim of our study, data analysis revealed that 423 (82.6%) of the participants had previous information about gout disease (Figure 2), their main source of information is colleague/friend which represented (39.6%), followed by online resources (38%), doctor/health care provider (21.8%), television (10.4%), newspapers/magazines (8.4%), radio (2.4%), and others sources (31.2%). 52 (10.4%) of the participants had previously been diagnosed with gout disease, they often depend on starches and legumes (17.6%), chickens (16.4%), and vegetables and

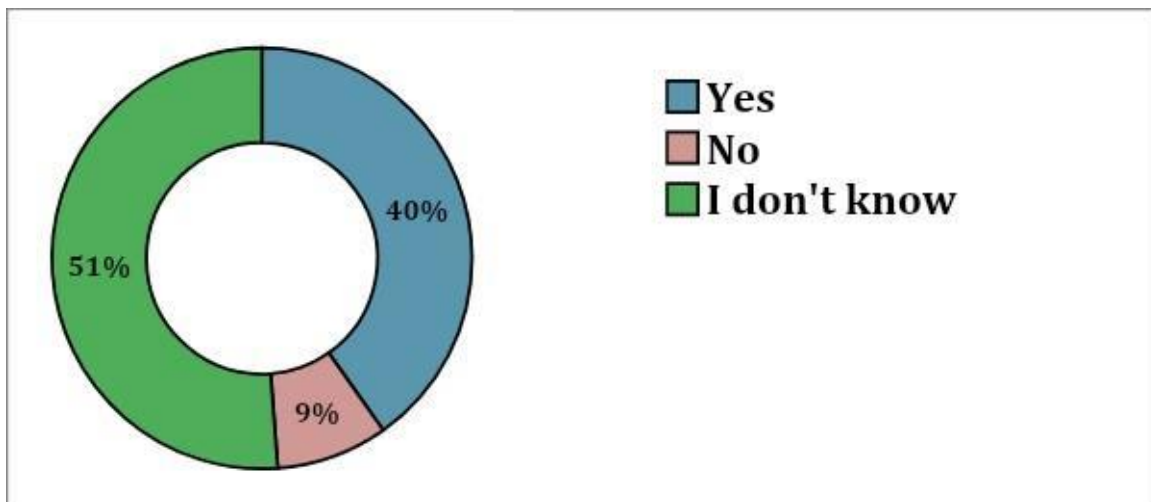
fruits (12.8%) for their diet.

Participants were asked about the causes of gout disease (Figure 3), most of them (78.4%) know that eat a large amount of meat is the main cause, the other causes include autoimmune causes (12.6%), thyroid diseases (8.2%) and heart disease (4.4%) while some participants think that gout disease may be caused by unknown causes (7.6%), sports exercises (5.2%) and lack of sleep (4.4%). 405 (81%) of the participants think that there is a relationship between gout and eating meat while 9 (1.8%) did not. There is a possibility for gout to cause kidney complications, 201 (40.2%) of the participants know that while half of the participants (51.2%) did not know or did not have any opinion (Figure 4).

Amongst the symptoms of gout disease (Figure 5), pain in the joints is the most selected (71.4%) followed by swelling around the joints (53.4%), redness (17.8%), and heat (7.4%). 202 (40.4%) of the participants think that gout is associated with other diseases, which include high



**Figure 3:** The distribution of the respondents according to the causes of Gout Diseases



**Figure 4:** The distribution of the respondents according to their knowledge of the relationship between Gout Disease and Kidney complications.

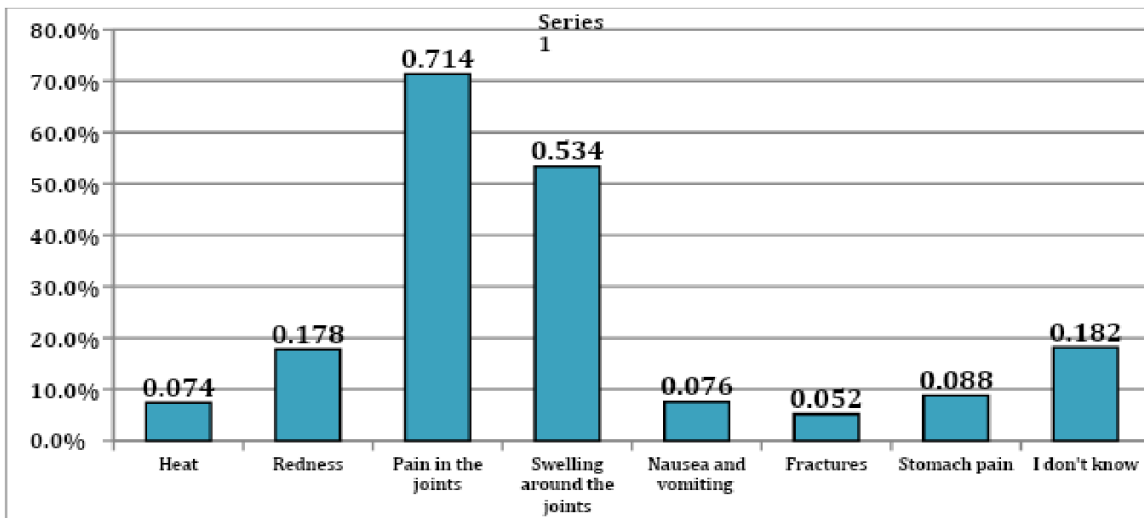
levels of fats and cholesterol in the blood (33%), obesity (20.8%), chronic kidney disease (15.2%), hypertension (14.4%), diabetes mellitus and heart disease (11%), and few of them think that gout disease is associated with anemia (3.6%).

About the prevention of gout disease, 297 (59.4%) know that it is a preventable disease while more than a third of the participants (35.2%) did not know (Figure 6). Participants know that the ways to prevent gout include a healthy food lifestyle (83.2%), being physically active (55.4%), and loss of excess weight (39.4%), while more than half of the participants (56.2%) think that drinking a high amount of fluids such as water is one of the ways to prevent gout. 287 (57.4%) of the participants know that

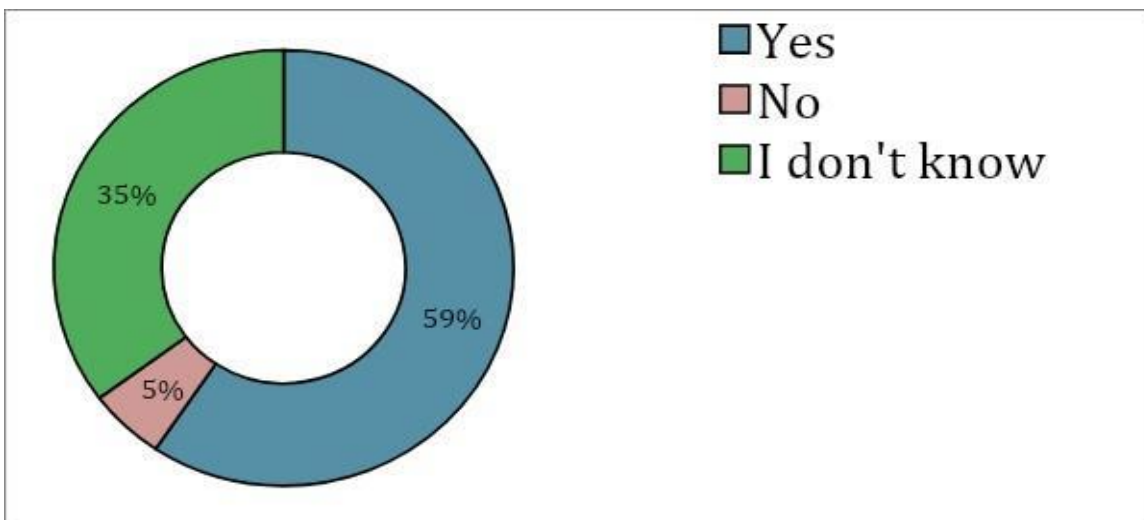
the treatment for gout include stop eating large amounts of meat, change to a healthy lifestyle, and take medications under medical supervision (Figure 7).

The level of awareness of gout disease was classified based on the responses of the participants into either poor or good level of awareness. There was high awareness among the adult population in Saudi Arabia where most of the participants (n=366, 73.2%) were recognized with good levels of awareness while 134 (26.8%) have a poor level of awareness (Figure 8).

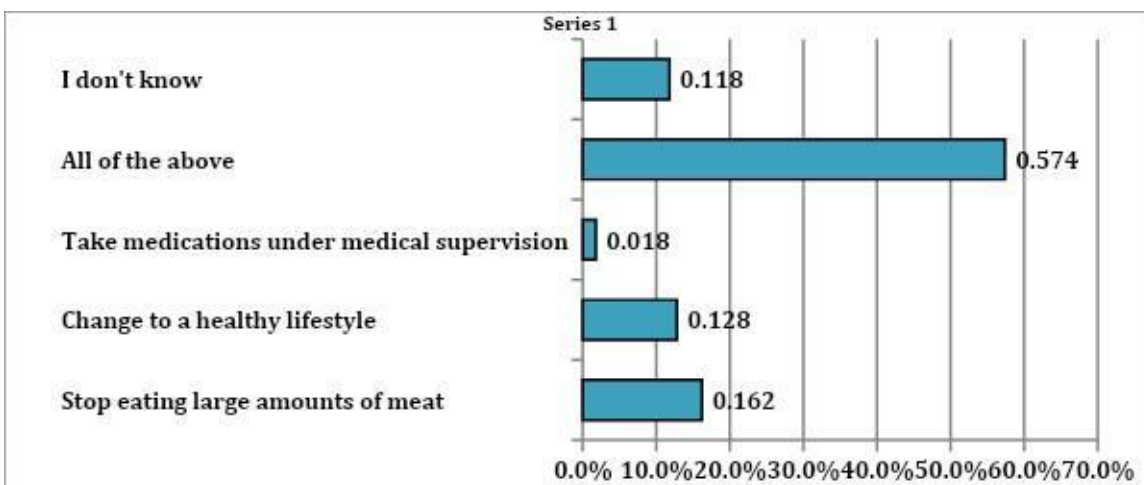
The Chi-square test was used to determine the significance of differences between the level of awareness and the socio-demographic data of the participants (Table 2). No significant difference was observed between gender,



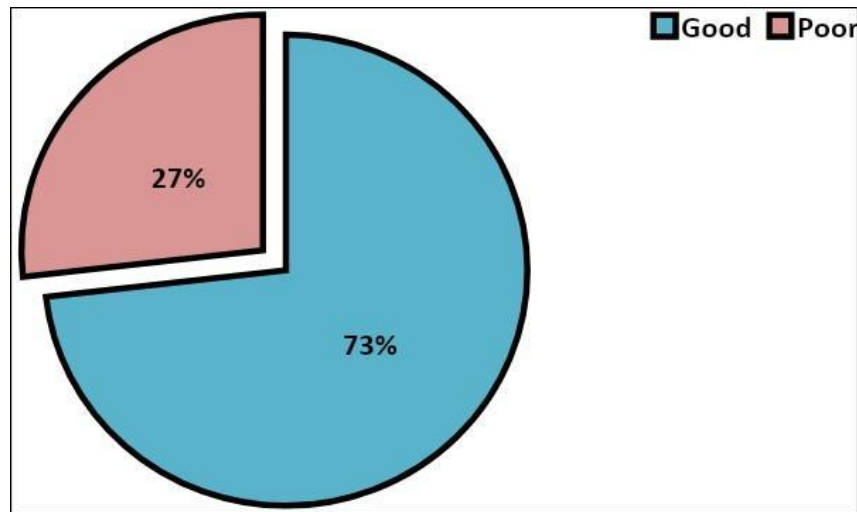
**Figure 5:** The distribution of the respondents' expectations of the symptoms of Gout disease



**Figure 6:** The distribution of the respondents according to their knowledge of the prevention of Gout disease



**Figure 7:** The distribution of the respondents according to their knowledge of the ways of treatment of Gout disease



**Figure 8:** The distribution of the participants according to their level of awareness of Gout disease

**Table 2.** The Relationship between socio-demographic characteristics of participants and their level of awareness

Character	level of awareness				P-value
	Good		Poor		
	count	%	count	%	
<b>Gender</b>					
Male	184	73.6%	66	26.4%	0.840
Female	182	72.8%	68	27.2%	
<b>Age (years)</b>					0.001
18 - 29	140	64.8%	76	35.2%	
30 - 39	66	75%	22	25%	
40 - 49	88	83.8%	17	16.2%	
≥ 50	72	79.1%	19	20.9%	
<b>Nationality</b>					0.386
Saudi	352	72.9%	131	27.1%	
Non-Saudi	14	82.4%	3	17.6%	
<b>Marital Status</b>					0.007
Single	133	66.2%	68	33.8%	
Married	225	78.7%	61	21.3%	
Divorced	6	54.5%	5	45.5%	
Widowed	2	100%	0	0	
<b>Level of Education</b>					0.014
Elementary	2	100%	0	0	
Intermediate	4	44.4%	5	55.6%	
Secondary	69	66.3%	35	33.7%	
University	261	74.1%	91	25.9%	
Others	30	90.9%	3	9.1%	
<b>Occupation</b>					0.000
Student	83	61.9%	51	38.1%	
Employed	180	80.7%	43	19.3%	
Unemployed	53	63.9%	30	36.1%	
Retired	50	83.3%	10	16.7%	

nationality, and level of awareness, as the calculated P values for these parameters were recorded as 0.840 and 0.386 respectively. On the contrary, there were significant differences between the age, marital status, level of education, and occupation concerning the level of

awareness, as the calculated P values for these parameters were recorded as 0.001, 0.007, 0.014, and 0.000 respectively. Our results showed that the level of awareness improves with increasing age and increasing level of education. Also, a higher level of awareness is

**Table 3.** The Association between gout disease, chronic disease, obesity, and level of awareness of gout disease

Character	Level of Awareness				P-value
	Good		Poor		
	count	%	count	%	
<b>Gout disease</b>					
Yes	45	86.5%	7	13.5%	<b>0.022</b>
No	321	71.7%	127	28.3%	
<b>Chronic disease</b>					
None	299	72.4%	114	27.6%	<b>0.824</b>
DM	19	79.2%	5	20.8%	
HTN	24	77.4%	7	22.6%	
DM & HTN	24	75%	8	25%	
<b>Obesity</b>					
Yes	124	75.6%	40	24.4%	<b>0.395</b>
No	242	72%	94	28%	
<b>Chronic disease &amp; Obesity</b>					
Obese with chronic disease	34	77.3%	10	22.7%	<b>0.713</b>
Obese without chronic disease	90	75%	30	25%	
Non-obese with chronic disease	33	76.7%	10	23.3%	
Healthy	209	71.3%	84	28.7%	

associated with widowed and retired participants.

To determine the significance of differences between gout disease, chronic disease, obesity, and level of awareness of gout disease chi-square test was used (Table 3). No significant difference was observed between chronic disease and obesity or both concerning the level of awareness, as the calculated P values were recorded as 0.824, 0.395, and 0.713 respectively. On the contrary, there was a significant difference between having gout disease and level of awareness (0.022). Our results showed that a higher level of awareness is associated with participants who had previously been diagnosed with gout disease.

## DISCUSSION

The present study involved a random selection of 500 adult participants in Riyadh, Saudi Arabia to assess their level of awareness of gout disease and their level of awareness, to analyze if there is a significant relationship between sociodemographic data of the participants, and to assess the association between gout disease, chronic disease, and obesity.

In this study, the participant's 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, their main source of information is colleague/friend which represented 39.6%, followed by online resources 38%, doctor/health care provider 21.8%, television 10.4%, newspapers/magazines 8.4%, radio 2.4%, and others sources 31.2%. According to the findings of our investigation, 38% of online resources represent the most frequently used source of information about gout disease. These various sources helped the participants to obtain further information about the disease and help in its awareness. Our results agree with the previous findings

of a study conducted in Taif city, Saudi Arabia by Atalla et al. (2020) who found that most of the participants were aware of the disease, representing 69.3% individuals who heard about gout disease and 27.7% who did not hear about it. Also, there were 3% respondents who did not know about gout disease. The most common source of individuals' information about gout disease was the internet which represented 31.84%, followed by friend or colleague 27.56%, then by doctors /health care providers 8.76%, and individuals who did not use any sources to get information about it were only 9%.

Our study revealed that the awareness gap was in associated diseases of gout and kidney complications. Results showed that most of the participants represent 51% respondents with no awareness about the close association between gout disease and kidney complications. In study of Deprouw et al. (2019) to explore partners' and nurses' knowledge and representations of gout, found knowledge gaps which include gout causes, unawareness of urate-lowering therapy and the possibility to cure gout disease. However, only a few studies investigate the awareness of gout disease and its association with kidney complications. According to the possibility for gout to cause kidney complications, 40.2% of our participants know that while 51.2% of the participants did not know or did not have any opinion. These findings are positively associated with a previous finding that 41.86% respondents from Atalla et al. (2020) study, who believed that gout disease could cause renal complications, 26.91% said that gout disease did not cause renal complications, and 31.23% did not know about the relationship between gout disease and renal complications.

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%. These findings are at least partly in line with a previous finding that 40% of respondents from Atalla et al. (2020) 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.

According to meat consumption and poor dietary habits, this has been implicated in the pathogenesis of hyperuricemia. Conversely, increase intake of low-fat dairy products, whole grains, coffee, nuts, vegetables and legumes has been shown to decrease the risk of hyperuricemia and therefore are frequently recommended in the management of hyperuricemia and gout. Results 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. (2020) who stated that almost 69.3% of participants declared association of the disease with meat consumption.

Concerning the best gout disease treatment, 57.4% of the participants know that the treatment for gout includes stopping eating large amounts of meat, changing to a healthy lifestyle, and taking medications under medical supervision. This was according to the results of a study by Atalla et al. (2020) which included 36.96% of participants who stated that changing lifestyle, medications, and stopping meat intake would treat gout disease. Approximately, 34.98% believed that medications would be the best treatment for gout disease. However, 13.53% respondents declared that stopping meat consumption would be the best treatment for gout disease.

About the prevention of gout disease, 59.4% of the participants know that it is a preventable disease while more than a third of the participants representing 35.2% did not know. Similarly, in the study of Atalla et al. (2020), only 19.87% of individuals stated that gout disease was not a preventable disease and most of the individuals 58.61% reported that it was preventable. Meanwhile, obesity and ageing population are rising. Changes in lifestyle, dietary habits and population are attributed to this phenomenon.

The findings clearly demonstrate the participants level of awareness about the gout disease. One of the interesting findings in our investigation was that increasing age positively correlated with the higher level of awareness. Also, higher levels of awareness are associated with widowed and retired participants, this adds new knowledge to this area of research. A study with the cross-sectional design carried out in Southern Nigeria reported that Marital status showed significant association with hyperuricemia, this reflects the decrease in the awareness about gout disease in this group. There are several plausible explanations for this association, changes in marital status have been found to influence dietary habits

and lifestyle choices either positively or negatively including composition and quality of diets as well as physical activity status.

## CONCLUSION

Gout is the most common prevalent form of inflammatory arthritis. Also it is associated with impaired quality of life. This disease has been linked to many causes and risk factors including obesity, renal disease, hypertension, and even certain diets. This study aimed to assess the awareness regarding gout disease among the male and female adult population in Riyadh city, Saudi Arabia, in 2020. Besides, to bring attention to this important topic and reduce the complication as possible by raising awareness. The level of awareness of gout disease was sufficient among Saudi adult people in Riyadh city, Saudi Arabia. Most of the participants seemed to have an idea about symptoms and the causes of gout disease. There was a significant relationship between age, marital status, level of education occupation, and having gout disease concerning the level of awareness. Participants who had been diagnosed with gout disease often depend on carbohydrates and legumes, chickens, and vegetables and fruits for their diet.

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