

Original Article

AWARENESS AND ATTITUDE OF EGYPTIAN POPULATION TOWARDS GOUT

Osama Daifallah^{1(*)}, Abdelhfeez Moshrif², Hamid Khalifa³, Rabab Ali¹

¹Rheumatology dept., Faculty of Medicine, Sohag Univ., Egypt.

²Rheumatology dept., ³Community Medicine dept., Faculty of Medicine, Al Azhar Univ., Cairo, Egypt

*E-mail: abou_sehly@hotmail.com

Received 13/10/2021

Accepted 30/12/2021

Abstract

Although gout is a common rheumatic disease with worldwide prevalence of about 1.3%, mal-awareness might impact the disease control and especially the patient's compliance with urate lowering therapies. The aim of this research is to study the level of awareness, attitude, and misconceptions among the Egyptian population towards gout and compare between levels of awareness and different demographic factors. In this cross-sectional study, 1200 participants (18-60 years) were randomly enrolled (53.8% were females). A prepared validated questionnaire was used for data collection about the knowledge, attitude, and misconceptions towards gout and its risk factors and possible complications. The relation between socio-demographic factors of participants and their level of awareness was calculated using chi-square test. After demographic data collection, the entry question of the survey was; do you know a disease called gout? Only the responders with "yes" were the target of the evaluation by completing the questionnaire. In this study, data was collected from 1200 adult participants, the socio-demographic characteristics show that 706 (58.8%) were females while 494 (41.2%) were males. participants who had previous information about gout were 632 (52.7%) while 568 (47.3%) don't know gout. There was a high statistically significant difference between participants who know and those who don't know gout as regard to education, occupation, marital status and residence (p value = 0.000, 0.000, 0.037 and 0.000 respectively). Regarding to complications of gout, 230 (36.9%) of the participants know that gout can lead to kidney disease while only 30 (4.8%) think it does not with high statistically significant difference between participants regarding gender (p value= 0.001). The level of awareness about gout was insufficient among the general population in Egypt. There was a significant relation between gender, age, marital status and the level of awareness. Considering plantar fasciitis as a frequent clinical presentation of gout is a common misconception among Egyptians. Awareness campaigns on gout should be organized and encouraged by the health authorities.

Keyword: Gout, Awareness, Attitude, Joint pain Egyptian population.

1. Introduction

Gout is a crystal deposition disease caused by monosodium urate crystals deposition in joints and other tissues leading to several clinical presentations [1]. It is one of the most common rheumatic diseases of adulthood, with a self-reported prevalence recently estimated at 3.9 percent of adults (8.3 million people) in the USA [2]. Over the past few decades, the prevalence of

gout has increased, induced by variables such as an increased prevalence of comorbidities promoting hyperuricemia, including hypertension, obesity, metabolic syndrome, type 2 diabetes mellitus and Chronic Kidney Disease (CKD). Some dietary patterns and widespread prescriptions of thiazide and loop diuretics for cardiovascular diseases are other variables responsible for the

growing prevalence of gout [2,3]. Persistently elevated blood levels of uric acid (hyperuricemia) greater than 6.8 mg / dl serum saturation, is the direct leading cause of urate deposition on the articular cartilage. However, only a handful of people with elevated levels of serum uric acid (SUA) ever develop gout, stressing the importance of other factors in deciding crystal formation [4]. Clinical symptoms are characterized by a sudden onset of extremely hard-to-bear pain. Redness, swelling and warming of the affected joint are some signs and symptoms. Much of the time, the first metatarsophalangeal joint of the big toe is involved in acute attacks. The attacks are most frequently self-limiting, lasting 3-14 days [5]. The attacks get less painful over time, but last longer and appear to include more than one joint and tendon. Chronic crystal deposition affects the joints and leads to the production of tophi (urate crystal deposits in tissues), with chronic joint stiffness and swelling [6]. Gouty arthritis can resemble rheumatoid arthritis with the chronic inflammation and swelling of the joints and lead to severe inflammation, deformities, tophi, kidney stone development, and renal insufficiency [7]. The American College of Rheumatology (ACR) and the European League Against Rheumatism (EULAR) advocate the use of education and nutrition alongside pharmacological treatments [8,9]. A combination of pharmacological therapies, diet change and likely the use of dietary supplements may therefore lead to optimal gout management [10,11]. In the field of gout management, several treatment and information differences remain. Low treatment rates with urate-lowering therapy (ULT) and low adherence to ULT drugs and failure to track and maintain a target serum urate < 6 mg / dl are main treatment disparities that are mainly caused by patients mal-awareness about the disease [12]. Both health-care providers and people with gout agree that patient education is vital to improving the quality of gout

care [13]. There are many barriers to care of gout [14], but an important reason for low uptake and poor adherence and persistence with ULT appears to be significant gaps in knowledge about gout and its treatment in people with this condition, both in the general public and in health-care professionals [15-17]. We aimed to Study the level of awareness of the Egyptian population about gout and compare between levels of awareness and different demographic factors.

2. Patients and methods

2.1. Study area

This study was conducted in Egypt during the period from 1 January 2019 to 1 January 2020.

2.2. Study population

The study population was all adult population who lives in Egypt, and agreed to fill the Questionnaire.

2.3. Study design and sample size

Total enumeration method was used for including all the adult male and female agreed to answer the questionnaire in this study. Sample size taken in this study is according to this formula with significance adopted at $p > 0.05$ ($n = NZ^2P(1 - P) / (D^2 + Z^2P(1 - P))$). Through a cross-sectional study, 1200 participants (18-62 years) of those attending the outpatient clinics of our university hospitals between January to April 2020 were interviewed and provided with detailed information about the study. An informed consent was obtained from each participant. The work conforms to the Helsinki declarations ethical standards and was approved by the local ethical committees of Al-Azhar and Sohag Universities.

2.4. Data collection tools and instruments

The participants responded to a prepared questionnaire about the knowledge and attitude towards gout and its potential complications. The questionnaire was constructed by the second author and then revised, refined and adapted by the rest of the authors. To validate the survey, a

pilot analysis was done and the second and third authors then revised the Arabic translation of the version provided, its design, content and easiness to fill in. The questionnaire included questions about socio-demographic factors (Age, gender, marital status, occupation, and level of education) and awareness of gout among adult population in Egypt. The entry question was "Do you know a disease called gout? Those who know the disease were asked to complete the study and respond to the close-ended questions about some clinical presentations and complications of gout. Answered by yes, no, I don't know. A common misconception of gout among Egyptians noted in the daily practice is the strong relation between gout and heel pain "plantar fasciopathy". This point was also involved in the applied questionnaire. Patients were contacted face-to-face and their answers were recorded patient by patient and then transferred into an excel sheet.

2.5. Data analysis

Data were coded and analyzed using the Statistical Package for Social Science (SPSS) version 21. The level of awareness of adult population in Egypt toward Gout 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. The relation between socio-demographic factors of participants and their level of awareness was calculated using Pearson chi-square test. A statistical significance was determined at $p = 0.05$.

3. Results

Our, data was collected from 1200 adult participants, the socio-demographic characteristics show that 706 (58.8%) were females while 494 (41.2%) were males. Regarding to marital status 206 (17.2%) of the participants were single, 928 (77.3%) were married, 48 (4%) were widowed while 18 (1.5%) were divorced. The participants level of education ranged from 468 (39%) Illiterate, 580 (48.3%) before high educa-

tion and 152 (12.7%) high education. The geographical distribution of the participants was as follows: 910 (75.8%) from rural and 290 (24.2%) from urban. In addition, 454 (37.8%) of the participants have an occupation while 746 (62.2%) have not. In order to assess the general population awareness about gout while focusing on the first aim of our study, data analysis summarized in tab. (1) revealed that participants who had previous information about gout were 632 (52.7%) while 568 (47.3%) don't know gout. There was a high statistically significant difference between participants who know and don't know gout as regard to education, occupation, marital status and residence (p value < 0.001 , <0.001 , 0.037 and <0.001 respectively). Regarding the clinical presentation of gout, 422 participants (69.6%) know that gout leads to joint pain and swelling while few of the participants (3.2%) think it does not with no statistically significant difference between participants as regard to education, occupation, marital status and residence tab. (2). To examine the in-depth knowledge about the common clinical presentation of acute gout, the participants were asked about the gout as a cause of inflammation of the metatarsophalangeal joint of the big toe. 254 participants don't have knowledge about this topic while 350 (56.1%) know that gout can lead to pain and swelling of the big toe and only 20 (3.2%) of the participants think it does not with high statistically significant difference between participants as regard gender (p value= 0.001) tab. (3). The majority of the participants (532; 85.3%) believes that gout commonly leads to heel pain while only 8 (1.3%) of the participants think it does not with no statistically significant difference between participants as regard to education, occupation, marital status and residence tab. (4). Regarding to complications of gout, 230 (36.9%) of the participants know that gout can lead to kidney disease while only 30 (4.8%) think it does not with high statistically significant difference between participants regarding gender (p value= 0.001) as shown in tab. (5).

Table (1) Distribution of the studied population demographic features according to their knowledge about gout. Do you know a disease called gout?

The study Population	Who know Gout (632)		Who don't know gout 568)		Total (1200)	
	No.	%	No.	%	No.	%
Education level:						
▪ Illiterate	146	31.2	322	68.8	468	39.0
▪ before high education	352	60.7	228	39.3	580	48.3
▪ High	134	88.2	18	11.8	152	12.7
Pearson Chi-square: 97.308			P: 0.000 **			
Occupation:						
▪ No work	362	48.5	384	51.5	746	62.2
▪ Crafted	64	57.1	48	42.9	112	9.3
▪ Daily worker	64	41.6	90	58.4	154	12.8
▪ Employee	58	72.5	22	27.5	80	6.7
▪ Private job	84	77.8	24	22.2	108	9.0
Pearson Chi-square: 26.798			P: 0.000 **			
Gender:						
▪ Male	176	55.9	218	44.1	494	41.2
▪ Female	356	50.4	350	49.6	706	58.8
Pearson Chi-square: 1.729			P: 0.189			
Marital status:						
▪ Single	130	63.1	76	36.9	206	17.2
▪ Married	476	51.3	452	8.7	928	77.3
▪ Divorced	10	55.6	8	44.4	18	1.5
▪ Widowed	16	33.3	32	66.7	48	4.0
Pearson Chi-square: 8.483			P: 0.037 *			
Residence:						
▪ Rural	432	47.5	478	52.5	910	75.8
▪ Urban	200	69.0	90	31.0	290	24.2
Pearson Chi-square: 20.376			P: 0.000 **			
Total	632	52.7	568	47.3	1200	100.0

P value > 0.05; Non-significant; ** *p value* < 0.001; Highly significant; * *p value* < 0.05; Significant

Table (2) Distribution of the studied population by demographic features according to their knowledge about joint pain and swelling caused by gout. Can gout lead to joint pain and swelling?

The study Population	Yes (422)		No (20)		I don't know (182)		Total (624)	
	No.	%	No.	%	No.	%	No.	%
Education level:								
▪ Illiterate	88	61.1	8	5.6	48	33.3	144	23.1
▪ before high education	244	69.7	10	2.9	96	27.4	350	56.1
▪ High	90	69.2	2	1.5	38	29.2	130	20.8
Pearson Chi-square: 4.544			P: 0.805					
Occupation:								
▪ No work	234	66.9	8	2.3	108	30.9	350	56.1
▪ Crafted	50	75.8	0	0.0	16	24.2	66	10.6
▪ Daily worker	44	68.8	6	9.4	14	21.9	64	10.3
▪ Employee	44	75.9	2	3.4	12	20.7	58	9.3
▪ Private job	50	58.1	4	4.7	32	37.2	86	13.7
Pearson Chi-square: 9.510			P: 0.301					
Gender:								
▪ Male	192	69.1	12	4.3	74	26.6	278	44.6
▪ Female	230	66.5	8	2.3	108	31.2	346	55.4
Pearson Chi-square: 1.601			P: 0.449					
Marital status:								
▪ Single	94	72.3	0	0.0	36	27.7	130	20.8
▪ Married	308	65.8	18	3.8	142	30.3	468	75.0
▪ Divorced	4	40.0	2	20.0	4	40.0	10	1.6
▪ Widowed	16	100.0	0	0.0	0	0.0	16	2.6
Pearson Chi-square: 11.862			P: 0.065					
Residence:								
▪ Rural	292	67.9	16	3.7	122	28.4	430	68.9
▪ Urban	130	67.0	4	2.1	60	30.9	194	31.1
Pearson Chi-square: 0.732			P: 0.694					
Total	422	69.6	20	3.2	182	29.2	624	100.0

Table (3) Distribution of the studied population by demographic features according to their knowledge about pain in the pig toe joints caused by gout. Can gout lead to pain and swelling of big toe?

The study Population	Yes (350)		No (20)		I don't know (254)		Total (624)	
	No.	%	No.	%	No.	%	No.	%
Education level:								
▪ Illiterate	74	51.4	4	2.8	66	45.8	144	23.1
▪ before high education	198	56.6	10	2.9	142	40.6	350	56.1
▪ High	78	60.0	6	4.6	46	35.4	130	20.8
Pearson Chi-square: 3.184			P: 0.922					
Occupation:								
▪ No work	186	53.1	4	1.1	160	45.7	350	56.1
▪ Crafted	38	57.6	4	6.1	24	36.4	66	10.6
▪ Daily worker	38	59.4	2	3.1	24	37.5	64	10.3
▪ Employee	36	62.1	4	6.9	18	31.0	58	9.3
▪ Private job	52	60.5	6	7.0	28	32.6	86	13.8
Pearson Chi-square: 9.661			P: 0.290					
Gender:								
▪ Male	176	63.3	16	5.8	86	30.9	278	44.6
▪ Female	174	50.3	4	1.2	168	48.6	346	55.4
Pearson Chi-square: 13.295			P: 0.001 **					
Marital status:								
▪ Single	76	58.5	6	4.6	48	36.9	130	20.8
▪ Married	258	55.1	14	3.0	196	41.9	468	75.0
▪ Divorced	6	60.0	0	0.0	4	40.0	10	1.6
▪ Widowed	10	62.5	0	0.0	6	37.5	16	2.6
Pearson Chi-square: 1.358			P: 0.968					
Residence:								
▪ Rural	250	58.1	14	3.3	166	38.6	430	68.9
▪ Urban	100	51.5	6	3.1	88	45.4	194	31.1
Pearson Chi-square: 1.273			P: 0.529					
Total	350	56.1	20	3.2	254	40.7	624	100.0

P value > 0.05; Non-significant; ** Highly significant

Table (4) Distribution of the studied population by demographic features according to their knowledge about pain in the heel caused by gout. Can gout lead to heel pain?

The study Population	Yes (532)		No (8)		I don't know (84)		Total (624)		
	No.	%	No.	%	No.	%	No.	%	
Education level:									
▪ Illiterate	120	83.3	0	0.0	24	16.7	144	23.1	
▪ before high education	296	84.6	8	2.3	46	13.1	350	56.1	
▪ High	116	89.2	0	0.0	14	10.8	130	20.8	
Pearson Chi-square: 7.096				P: 0.526					
Occupation:									
▪ No work	296	84.6	4	1.1	50	14.3	350	56.1	
▪ Crafted	52	78.8	2	3.0	12	18.2	66	10.6	
▪ Daily worker	56	87.5	2	3.1	6	9.4	64	10.3	
▪ Employee	54	93.1	0	0.0	4	6.9	58	9.3	
▪ Private job	74	86.0	0	0.0	12	14.0	86	13.8	
Pearson Chi-square: 4.955				P: 0.833					
Gender:									
Male	240	86.3	4	1.4	34	12.2	278	44.6	
Female	292	84.4	4	1.2	50	14.5	346	55.4	
Pearson Chi-square: 0.364				P: 0.833					
Marital status:									
▪ Single	104	80.0	2	1.5	24	18.5	130	20.8	
▪ Married	404	86.3	6	1.3	58	12.4	468	75.0	
▪ Divorced	10	100.0	0	0.0	0	0.0	10	1.6	
▪ Widowed	14	87.5	0	0.0	2	12.5	16	2.6	
Pearson Chi-square: 2.658				P: 0.850					
Residence:									
▪ Rural	364	84.7	8	1.9	58	13.5	430	68.9	
▪ Urban	168	86.6	0	0.0	26	13.4	194	31.1	
Pearson Chi-square: 1.835				P: 0.400					
Total	532	85.3	8	1.3	84	13.5	624	100.0	

P value > 0.05; Non-significant

Table (5) Distribution of the studied population by demographic features according to their knowledge about kidney affection caused by gout. Can gout lead to kidney disease?

The study Population	Yes (230)		No (30)		I don't know (364)		Total (624)		
	No.	%	No.	%	No.	%	No.	%	
Education level:									
▪ Illiterate	36	25.0	10	6.9	98	68.1	144	23.1	
▪ before high education	140	40.0	12	3.4	198	56.6	350	56.1	
▪ High	54	41.5	8	6.2	68	52.3	130	20.8	
Pearson Chi-square: 8.871				P: 0.353					
Occupation:									
▪ No work	120	34.3	10	2.9	220	62.9	350	56.1	
▪ Crafted	28	42.4	4	6.1	34	51.5	66	10.6	
▪ Daily worker	18	28.1	2	6.1	44	68.8	64	10.3	
▪ Employee	26	44.8	4	6.9	28	48.3	58	9.3	
▪ Private job	38	44.2	10	11.6	38	44.2	86	13.8	
Pearson Chi-square: 11.935				P: 0.154					
Gender:									
Male	110	39.6	26	9.4	142	51.1	278	44.6	
Female	120	34.7	4	1.2	222	64.2	346	55.4	
Pearson Chi-square: 13.531				P: 0.001 **					
Marital status:									
▪ Single	56	43.1	6	4.6	68	52.3	130	20.8	
▪ Married	168	35.9	24	5.1	276	59.0	468	75.0	
▪ Divorced	0	0.0	0	0.0	10	100.0	10	1.6	
▪ Widowed	6	37.5	0	0.0	10	62.5	16	2.6	
Pearson Chi-square: 5.197				P: 0.519					
Residence:									
▪ Rural	160	37.2	20	4.7	250	58.1	430	68.9	
▪ Urban	70	36.1	10	5.2	114	58.8	194	31.1	
Pearson Chi-square: 0.063				P: 0.969					
Total	230	36.9	30	4.8	364	58.3	624	100.0	

*P value > 0.05; Non-significant, ** Highly significant*

4. Discussion

Through more than two centuries of discoveries and study, explanations of the epidemiology, clinical characteristics, and natural history of gout have grown. The latter half of the 20th century provided evidence that urate crystal deposition involves the pathogenesis of gout. The introduction of polarized light microscopy into clinical practice was essential in this growth, providing urate crystal identification in synovial fluid as a mean of easy and conclusive diagnosis and resolving the previously unclear relationship between hyperuricemia and gout [18]. Gout is associated with se-

vere pain, impairment and a detrimental effect on quality of life [19]. With advancing age, the incidence of gout rises and is associated with diuretic use, low dose aspirin, elevated blood pressure, cardiovascular disease, chronic renal failure and metabolic syndrome [20]. Proper management of gout is strongly affected by the patients education and awareness about the disease [13]. A previous study on the adherence to medications among patients with seven diseases involving gout, osteoporosis, hypertension, and diabetes mellitus, found that adherence was lowest in gouty

patients [21]. A recent systematic review about the key barriers of gout care considered that knowledge and awareness among the patients resemble the first barrier [22]. To our knowledge, this is the first study to evaluate the level of awareness and the effect of the different demographic factors among Egyptians. The specialty of rheumatology is somewhat recent in our area compared to the situation in the developed countries. However, it's a rapidly progressing field with many advances in Egypt [23]. Nevertheless, most of patients with musculoskeletal health problems seek medical consultations with the orthopedists. Several studies have been performed to evaluate the community awareness about rheumatic and musculoskeletal diseases and the effect of education on the disease outcome [24-27]. We hypothesized that a significant mal-awareness will be discovered in our community due to the relative deficient number of rheumatologists and the absence of the referral system and family doctors in our health organizations. This study involved random selection of 1200 adult Egyptian citizens to assess their awareness about gout, and to analyze if there is a significant relation between demographic data of the participants and their level of awareness. In this study the participants who had previous information about gout were only (52.7%) which reflects the marked mal-awareness and lack of knowledge among the population. A study on Qatari residents showed that 58% of the study subjects agree that gout occurs when urate crystals accumulate in the joint, 27% agree that elders are more likely to have gout than children, 23% agree that gout disease can be hereditary, 23% agree that men are more likely to develop gout at younger age than women, 32% disagree that people with low uric acid level are more susceptible to gout [28]. The acute episode of gout, which is usually monoarticular, presenting as severe and painful inflammatory arthritis, mostly of the first metatarsophalangeal joint (podagra). Other joints

involved include ankles, knees, wrists, and fingers in chronic conditions [29]. In our study, 422 (69.6%) of participants know that gout lead to joint pain and swelling while few of the participants think it doesn't (3.2%) with no statistically significant difference between participants as regard to education, occupation, marital status and residence. While in Alshammari et al., (28%) agree that the signs and symptoms of gout almost always suddenly and acutely, 36% agree that gout cause acute pain in joints, 33% agree that gout cause redness and swelling of the joint, 29% agree that a gout attack can last for 5 to 10 days [30]. Also, 532 (85.3%) of participants in the present study know that gout leads to heel pain while 8 (1.3%) of the participants think it does not, with no statistically significant difference between participants as regard to education, occupation, marital status and residence. In patients with gout who overproduce uric acid and thus have hyperuricosuria, a low urine pH is seen; the combination of acidic urine and a high concentration of uric acid contributes to an increased risk of uric acid nephrolithiasis found in this population. The most common type of stone developed by people with gout, however, are calcium oxalate stones, as they are in people without gout [30]. The study in our hand revealed that 230 (36.9%) of participants know that gout can lead to kidney disease while 30 (4.8%) think it can't with a high statistically significant difference between participants as regard gender. Our study is similar to that performed in the United Kingdom identifying patient beliefs and knowledge deficits about gout [31]. In a previous study when, people suffering from gout receive complete individualized education about gout, tailored to their own information needs and understanding, 100% want to receive ULT, and persistence is excellent (92%) at 1 year and remains high (91%) at 5 years, with 85% reporting taking ULT on at least 6 days/week 5 years after receiving such education. These

findings suggest that optimal individualized education significantly improves gout care in the long term [32,33]. However, within the sense of certain limitations, the findings presented here should be interpreted. The analysis is constrained by the fact that a small managed care scheme was based on this. However, with very few patients cared for by a rheumatologist, we think the study represents a typical clinical practice. The racial diversity in our population has been reduced. In addition, it would be better to assess the knowledge among patients with gout and health care providers which may be the subject of a future study. Of note, we have not assessed the understanding of triggers, risk factors and gout care.

5. Conclusion

The overall level of awareness about gout was insufficient among the general population in Egypt. There was a significant relation between gender, age, marital status and the level of awareness. The misconception that gout is a common cause of plantar fasciopathy should be discussed with all patients and musculoskeletal health care providers.

References

- [1] Richette, P. & Bardin, T. (2010). Gout. *Lancet*. 375 (9711): 318-328.
- [2] Kuo, C-F, Grainge, M. W Zhang, et al. (2015). Global epidemiology of gout: Prevalence, incidence and risk factors. *Nat Rev Rheumatol*. 11: 649-662
- [3] Doherty M. (2009). New insights into the epidemiology of gout. *Rheumatology*. 48 (Suppl 2): ii2-ii 8.
- [4] Conway, N., Schwartz, S. (2009). Diagnosis and management of acute gout. *Rhode Island Medical J*. 92 (11): 356-358.
- [5] Mandell, B. (2008). Clinical manifestations of hyperuricemia and gout. *Cleveland Clinic J. of Medicine*. 75: S5-S8.
- [6] Martinon, F. (2010). Update on biology: Uric acid and the activation of immune and inflammatory cells. *Current Rheumatology Reports*. 12 (2): 135-141.
- [7] Keith, M., Gilliland, W. (2007). Updates in the management of gout. *The American J. of Medicine*. 120 (3): 221-224.
- [8] Zhang, W., Doherty, M., Bardin, T., et al. (2006). EULAR evidence based recommendations for gout. Part II: Management. Report of a task force of the EULAR standing committee for international clinical studies including therapeutics (ESCISIT). *Ann Rheum Dis*. 65 (10): 1312-1324.
- [9] Khanna, D., Fitzgerald, J., Khanna, P., et al. (2012). American college of rheumatology guidelines for management of gout. Part 1: Systematic nonpharmacologic and pharmacologic therapeutic approaches to hyperuricemia. *Arthritis Care Res*. 64 (10): 1431-1446.
- [10] Choi, H. (2010). A prescription for lifestyle change in patients with hyperuricemia and gout. *Curr Opin Rheumatol*. 22 (2): 165-172.
- [11] Zhang, Y., Neogi, T., Chen, C., et al. (2012). Cherry consumption and decreased risk of recurrent gout attacks. *Arthritis Rheum*. 64 (12): 4004-4011.
- [12] Briesacher, B., Andrade, S., Fouayzi, H., et al. (2008). Comparison of drug adherence rates among patients with seven different medical conditions. *Pharmacotherapy*. 28 (4): 437-443.
- [13] Harrold, L., Mazor, K., Velten, S., et al. (2010). Patients and providers view gout differently: A qualitative study. *Chronic Illness*. 6: 263-271.
- [14] Doherty, M., Jansen, T., Nuki, G., et al. (2012). Gout: Why is this curable disease so seldom cured? *Ann Rheum Dis*. 71: 1765-1770.
- [15] Weaver, A., Cheh, M., Kennison, R. (2008). How PCP education can impact gout management: The gout essentials. *J. Clin Rheumatol*. 14 (5 Suppl): S42-S46.
- [16] Spencer, K., Carr, A., Doherty, M. (2012). Patient and provider barriers

- to effective management of gout in general practice: A qualitative study. *Ann Rheum Dis.* 71: 1490-1495.
- [17] Vaccher, S., Kannagara, D., Baysari, M. (2016). et al. Barriers to care in gout: From prescriber to patient. *J. Rheumatol.* 43: 144-149.
- [18] Mikuls, T., Farrar, J., Bilker, W., et al. (2005). Gout epidemiology: Results from the UK General Practice Research Database. *Ann Rheum Dis.*; 64: 267-272.
- [19] Strand, V., Khanna, D., Singh, J., et al. (2012). Improved health-related quality of life and physical function in patients with refractory chronic gout following treatment with pegloticase: Evidence from phase III randomized controlled trials. *J. of Rheumatol.* 39 (7): 1450-1457.
- [20] Wallace, K., Riedel, A., Joseph-Ridge, N., et al. (2004). Increasing prevalence of gout and hyperuricemia over 10 years among older adults in a managed care population. *J. of Rheumatol.* 31 (8): 1582-1587.
- [21] Briesacher, B., Andrade, S., Fouayzi, H., et al. (2008). Comparison of drug adherence rates among patients with seven different medical conditions. *Pharmacotherapy*, 28 (4): 437-443.
- [22] Rai, S., Choi, H., Choi, S. et al. (2018). Key barriers to gout care: A systematic review and thematic synthesis of qualitative studies *Rheumatology (Oxford)* 57 (7): 1282-1292.
- [23] Gheita, T., Eesa, N. (2019). Rheumatology in Egypt: Back to the future. *Rheumatol Int.* 39 (1): 1-12.
- [24] Sayed, A., Se'eda, H., Elteawy, N., et al. (2021). Awareness of rheumatic heart disease in Egypt: A national multicenter study. *J. Cardiovasc Dev Dis.* 8 (9): 108.
- [25] Gamal, S., Eleishi, H., Moghazy, A., et al. (2021). Effect of education on disease activity and functional status in rheumatoid arthritis patients. *Egypt Rheumatol.* 43 (1): 7-11.
- [26] Bin Haikel, K., Al Tulaihi, B. (2019). Awareness of systemic lupus erythematosus among primary health care patients in Riyadh, Saudi Arabia. *Saudi Med J.* 40 (2): 177-182.
- [27] Moshrif, A., Aly, H., Khalifa, H. (2021). Knowledge, attitude, and misconceptions towards osteoporosis among patients with musculoskeletal health problems. *Int. J. Clin. Rheumatol.* 16 (2): 045-051
- [28] Alshammari, I. & Mujtaba, M. (2017). Public knowledge and awareness about gout: A cross-sectional study in Qatar. *JPRI.* 17 (4): 1-11.
- [29] Hanan, A. (2014). Gout. *The Egyptian J. of Internal Medicine.* 26 (2):35-39.
- [30] Pak, C., Poindexter, J., Adams-Huet, B., et al. (2003). Predictive value of kidney stone composition in the detection of metabolic abnormalities. *Am J. Med.* 115 (1): 26-32.
- [31] Pal, B., Foxall, M., Dysart, T. (2000). How is gout managed in primary care? A review of current practice and proposed guidelines. *Clin Rheumatol.* 19 (1): 21-25.
- [32] Rees, F., Jenkins, W., Doherty, M. (2013). Patients with gout adhere to curative treatment if informed appropriately: Proof-of concept observational study. *Ann Rheum Dis.* 72: 826-830.
- [33] Abhishek, A, Jenkins, W., La-Crette, J., et al. (2017). Long-term persistence and adherence on urate-lowering treatment can be maintained in primary care 5-year follow-up of a proof-of-concept study. *Rheumatology.* 56: 529-533.