

Predictors of Acute Attacks and Satisfaction Among Patients with Gout in Saudi Arabia: A Cross-Sectional Study

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ABSTRACT

Background: Gout is a chronic noncommunicable disease that might lead to multiple systemic complications if it is left untreated. The aim of this study was to identify predictors of acute gout attacks and patients' satisfaction.

Methods: This was a descriptive cross-sectional study that was conducted on gout patients referred to university clinics and local health facilities in central Riyadh, Saudi Arabia for the duration between April and August 2022. Binary logistic regression analysis was used to identify risk factors of acute gout attack and predictors of patients' satisfaction. The dummy variable used to identify predictors of patients' satisfaction was the mean satisfaction score of the study sample.

Results: A total of 212 patients participated in this study. The median duration of disease was 2.00 years (IQR: 1.00-4.00). Around one-third (36.6%) of the patients reported that they are currently suffering from acute gout attack. The median number of attacks of gout annually before starting treatment was 3.00 (2.00-5.00). The median number of attacks of gout annually after starting treatment decreased and reached 1.00 (IQR: 0.25-3.00). The mean satisfaction score was 19.7 (3.8) out of 25, which is equal to 78.8% of the maximum attainable score and demonstrates a moderately high level of satisfaction. Higher BMI (More than 27.9 kg/cm²), having diploma or higher education, being unemployed, and having comorbidities history were risk factors that increased the likelihood of experiencing acute gout attack ($p < 0.05$). Older age (40.5 and above), higher BMI (More than 27.9 kg/cm²), having diploma, and having comorbidities history were predictors of lower level of satisfaction among patients with gout ($p < 0.05$).

Conclusion: The study found that individuals who are diagnosed with gout exhibited a notably elevated degree of satisfaction. Elevated body mass index and a preexisting medical history of comorbidities were identified as risk variables associated with an increased likelihood of experiencing an acute gout attack. The management of acute gout attacks requires the adoption of a comprehensive strategy that includes modifications in lifestyle, changes in eating habits, and the efficient administration of medication.

Keywords: Acute; Gout; Patient; Satisfaction; Saudi Arabia

INTRODUCTION

Gout has been well acknowledged as one of the prevailing chronic inflammatory joint illnesses. It is widely recognized that there exists a notable disparity between males and females in terms of gout susceptibility. Gout is distinguished by the presence of excessive levels of uric acid in the bloodstream, known as hyperuricemia, with recorded values reaching as high as 6.8 mg/dl [1]. Urate crystals are generated due to elevated concentrations of uric acid in the bloodstream, hence augmenting the propensity for the formation of kidney stones. Tophi may sometimes manifest as a concomitant symptom of gout, potentially leading to the development of gouty arthritis over time [2]. In addition to several other symptoms, the manifestation of acute gout is characterized by the presence of severe pain, swelling, and discomfort in the surrounding area of the joints. The term "inter-critical gout" pertains to the periods of time in which individuals with gout experience no symptoms or manifestations between episodes of gout attacks. The term "podagra" is frequently employed in medical discourse to denote the manifestation of acute gout, characterized by the presence of urate crystals affecting the first metatarsophalangeal joints and resulting in intense pain. Furthermore, there are plainly observable signs that accompany acute gout symptoms, indicating the occurrence of flare-ups

[2]. This encompasses a pronounced inflammatory response resulting in discomfort and agony persisting for a duration of approximately 5-10 days. The condition of asymptomatic hyperuricemia, though, endures over an extended period of time in correlation with sporadic episodes of exacerbation. Conversely, the crystals may exhibit indications of rapid growth accompanied by inflammation and intense discomfort, ultimately progressing to the development of tophi and chronic gout. Tophi are observable in a diverse range of anatomical locations, encompassing cutaneous tissues, articular spaces, and bones [3, 4]. Individuals afflicted with gout may have discomfort that hampers their ability to carry out routine activities, accompanied by temporary or enduring limitations in movement. The influence on quality of life is therefore substantial. Gout exhibits a strong correlation with various health disorders, including stroke, diabetes, myocardial infarction, and hypertension [5]. The frequency and occurrence of gout have seen an upward trend characterized by accelerated growth in recent years [6]. Prior studies have indicated that patients frequently receive limited guidance regarding lifestyle modifications and drug adherence [7, 8].

Patients may encounter negative experiences with healthcare practitioners, so obstructing efficient communication and hindering the provision of suitable care [9-16]. Moreover, it is important to

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note that patients may have negative experiences with urate-lowering therapy (ULT), including a lack of awareness regarding the potential occurrence of gout flares upon commencing this particular treatment. Finally, certain patients may demonstrate a hesitancy in adhering to long-term treatment regimens [12].

According to a prior research conducted in Saudi Arabia by Al-Arfaj A.S., the estimated prevalence rate of gout was approximately 8.4% [17]. There are several barriers to adherence; yet, numerous research conducted across diverse therapeutic domains have established a favorable correlation between treatment satisfaction and adherence to therapy [18, 19]. There is a positive correlation between treatment satisfaction and improved quality of life [19-21]. The evaluation of treatment satisfaction offers a valuable avenue for integrating patient viewpoints into the process of clinical decision-making, with the ultimate goal of enhancing the overall quality and value of healthcare [22]. The identification of predictors of acute gout attacks has great importance due to its potential to greatly influence the care and preventative strategies employed for this distressing and incapacitating ailment. These objectives encompass enhancing the quality of patient care, informing the formulation of preventive measures, and mitigating the occurrence and intensity of such episodes. Therefore, the aim of this study was to identify predictors of acute gout attacks and patients' satisfaction.

METHODOLOGY

Study design

The present investigation entailed a descriptive cross-sectional study involving individuals diagnosed with gout who were sent to university clinics and municipal health facilities in central Riyadh, Saudi Arabia. The study took place during a period spanning from April to August 2022.

Study population and recruitment

This study included individuals residing in Saudi Arabia who had been diagnosed with gout by their healthcare provider. The inclusion criteria required participants to have blood uric acid levels over 6 mg/dl for females and 7 mg/dl for males, and to be 18 years of age or older. Patients who failed to meet the inclusion criteria, were diagnosed with chronic illnesses other than gout, or did not grant consent for participation were excluded from the study.

Sampling procedure

The participants for this study were chosen through the utilization of a convenience sampling technique. The current study comprised participants who willingly participated and satisfied the predetermined inclusion criteria, thereby being deemed qualified. At the commencement of the study, participants were presented with an informed consent document and were given the option to either continue or terminate their involvement in the study. The study's objectives were comprehensively explained to enhance patients' comprehension of the significance of their participation. The invitation letter of the study provided a detailed description of the necessary inclusion criteria.

Data collection

The first section of the data collection instrument was where patients indicated their consent and willingness to take part in the study. The second section captured the following demographic details: gender, age, chronic diseases history, education level, and employment status. The third section collected clinical data and disease profile from gout

patients. The body mass index (BMI), prior gout episodes, disease history (duration of disease, age at diagnose, time between the onset of symptoms and diagnosis, and number of attacks of gout annually before/after starting treatment, and whether they referred to nutritionist to treat gout), and medications use were all taken into consideration. In addition, patients' satisfaction with health service, ability to carry out the demands and chores of daily life, sleep quality, and support from family and friends were investigated. Satisfaction was examined by asking the patients about their satisfaction concerning health service provided, ability to carry out the demands and chores of daily life since diagnosis, the effect of gout on job performance and working life, sleep quality, and support from family and friends. Satisfaction was measured using 5-point Likert scale that ranges between extremely satisfied (assigned score 5) and extremely dissatisfied (assigned score 1). The higher the score, the more satisfied the patient.

Questionnaire reliability and piloting

A preliminary investigation was undertaken by the researcher on a sample of 15 individuals who satisfied the predetermined criteria in order to validate their comprehension of the survey instrument and ascertain its alignment with the intended construct being assessed. The participants verified the content and face validity of the questionnaire.

Ethical approval

This research had ethical approval from Prince Sattam bin Abdulaziz University Deanship of Scientific Research, Research Ethics committee in Health and Science Disciplines. Approval number (REC-HSD-99-2021). All study participants gave their informed consent for inclusion before they participated in the study.

Statistical analysis

The Statistical Package for Social Science (SPSS) software for Windows, version 22 (IBM Corp., Armonk, NY, USA) was used to analyze the data for this study. Frequencies and percentages were used to present categorical variables. The mean and standard deviation were used to present continuous variables. Binary logistic regression analysis was used to identify risk factors of acute gout attack and predictors of patients' satisfaction. The dummy variable used to identify predictors of patients' satisfaction was the mean satisfaction score of the study sample. Statistical significance was defined as p-value less than 0.05.

RESULTS

Demographic and Clinical Characteristics

Table 1 below presents the demographic and clinical characteristics of the patients. A total of 212 patients participated in this study. The mean age of the patients was 40.5 (SD: 13.3) years. More than half of the patients (64.6%) were males. Around half of the patients (49.5%) reported that they hold a bachelor's degree and that they have full-time job (48.4%). More than half of the patients (62.9%) reported that they have comorbid disease(s).

Table 1. Demographic and clinical Characteristics

Variable	Frequency	Percentage
Age (mean (standard deviation)) years	40.5	(13.3)
Gender		
Male	137	64.6%
Body mass index (mean (standard deviation)) kg/cm ²	27.9	(6.6)
Education		

Secondary school or lower	66	31.1%
Diploma	20	9.4%
Bachelor's degree	105	49.5%
Higher education	21	9.9%
Employment status		
Student	34	16.0%
Full-time job	103	48.4%
Part-time job	11	5.2%
Unemployed	40	18.8%
Retired	25	11.7%
Comorbidity history		
Yes	134	62.9%

Patients' disease profile

Table 2 below presents patients' disease profile. The median duration of disease was 2.00 years (IQR: 1.00-4.00). The median age of the patients at the time of the diagnosis was 35.00 years (IQR: 27.00-46.00). The median time between the onset of symptoms and diagnosis was 4.00 months (IQR: 2.00-7.00). Around one-third (36.6%) of the patients reported that they are currently suffering from acute gout attack. The median number of attacks of gout annually before starting treatment was 3.00 (2.00-5.00). The median number of attacks of gout annually after starting treatment decreased and reached 1.00 (IQR: 0.25-3.00). The most commonly used medications class to manage gout attacks was NSAIDs. Around 46.2% of the patients reported that they referred to nutritionist to treat gout.

Table 2. Patients' disease profile

Variable	Frequency	Percentage
Median duration of disease (IQR)	2.00 (1.00-4.00)	
Median age at diagnose (IQR)	35.00 (27.00-46.00)	
Median time between the onset of symptoms and diagnosis (months) (IQR)	4.00 (2.00-7.00)	
Are you currently suffering from a gout attack?		
Yes	78	36.6%
Median number of attacks of gout annually before starting treatment (IQR)	3.00 (2.00-5.00)	
Median number of attacks of gout annually after starting treatment (IQR)	1.00 (0.25-3.00)	
Gout medications:		
NSAIDs	104	49.1%
Allopurinol	46	21.7%
Febuxostat	41	19.3%
Colchicine	34	16.0%
Steroids	29	13.7%
Probenecid	23	10.8%
Referred to nutritionist to treat gout?		
Yes	98	46.2%

Risk factors of acute attack and predictors of patients' satisfaction

The mean satisfaction score was 19.7 (3.8) out of 25, which is equal to 78.8% of the maximum attainable score and demonstrates moderately high level of satisfaction. Higher BMI (More than 27.9 kg/cm²), having diploma or higher education, being unemployed, and having comorbidities history were risk factors that increased the likelihood of experiencing acute gout attack (p<0.05). Older age (40.5 and above), higher BMI (More than 27.9 kg/cm²), having diploma, and having comorbidities history were predictors of lower level of satisfaction among patients with gout (p<0.05).

Table 3. Risk factors of acute attack and predictors of patients' satisfaction

Variable	Odds ratio of having acute attack (95% confidence interval)	Odds ratio of being more satisfied (95% confidence interval)
Age category		
40.5 years or lower	1.00	1.00
More than 40.5 years	0.75 (0.43-1.32)	0.42 (0.24-0.73)**
Gender		
Female (Reference category)	1.00	1.00
Male	0.88 (0.49-1.58)	0.85 (0.48-1.51)
Body mass index category		
27.9 kg/cm ² or lower	1.00	1.00
More than 27.9 kg/cm ²	3.27 (1.83-5.84)***	0.22 (0.12-0.39)***
Education		
Secondary school or lower (Reference category)	1.00	1.00
Diploma	4.3 (1.48-12.31)**	0.30 (0.10-0.91)*
Bachelor's degree	0.88 (0.45-1.73)	1.50 (0.80-2.80)
Higher education	7.36 (2.37-22.86)***	1.18 (0.44-3.18)
Employment status		
Student (Reference category)	1.00	1.00
Full-time job	2.06 (0.85-5.01)	1.15 (0.52-2.53)
Part-time job	3.90 (0.94-16.25)	0.40 (0.10-1.63)
Unemployed	3.25 (1.19-8.89)*	0.57 (0.23-1.44)
Retired	0.62 (0.16-2.34)	0.76 (0.27-2.15)
Comorbidity history		
No (Reference category)	1.00	1.00
Yes	2.70 (1.44-5.06)**	0.17 (0.09-0.33)***

*p<0.05; **p<0.01; ***p<0.001

DISCUSSION

Gout has been extensively recognized as a prevalent chronic inflammatory joint illness [1]. It is characterized by a variety of symptoms that can range from minor to severe, encompassing extreme pain, joint stiffness, and swelling [23]. Undoubtedly, individuals who encounter episodes of gout frequently encounter difficulties in carrying out their daily tasks, resulting in a substantial adverse effect on their overall well-being [24].

The findings of the study revealed that the median duration of gout disease was 2.00 years, with an interquartile range of 1.00-4.00 years. A study investigating the duration of urate crystal clearance from synovial fluid following successful hypouricemic treatment and its correlation with the duration of gout revealed that achieving normal serum uric acid (SUA) levels results in the elimination of urate crystals from synovial fluid (SF). Furthermore, it was observed that individuals with a longer history of gout require a greater amount of time for this process to occur [25]. These findings suggest that the duration of gout is influenced by various factors, including the timing of diagnosis and the management of elevated uric acid levels [1, 25-28]. In this study, it was observed that patients generally received their diagnosis at a median age of 35.00 years, with a range of 27.00-46.00 years. These findings are consistent with the global burden of disease research, which indicates that the incidence and prevalence of gout tend to be higher around the age of 30 for both males and females. However, it

is worth noting that the prevalence of gout in women increases after the age of 45, suggesting a potential association between menopause and the development of gout. This relationship has been previously documented [29]. There was a notable median interval of 4.00 months (with an inter-quartile range of 2.00-7.00 months) observed between the manifestation of symptoms and the subsequent diagnosis of gout. This delay in diagnosis is particularly prevalent in developing countries with low resources, where clinical diagnosis is commonly utilized as a means of identifying gout on a worldwide scale. However, a comparison between clinical diagnosis and microscopic inspection of crystals reveals a lower level of sensitivity and specificity [27]. The progression of gout diagnosis involves several stages, beginning with an asymptomatic elevation in uric acid levels. During this initial stage, there are no observable signs or symptoms of gout. However, the heightened uric acid levels promote the initiation of inflammation, which subsequently triggers the onset of acute gout inflammation [1]. Additionally, in specific scenarios where gout manifests atypically, such as affecting multiple joints or exhibiting an unusual distribution within the joints, it becomes imperative to differentiate gout from other potential diagnoses. The presence of heightened concentrations of SUA in conjunction with characteristic joint manifestations, such as podagra, generally facilitates an easy diagnostic process. Nevertheless, it is recommended to do an investigation of synovial fluid in order to eliminate alternative potential causes, namely septic arthritis [27, 28]. Moreover, the presence of tophi can act as a dependable sign of gout. However, it remains crucial to eliminate the potential presence of other rheumatic disorders linked to nodules prior to reaching a conclusive diagnosis of gout [26]. Indeed, it is widely thought that all the aforementioned elements are related with the delay and discrepancy in the timeframe between the manifestation of symptoms and the formal diagnosis.

In the present study, it was found that around 36.6% of the patients reported experiencing acute gout attacks. This finding suggests a significantly higher prevalence of acute gout attacks when compared to the general gout prevalence of 8.4% in Saudi Arabia [17]. Furthermore, it is worth noting that acute gout attacks account for approximately 0.13% of emergency visits [30]. Typically, acute gout is characterized by episodes of pain, redness, and swelling in either a single joint or a limited number of joints in the lower limbs [31]. Furthermore, the findings of the study indicate that the median annual gout attacks per patient were 3.00 prior to commencing treatment. This aligns with the results of a previous study that emphasized the significance of the timing of therapy for individuals with gout [32]. Specifically, initiating Urate-Lowering Therapy (ULT) during an acute gout attack was found to reduce the time required to achieve the desired serum urate levels. However, within the first 12 weeks, individuals who received ULT while experiencing an acute gout attack saw a higher frequency of subsequent gout attacks in comparison to those who commenced ULT after the acute episode. Additionally, the findings of the study indicate that following the initiation of treatment, there was a decrease in the median annual frequency of gout attacks, with the number reaching 1.00 attack per year. This reduction in gout attacks can be attributed to the effective use of anti-hyperuricemia medications, which significantly lower the average levels of serum urate. It is worth noting that there exists a correlation between the levels of uric acid in the blood and the recurrence of acute gout attacks. Specifically, a lower concentration of serum urate is associated with a decreased likelihood of experiencing repeated acute gouty attacks [33]. Furthermore, a study conducted by another researcher indicates that a significant proportion of persons, specifically 69%, who suffer from gout, encounter at least one recurring episode within a span of one year [34].

The study findings indicate that NSAIDs are the most commonly prescribed class of medications for treating gout attacks. The American

College of Physicians strongly recommends the use of NSAIDs for their proven effectiveness in reducing pain in patients with acute gout [35]. However, several studies have shown that corticosteroids are equally effective in treating and managing acute gout attacks [36]. Additionally, the use of colchicine is considered safer with fewer adverse events and more cost-effective for the treatment of acute gout [37]. Nevertheless, NSAIDs continue to be the most widely used and extensively studied pharmacological treatment for acute gout [38]. Furthermore, the findings of the study indicate that approximately 46.2% of the patients expressed their inclination towards consulting a nutritionist for the purpose of managing gout. This inclination can be attributed to the fact that gout is commonly referred to as "King's disease" in the Arabic region due to its association with a high purine diet, primarily derived from meat. Consequently, providing guidance on low-purine diets has been proven to effectively reduce uric acid levels in individuals with gout. The American College of Rheumatology also recognizes the role of nutritionists in gout management, as they can offer advice on nutrition, beverages, and lifestyle modifications for patients with gout and hyperuricemia. These recommendations are intended to be implemented in routine clinical practice. Additionally, weight reduction through regular exercise has been shown to lower uric acid levels and decrease the risk of gout occurrence.

Upon conducting an inquiry into the contentment of individuals with healthcare provision, their capacity to fulfill daily obligations and tasks, the quality of their sleep, and the level of support received from their family and friends, the findings of the study revealed a mean satisfaction score of 19.7 (SD: 3.8) on a scale of 25. This score corresponds to approximately 78.8% of the maximum attainable score. This finding suggests that the participants expressed a rather high degree of satisfaction. Patient satisfaction is known to exhibit significant variability. A study conducted in Europe revealed that individuals with gout frequently encounter delayed diagnoses, inefficient disease management, and inadequate monitoring. Interestingly, a significant proportion of the patients under examination conveyed contentment with their present treatment [39]. Furthermore, an additional investigation demonstrated that individuals experiencing a gout attack displayed reduced treatment satisfaction and diminished health-related quality of life in comparison to those not currently experiencing an attack [40]. However, our study primarily attributes the heightened satisfaction to specific patient encounters associated with living with gout, encompassing emotional experiences, disturbances in daily activities, interactions with healthcare practitioners, and adaptive mechanisms [41]. On the contrary, it has been observed that individuals with gout have a diminished health-related quality of life in comparison to the broader community. In addition, it was found that the frequency of gout attacks and the extent of joint involvement had a substantial impact on the quality of life reported by these individuals [42].

The findings of the study revealed certain risk factors that were associated with an increased likelihood of experiencing an acute episode of gout. The factors that were shown to be associated with the condition were having BMI more than 27.9 kg/cm², holding a diploma or a higher educational status, being unemployed, and having a medical history of comorbidities. Furthermore, the findings of the investigation indicated that advanced age (40.5 years and older), an elevated BMI (exceeding 27.9 kg/cm²), possession of a diploma, and a medical history of comorbidities were identified as predictive variables associated with diminished levels of satisfaction among individuals diagnosed with gout. Obesity and elevated BMI have been identified as significant risk factors in the onset of gout [43]. It is widely recognized that weight reduction plays a crucial role in the prevention of gout [44]. Furthermore, there has been a notable increase in the incidence of gout over the past two decades, accompanied by a growing

prevalence of various comorbidities such as hypertension, diabetes, renal impairments, hypercholesterolemia, and obesity [45]. However, a recent study discovered a positive association between unemployment or low income and the risk of developing gout [46]. This finding is consistent with the results of this study. Conversely, this investigation revealed that individuals with lower levels of education face an elevated risk of gout [47]. It is important to acknowledge that these findings are not congruent with the findings of this study, and further exploration of socioeconomic indicators related to gout is warranted. In conclusion, the satisfaction level of patients with health services, their ability to perform daily tasks, sleep quality, and support from family and friends were found to be low among elderly individuals, patients with higher BMI, and those with a history of comorbid diseases. This can be attributed to the impaired physical and health-related quality of life experienced by gout patients in these groups [48]. Consequently, future studies in the field of gout should prioritize the enhancement of early diagnosis by developing more precise diagnostic instruments. Moreover, it is imperative to examine the socioeconomic determinants that contribute to the risk of developing gout and the level of patient satisfaction in order to achieve a thorough comprehension of the condition. Conducting a research study into alternative treatment modalities and their efficacy, alongside a comprehensive evaluation of the role of nutritionists in weight management programs and nutritional treatments, will contribute to the advancement of gout management techniques. In conclusion, it is imperative that future research places significant emphasis on prioritizing the continuous endeavors to enhance public awareness regarding the risk factors associated with gout and the criticality of prompt medical action.

CONCLUSION

Patients who were diagnosed with gout showed a relatively high level of satisfaction. High BMI and having a history of comorbidities were risk factors that increased the chance of having an acute gout attack. The mitigation of acute gout attacks necessitates the implementation of a multifaceted approach, which encompasses alterations in lifestyle, adjustments in dietary patterns, and the effective management of medication.

Authorship Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Funding: The author extends their appreciation to the Deputyship for Research & Innovation, Ministry of Education in Saudi Arabia for funding this research work through project number: (IF-PSAU-2021/03/17631)

Institutional Review Board Statement: This research had ethical approval from Prince Sattam bin Abdulaziz University's Deanship of Scientific Research, Research Ethics Committee in Health and Science Disciplines. Approval number (REC-HSD-99-2021).

Acknowledgments: The author extends their appreciation to the Deputyship for Research and Innovation, Ministry of Education in Saudi Arabia for funding this research work through project number (IF-PSAU-2021/03/17631).

Potential Conflicts of Interest: None

Competing Interest: None

Acceptance Date: 12-04-2024

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