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Public Awareness and Perceptions of Gout Risk and Prevention in Northern Saudi Arabia: A Cross-Sectional Study

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Abstract **Objectives:** Gout is a prevalent noncommunicable inflammatory arthritis caused by the deposition of monosodium urate crystals, primarily due to hyperuricemia. If left untreated, it can lead to chronic joint damage and systemic complications. Public awareness and perception of its risk and preventive factors are essential for early diagnosis, effective management, and disease prevention. **Objectives:** To assess the awareness and perception of risk and preventive factors related to gout among the adult population in Arar city, Northern Saudi Arabia. **Methods:** A descriptive cross-sectional study was conducted from September 1, 2024, to January 31, 2025, targeting adults aged 18 years and older residing in Arar. Data were collected via a validated, bilingual (Arabic-English) structured questionnaire disseminated online through social media platforms. The survey covered sociodemographic data, knowledge of risk factors, and preventive measures. Convenience sampling was used. Descriptive statistics were analyzed using SPSS Version 27. **Results:** A total of 400 participants responded (mean age: 36.4 ± 12.7 years; 52.5% male). Among them, 67.2% recognized high blood uric acid as the primary cause of gout, and 80.2% identified excessive meat consumption as a key risk factor. Preventive awareness was high, with 91% agreeing that gout is preventable, primarily through lifestyle modification (87.2%) and medication use (82.5%). However, knowledge gaps persisted regarding hereditary factors, comorbidities, and less commonly known dietary influences. **Conclusion:** While the general public in Arar city demonstrates a fair level of awareness about gout and its modifiable risk factors, significant misconceptions and knowledge deficiencies remain especially regarding genetic predisposition and long-term complications. Targeted health education interventions and culturally tailored public awareness campaigns are recommended to improve understanding and preventive behaviors.

Key Words Gout, public awareness, risk factors, preventive behavior, northern Saudi Arabia, cross-sectional study

INTRODUCTION

Gout is the most prevalent form of inflammatory arthritis worldwide, characterized by the deposition of monosodium urate crystals in and around joints and tissues, resulting in acute and chronic joint inflammation [1-4]. The primary etiological factor is hyperuricemia, which arises from either decreased renal urate excretion or excessive purine intake [1,5]. Clinically, gout manifests as intermittent painful arthritis episodes that can progress to chronic joint deformities and functional impairment if untreated [6,7].

Globally, the prevalence of gout ranges from 1% to 4%, with an annual incidence of approximately 2.68 per 1,000 individuals [8]. Men are disproportionately affected two to six times more frequently than women owing to higher baseline uric acid levels [10]. The global burden of gout continues to rise due to shifts in dietary habits, sedentary lifestyles, and increasing obesity rates [8]. In Saudi Arabia, a study conducted in Al-Baha, a southern region, reported a local prevalence of 35.3% among surveyed participants [9], suggesting potential regional variations in awareness and risk exposure.

Multiple comorbid conditions are associated with an increased risk of gout, including hypertension and diabetes mellitus [11,12]. In addition, well-established risk factors encompass older age, prolonged hyperuricemia, high consumption of red meat and seafood, obesity, excessive intake of sugar-sweetened beverages, alcohol use, and genetic predisposition [13,14]. Certain medications, such as diuretics and some antihypertensives, also elevate serum uric acid levels and thereby increase gout risk, whereas other drugs like sodium-glucose cotransporter 2 (SGLT2) inhibitors used in diabetes may offer protective effects [15,16].

Importantly, although gout is one of the most well-understood and manageable rheumatologic conditions, long-term disease control depends on sustained uric acid reduction to dissolve crystal deposits and prevent complications [17]. Without appropriate management, gout may contribute to systemic health issues beyond joint damage [18].

However, despite its growing prevalence and clinical consequences, many patients face barriers to effective management. These include inadequate knowledge about the chronic nature of the disease, misconceptions about its dietary triggers, and limited awareness of available treatments [19]. Emerging evidence suggests that certain dietary choices such as increased intake of vitamin C, tart cherry juice, low-fat dairy, black seed, yogurt, and olive leaf extract may lower gout incidence [13,14]. Additionally, a diet rich in whole grains, legumes, nuts, and vegetables is associated with reduced risk and better disease control [20].

Public education about modifiable risk factors is critical to reducing the burden of gout. Similarly, recognition of non-modifiable factors, such as age and genetic predisposition, may enhance early diagnosis and preventive care strategies [1]. Despite the increasing burden of gout in Saudi Arabia, there is limited published research on public awareness and perception of the disease, particularly in Northern regions such as Arar.

Therefore, the present study aims to assess the awareness and perception of risk and preventive factors related to gout among the adult population in Arar city, Northern Saudi Arabia.

MATERIAL AND METHODS

Study Design and Setting

A descriptive cross-sectional study was conducted among the adult general population in Arar city, Northern Saudi Arabia, from September 1, 2024, to January 31, 2025. Arar is a major city in the Northern Border Province, and the study was designed to assess community-level awareness and perceptions regarding gout.

Sample Size Calculation

The minimum required sample size was calculated using Epi Info version 7.2.4.0, assuming an awareness prevalence of 73.2% [22], with a 5% margin of error and 80% statistical power. The computed sample size was 302. To enhance precision and account for potential non-responses or incomplete data, the final sample included 400 participants.

Sampling Technique

Participants were recruited using a convenience sampling approach through online platforms, including WhatsApp and Twitter. This method allowed broad dissemination but may have introduced selection bias by favoring younger, more educated, and digitally literate individuals. No randomization or stratification was applied.

Inclusion and Exclusion Criteria

Inclusion criteria encompassed all adults aged ≥18 years who were residents of Arar city and consented to participate. Individuals under 18 or those who declined participation were excluded from the study.

Data Collection Tool

A structured, self-administered questionnaire was developed based on previously published literature (18, 20, 22–25). The questionnaire assessed:

- Sociodemographic characteristics;
- Awareness of gout risk factors;
- Knowledge of preventive measures and misconceptions.

The tool underwent content validation by two independent family medicine experts. It was initially designed in English, then translated into Arabic and back-translated to English by a certified multilingual expert to ensure accuracy. A pilot study involving 20 participants was conducted to evaluate clarity, cultural appropriateness, and completion time. Findings from the pilot were used to refine the final version.

Ethical Considerations

Ethical approval was obtained from the Local Bioethical Committee of Northern Border University (Decision No. 106/24/H; dated September 12, 2024). Digital informed consent was obtained electronically at the beginning of the online survey. Responses were anonymized, and no personally identifiable data were collected.

Data Management and Statistical Analysis

Data were entered and analyzed using IBM SPSS Statistics for Windows, Version 27.0 (Armonk, NY). Descriptive statistics were used to summarize the data: categorical variables were expressed as frequencies and percentages, while continuous variables were presented as means and standard deviations. No inferential statistical analysis (e.g., Chi-square tests or regression) was performed in this study. Missing data handling procedures were not explicitly applied, as all survey items were mandatory in the digital format.

RESULTS

Sociodemographic Characteristics of Participants

A total of 400 individuals participated in the study. The mean age of respondents was 36.4 ± 12.7 years, with the majority (44.8%) falling in the 30–50 age group, followed by 41.3% aged 18–30 years, and 14% aged 50 or above. Males slightly outnumbered females, comprising 52.5% of the sample. Regarding marital status, most participants were married (60.5%), while 36.3% were single and 3.3% divorced. Educational attainment was high, with 81.8% holding a university degree, 11.5% having completed high school, and 6.8% possessing a postgraduate qualification. In terms of occupation, 43.8% were employed, 29.8% were students, and 8.5% were retired. Only 8% were not working, and 10% reported having other forms of employment. Regarding chronic illnesses, the majority (82.5%) reported no chronic disease, while 7.8% had hypertension, 5.8% had diabetes mellitus, and 4.0% had both conditions.

Prevalence and Clinical Profile of Gout Among Participants

Out of the 400 respondents, 11.8% (n = 47) reported having been diagnosed with gout. Among these, family physicians were the most common diagnosing specialists (40.4%), followed by internists (32%), rheumatologists (17%), and orthopedic surgeons (10.6%). Most diagnosed individuals (80.9%) had been living with the disease for more than one year, indicating a long-term experience with the condition. Regarding the duration between symptom onset and formal diagnosis, 38.3% reported being diagnosed within 1–3 months, 25.5% between 3–6 months, 8.5% within 6–12 months, and 27.7% after more than a year. These findings reflect variability in disease recognition and access to appropriate medical consultation.

Awareness of Risk Factors Associated with Gout

Participants' knowledge of risk factors contributing to gout was assessed through a series of Likert-scale items. Approximately 67.2% agreed or strongly agreed that increased blood uric acid levels and their precipitation in the joints are the primary cause of gout. Excessive meat consumption was the most widely recognized risk factor, with 80.2% acknowledging it as a major contributor.

Table 1: Sociodemographic data of the studied participants

Items		No	%
Age	18-30	165	41.3
	30-50	179	44.8
	≥50	56	14.0
Sex	Male	210	52.5
	Female	190	47.5
Marital status	Single	145	36.3
	Married	242	60.5
	Divorced	13	3.3
Educational level	High school	46	11.5
	University	327	81.8
	Post-graduate study	27	6.8
Occupation	I don't work	32	8.0
	Student	119	29.8
	Employee	175	43.8
	Retired	34	8.5
	Other	40	10.0
Do you have any of the following chronic diseases?	Hypertension	31	7.8
	Diabetes mellitus	23	5.8
	Diabetes and Hypertension	16	4.0
	None	330	82.5

Table 2: Frequency of gout disease among participants

		No	%
Have you ever had Gout Disease	Yes	47	11.8
	No	353	88.2
Who diagnosed you with gout*	Rheumatologist	8	17
	Orthopedic surgeon	5	10.6
	Internist	15	32
	Family physician	19	40.4
Duration of disease*	Less than one year	9	19.1
	More than one year	38	80.9
Time elapsed between the onset of symptoms and your diagnosis of gout (months)*	1-3 months	18	38.3
	3-6 months	12	25.5
	6-12 months	4	8.5
	> 12 months	13	27.7

Table 3: The participants' understanding of the factors that enhance the probability of acquiring gout

Items	Strongly disagree No (%)	Ddisagree No (%)	Undecided No (%)	Agree No (%)	Strongly agree No (%)
Do you believe the following contributes to the risk of gout?					
Gout is caused by increased blood uric acid and its precipitation in the joints	9(2.3)	12(3)	110(27.5)	167(41.7)	102(25.5)
Eating large amounts of meat	10(2.5)	15(3.8)	54(12.5)	159(39.8)	162(40.4)
Older adults	14(3.5)	24(6)	94(23.5)	170(42.5)	98(24.5)
Overweight / obesity	6(1.5)	28(7)	103(25.7)	187(46.8)	76(19)
Lack of physical exercise	9(2.2)	32(8)	109(27.3)	170(42.5)	80(20)
Hyperlipidemia	8(2)	27(6.8)	124(31)	180(45)	61(15.2)
Men are more likely to develop gout	14(3.5)	34(8.5)	138(34.5)	152(38)	62(15.5)
Frequent consumption of sugar-sweetened soft drinks.	9(2.3)	45(11.3)	155(38.7)	127(31.7)	64(16)
Kidney diseases	16(4)	41(10.2)	161(40.2)	133(33.3)	49(12.3)
Diabetes increases	8(2)	55(13.8)	170(42.5)	125(31.2)	42(10.5)
Hypertension	8(2)	55(13.8)	181(45.2)	117(29.2)	39(9.8)
Taking certain medications	14(13.5)	53(13.3)	178(44.5)	103(25.7)	52(13)
Hereditary	26 (6.5)	111(27.8)	158(39.4)	73(18.3)	32(8)

Table 4: Participants' knowledge about factors that might prevent gout development

Items	Yes	No	I do not know
Gout causes kidney stones	142 (35.5%)	39(9.8%)	219(54.7%)
Gout causes redness and swelling of the joints	28(6.9%)	274(66.6%)	98(24.5%)
Gout disease can be prevented	364(91)	4(1)	32(8)
Do you think that the following factors can prevent/decrease the risk of gout development?			
Changing to a healthy lifestyle	349(87.2)	11(2.8)	40(10)
Taking medications	330 (82.5)	11(2.8)	59 (14.7)
Minimizing the consumption of meat	311(77.8)	28(7)	61(15.2)
Vegetables and fruits	311(77.7)	13(3.3)	76(19)
Drinking enough water	275(68.8)	10(2.5)	115(28.7)
Reducing body weight	270(67.5)	30(7.5)	100(25)
Low-fat diet	191(47.8)	24(6)	185(46.2)
Yogurt	170(42.5)	29(7.3)	201(50.2)
vitamin C	167(41.8)	18(4.4)	215(53.8)
Black seed	146 (36.5)	25(6.3)	229 (57.2)
Coffee	86(21.5)	84(21)	230(57.5)

Other commonly recognized factors included advanced age (67%), overweight or obesity (65.8%), lack of physical activity (62.5%), hyperlipidemia (58.2%), and male gender (53.5%). Less frequently recognized but still notable were excessive intake of sugar-sweetened beverages (47.7%), kidney diseases (45.6%), diabetes mellitus (41.7%), hypertension (39%), medication-induced gout (38.7%), and hereditary predisposition (36.3%). Despite general awareness of prominent risk factors, lower recognition of hereditary and comorbidity-related risks indicates persistent knowledge gaps within the community.

Knowledge of Gout Prevention and Misconceptions

Participants were also assessed on their understanding of gout prevention and related misconceptions. A significant proportion (91%) believed that gout is preventable. The most commonly acknowledged preventive measure was adopting a healthy lifestyle (87.2%), followed by taking appropriate medications (82.5%), reducing meat consumption (77.8%), and increasing intake of fruits and vegetables (77.7%). Additional preventive beliefs included drinking adequate water (68.8%), weight reduction (67.5%), and following a low-fat diet (47.8%). Meanwhile, items such as yogurt (42.5%), vitamin C (41.8%), black seed (36.5%), and coffee (21.5%) were less frequently identified as protective factors. Regarding disease misconceptions, 35.5% believed that gout causes kidney stones, while only 6.9% recognized redness and swelling of the joints as a symptom, highlighting notable gaps in symptom-related awareness and disease impact. These findings underscore the need for improved health education on both the biomedical and symptomatic aspects of gout.

DISCUSSION

This study examined public awareness and perceptions regarding gout and its associated risk and preventive factors among adults in Arar city, Northern Saudi Arabia. Approximately two-thirds of the participants (67.2%) correctly identified elevated serum uric acid and its joint deposition as the primary cause of gout. This level of awareness is consistent with findings from Zogel *et al.* [23] in southern Saudi Arabia (60%) and Mohrag *et al.* [20] in Jazan (51.7%) [23]. Comparable awareness levels have also been reported in Riyadh (82.6%) [22], Taif (69.3%) [25], Egypt (52.7%) [26], and Qatar (58%) [24], suggesting a generally moderate but regionally variable understanding of the disease's etiology across the Arab world.

The current study found that the most commonly recognized risk factor for gout was excessive consumption of meat (80.2%), followed by old age (67%), obesity (65.8%), lack of physical activity (62.5%), and hyperlipidemia (58.2%). These findings align with prior Saudi studies where red meat consumption, obesity, and aging were frequently reported as key contributors to gout [21]. For example, in Mohrag *et al.* [20] study, physical inactivity (48.9%), hyperlipidemia (48.8%), and high meat intake (43.3%) were notable risk factors [20]. Similarly, Zogel *et al.* [23] reported that 54.2% and 54% of their respondents identified hyperlipidemia and inactivity as risk enhancers, respectively.

Despite good recognition of lifestyle-related risk factors, awareness of comorbid and hereditary contributors remained comparatively low. Only 41.7% of participants in this study associated diabetes with increased gout risk, and 39% recognized hypertension as a contributing factor. This trend was similarly noted in earlier studies, such as Mohrag *et al.* [20] (diabetes: 36.3%, hypertension: 37.7%), and in a Qatari study where hypertension and hereditary factors were cited by just 22% and 23% of participants, respectively [24]. Notably, only 36.3% of participants in the current study recognized heredity as a risk factor, echoing findings from Indonesia where only 30% acknowledged a genetic link to gout [27]. This suggests a persistent gap in public knowledge regarding non-modifiable and comorbidity-related risk factors.

The current findings also exposed common misconceptions. For instance, only 6.9% of respondents recognized redness and joint swelling as symptoms of gout despite these being classical clinical features. A prior study from Taiwan showed that 71.4% of patients identified joint pain and over 50% reported joint

swelling as typical presentations [8], indicating a potential disconnect between public perception and clinical symptomatology. Moreover, 35.5% of participants believed that gout causes kidney stones, which is partially accurate but may reflect a conflation of uric acid-related conditions [28].

Encouragingly, the majority of respondents (91%) believed that gout is preventable, and many identified key preventive strategies. The most frequently cited protective measures were adopting a healthy lifestyle (87.2%), taking medications (82.5%), reducing meat consumption (77.8%), increasing fruit and vegetable intake (77.7%), drinking sufficient water (68.8%), and managing body weight (67.5%). These results are supported by previous Saudi studies that emphasized lifestyle modification and dietary adjustments as central to gout prevention [18,21,25]. For instance, Atalla *et al*. [25] found that 58.6% of participants in Taif believed in prevention through medical therapy and lifestyle change, and Khormi *et al*. [18] observed that most respondents associated reduced red meat and seafood intake with gout management.

Nevertheless, less commonly acknowledged preventive strategies such as yogurt (42.5%), vitamin C (41.8%), and coffee (21.5%) suggest inconsistent understanding of evidence-based dietary interventions. Prior studies have shown that low-fat dairy, whole grains, and vitamin C may reduce serum urate levels and lower gout risk [13,14,20]. The Qatari population, for example, showed limited awareness of such measures, with only 28% citing coffee as protective and even fewer recognizing dairy or vitamin C [24]. These data reinforce the need for tailored education campaigns that go beyond basic risk factors to incorporate scientifically validated dietary and pharmacologic information.

Strengths and Limitations

This study is among the first to evaluate public awareness and perception of gout in Northern Saudi Arabia, providing essential baseline data from a rarely studied population. The large sample size (n=400) enhances the reliability of findings, and the use of a pilot-tested, bilingual, and expert-validated questionnaire strengthens content validity. Ethical procedures were rigorously followed, and the study spanned several months, improving data diversity.

However, several limitations must be acknowledged. The convenience sampling method, conducted online via social media platforms, may have introduced selection bias favoring younger, educated, and internet-literate individuals. The self-reported nature of responses is subject to recall and social desirability bias. Additionally, the descriptive cross-sectional design precludes causal inference, and the lack of inferential statistics limits the identification of predictors or correlations. The study did not stratify results by subgroups such as gender, education level, or chronic disease history, which may have revealed deeper insights.

CONCLUSIONS

This study highlights a moderate level of public awareness and perception regarding gout among adults in Arar city, Northern Saudi Arabia. While participants demonstrated good knowledge of common modifiable risk factors such as excessive meat consumption, obesity, and aging there were notable gaps in recognizing non-modifiable and comorbidity-related risks, including hereditary factors, hypertension, and diabetes. Preventive knowledge was relatively high, particularly regarding healthy lifestyle changes and dietary moderation, yet awareness of protective roles of specific foods and supplements such as dairy products, whole grains, vitamin C, and coffee remains limited.

These findings underscore the need for comprehensive, evidence-based public health education campaigns that address both prevalent misconceptions and overlooked risk and protective factors. Culturally sensitive materials, targeted outreach through primary healthcare providers, and inclusion of gout education in chronic disease prevention programs could enhance awareness and facilitate earlier diagnosis and better self-management. Future research should explore predictors of awareness and assess the impact of targeted interventions across diverse Saudi populations.

Future Recommendations

Future studies should adopt probability-based sampling to enhance generalizability and consider incorporating mixed methods to capture qualitative insights on attitudes and beliefs. Inferential statistical analyses such as logistic regression could be employed to identify predictors of awareness and misconceptions. Expanding the research to include other regions of Saudi Arabia would allow for national comparisons. Interventional studies evaluating the effectiveness of targeted educational programs particularly in primary care and community settings are also warranted. Moreover, the integration of digital tools such as mobile apps or culturally tailored videos may be explored to disseminate gout-related health information effectively.

Implications for Practice

The findings suggest a clear need for targeted public health strategies aimed at improving awareness of both modifiable and non-modifiable risk factors for gout. Primary healthcare providers can play a crucial role by incorporating gout education into routine chronic disease counseling. Health educators and policymakers should prioritize the development of culturally appropriate materials in Arabic, especially addressing misconceptions around diet, heredity, and symptom recognition. Engaging platforms like schools, community centers, and media campaigns can enhance outreach, particularly among high-risk groups such as middle-aged men and individuals with metabolic comorbidities.

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