

## Determining the Frequency of Metabolic Syndrome in Gout Patients in Rheumatology Clinics of Sari in 2023-24

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### Abstract

**Objective:** Gout and metabolic syndrome (MetS) are associated with increased risk of cardiovascular involvement. The aim of the current study was to evaluate the frequency of MetS and its components in patients with gout.

**Materials and Methods:** This cross-sectional study was conducted on 150 patients with gout in Sari, Iran. The demographic, clinical and laboratory variables of the patients were recorded. The MetS was defined by the 2005 National Cholesterol Education Program (NCEP/ATP III) and International Diabetes Federation (IDF). Then, patients with gout with and without metabolic syndrome were compared in terms of demographic and clinical characteristics. Data analysis was performed by SPSS (version 19), at a significance level of  $< 0.05$ .

**Results:** The mean age of the patients was  $50.17 \pm 15$  year. Based on the NCEP/ATP III and IDF criteria, 88 (58.7%) and 90 (60%) were diagnosed with MetS, respectively. Age, body mass index, and duration of gout were significantly higher in patients with MetS criteria ( $P < 0.05$ ).

**Conclusion:** The frequency of MetS was found about 60% of patients with gout. Hypertriglyceridemia and central obesity are two more prevalent components of MetS in our patients. The association of MetS and cardiovascular diseases highlights the importance of attention and management of this condition in patients with gout.


**Keywords:** Hypertension, Hyperuricemia, Metabolic syndrome, Gout

### QR Code:



**Citation:** Babaee H, Mobini M, Niksolat F, Hoseinian Amiri A, Ali Mohammadpour R. Determining the Frequency of Metabolic Syndrome in Gout Patients in Rheumatology Clinics of Sari in 2023-24. IJDO 2025; 17 (3) :193-197

**URL:** <http://ijdo.ssu.ac.ir/article-1-968-en.html>

 10.18502/ijdo.v17i3.19268

### Article info:

**Received:** 29 January 2025

**Accepted:** 11 June 2025

**Published in July 2025**



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## Introduction

Gout is a common hyperuricemic disease that leads to painful inflammatory arthritis and a high burden of comorbidities. (1). The prevalence and incidence of gout are 1% to 6.8% and 0.58-2.89 per 1000 person-years respectively and is more common in older adults and men. The prevalence of gout in Iran is estimated to be 0.13%. (2). Metabolic syndrome (MetS) is a group of risk factors for cardiovascular disease and two of the most commonly used definitions are IDF and NCEP criteria. (3,4). The prevalence of metabolic syndrome in Iranian general population, aged 40-69 years has been reported to be 12.14%. (5).

The frequency of MetS in patients with gout varies in different populations, and it appears that more than half of these patients have MetS (6,7). According to the National Health and Nutrition Examination Survey 2007–2008, hypertension was present in 74% of patients with gout, 47% of people with hyperuricemia, and 24% of the normal population. The prevalence of diabetes among people with gout was 25.7% and 7.8% in people without gout (8). It was showed that in type2 diabetic patients, uric acid is strongly correlated with systolic and diastolic blood pressure levels (9). Hyperinsulinemia reduces renal excretion of uric acid (10). The purpose of this study was to investigate the frequency of MetS in patients with gout. Considering the differences in demographics and lifestyle habits, activity levels, economic factors, and access to healthcare, and the lack of a new and comprehensive study in Iran on the prevalence of MetS in patients with gout, the present study was designed.

## Material and methods

This cross-sectional study was conducted (2023-2024) on 150 consecutive gout patients. The sample size was calculated as 150 people using the general formula of proportions and considering  $P=0.51$ ,  $\alpha=0.05$  and  $d=0.08d$ .

## Patients

Gout was diagnosed based on the Rome classification criteria (11). To be diagnosed with gout, patients must have 2 of the following 4 criteria: uric acid level  $>7$  mg/dL in men or  $>6$  mg/dL in women, presence of tophi, presence of MSU crystals in SF or tissues, history of painful joint swelling with sudden onset and remission. Patients who were excluded if unwillingness to participate in the study, presence of malignancy and current chemotherapy, presence of other rheumatologically disease, use of corticosteroids for a disease other than gout.

The patients' demographic and clinical features were recorded and blood pressure, lipid profile (high-density lipoprotein cholesterol (HDL-c) and triglyceride (TG)), fasting blood glucose, and waist circumference were measured.

MetS was classified according to IDF 2004 and NCEP ATP III 2001 (3,4). The IDF criteria defined as central obesity (waist circumference  $\geq 94$  cm for men and  $\geq 80$  cm for women) and two of these conditions: elevated TGs ( $>150$  mg/dL) or treatment for it, low HDL cholesterol ( $<40$ mg/dl in men, 50 mg/dl for women), elevated blood pressure ( $>130$  mmHg systolic or  $>85$  mmHg diastolic) or treatment, and high FBS ( $>100$  mg/dL) or type II diabetes. The NCEP criteria was defined as waist circumference  $\geq 102$  cm for men and  $\geq 88$  cm for women, and two other defining criteria. Smoking was categorized as current smoker or non-smoker. There were also other variables considered in the study, including the age, gender, gout duration, and treatment modalities including anti-inflammatory and urate lowering medications.

## Assessments

Waist circumference was measured in a horizontal plane around the abdomen at the level of the iliac crest, at the end of a normal expiration. Blood pressure was assessed at rest by trained medical students. FBS and lipid

profile were measured after 12 hours overnight fasting (PARS AZMUN).

### Statistical analysis

Descriptive statistics methods such as ratios and percentages were used to determine the frequency of MetS using SPSS 20 software, and central and dispersion indices were used for quantitative variables. Chi-square and T tests were used to compare frequencies in patients with and without MetS.  $P < 0.05$  was considered significant.

### Ethical considerations

The study was approved by the Ethics and Research Committee of Mazandaran University of Medical Sciences, Mazandaran, Iran (code:IR.MAZUMS.IMAMHOSPITAL.REC.1402.040).

### Results

#### Demographic and clinical data

150 patients with gout were entered. The mean age of the patients was  $50.17 \pm 15$  year and 88% of subjects were male. Furthermore, seventeen (11.3%) of patients were current smoker. 16.7% of patients were taking glucocorticoids and 68.6% were taking uric acid-lowering drugs. These findings were summarized in Tables 1.

#### The Mets and its components in patients with gout

High waist circumference (according to NCEP and IDF), Hypertension, Low HDL, Hypertriglyceridemia, and Hyperglycemia were evaluated in patients. The MetS components are summarized in Tables 2. The most common components of MetS in patients with gout are hypertriglyceridemia and truncal obesity.

#### Comparison of patients according existence of MetS

As the results revealed, 88(58.7%) patients met the NCEP criteria for MetS. Comparison of findings were showed in Table 3. Age, body

mass index, and duration of gout were significantly higher in patients with MetS ( $P < 0.05$ ).

### Conclusion

This study investigated the frequency of MetS in the gout patients as 60% according to IDF criteria and 58.7% according to NCEP. Old Age, high body mass index, and long duration of gout were significantly more prevalent in patients with metabolic syndrome criteria.

Hypertriglyceridemia was the most common component of MetS. One third of patients in this study had hypertension. It was lower than results of similar studies. This result may be due to the lower incidence of chronic renal failure in our study patients. In most studies and in present study, more than half of gout patients are obese. We did not found any significant difference in uric acid levels between in patients with MetS than in patients without MetS.

Due to serious complications associated with MetS and gout, this frequent comorbidity should be recognized and managed. Special attention to nutrition and exercise is very important for weight loss and dyslipidemia control. Based on the knowledge of this relationship and the effects of both diseases on cardiovascular diseases, it is recommended that patients with gout be periodically evaluated and managed for components of metabolic syndrome. Early diagnosis of MetS in gout, non-pharmacological control of MetS components and selection of appropriate medication may be useful for better survival of patients.

Limitations: First, it was a cross sectional study conducted at a single city. Second, the study population was too small and third, the proportion of female patients in this study was small. It is recommended that larger studies be conducted in different Iranian ethnic groups, in different age groups, and in women.

**Table 1. Demographic and clinical data of patients with gout**

Variable	Result	
Age (years)	50.17 ( $\pm$ 15)	
Male, N (5)	132 (88%)	
Got married, N (%)	128(85.3%)	
Education level, N (%)	Illiterate	12(8%)
	Undergraduate	27(18%)
	Diploma	41(27.3%)
	Academic	70(46.7%)
Body mass index, Kg/M <sup>2</sup>	29.8 ( $\pm$ 5.17)	
Chronic kidney disease (CKD), N (%)*	9(6%)	
Renal stone, N (%)	45(30%)	
hypothyroidism, N (%)	15(10%)	
Ischemic heart disease	17(11.3%)	
Psoriasis, N (%)	5(3.3%)	
Alcohol consumption, N (%)	34(22.7%)	
Current smoker, N (%)	17(11.3%)	
Duration of gout (years)	5.24 $\pm$ 4.85	
Serum uric acid level (mg/dl)	7.64 ( $\pm$ 2.11)	
	NSAID	4(2.7%)
Taking anti-inflammatory drugs, N (%)	Colchicine	55(36.7%)
	Glucocorticoid	25(16.7%)
	Allopurinol	94(62.6%)
Taking uric acid-lowering medications, N (%)	Febuxostat	9(6%)

\* CKD was defined as GFR < 60 mL/min/1.73 m

**Table 2. The MetS and its components in patients with gout.**

Variable	Value
High waist circumference (according to NCEPT), N (%)	91 (60.6%)
High waist circumference (according to IDF), N (%)	93 (61.8%)
Hypertension, N (%)	47 (31.3%)
Low HDL, N (%)	77 (51.3%)
Hypertriglyceridemia, N (%)	104 (69.3%)
Hyperglycemia, N (%)	63 (42%)
Metabolic syndrome (according to NCEPT), N (%)	88 (58.7%)
Metabolic syndrome (according to IDF), N (%)	90 (60%)

**Table 3. Comparison of patients according existence of MetS, according to the NCEP III Criteria.**

Variable	MetS+	MetS-	P-value
Age(years)	52.45 ( $\pm$ 16.61)	47.02 ( $\pm$ 13.98)	0.045
Body mass index(Kg/M2)	31.13 ( $\pm$ 4.81)	27.79 ( $\pm$ 4.60)	<0.01
Duration of gout(years)	5.67 ( $\pm$ 5.60)	3.41 ( $\pm$ 4.08)	0.010
Serum uric acid level(mg/dl)	7.69 ( $\pm$ 2.17)	7.58 ( $\pm$ 2.06)	0.76

## Acknowledgments

The researchers would like to thank the Vice Chancellor for Research, Mazandaran University of Medical Sciences. This research resulted from Dr. Hengameh Babaei's thesis for a degree in general medicine.

## Funding

This article was financially supported by Mazandaran University of Medical Sciences, Sari, Iran.

## Conflict of Interest

No conflict of interest.

## Authors' contributions

H.B and F.N: collected the data, contributed data and analysis tools.

M.M: conceived and designed the analysis, collected the data, contributed data and analysis tools, wrote the paper.

A.HA: collected the data.

RA.M: performed the analysis. All the authors critically revised the manuscript, agree to be fully accountable for the integrity and

accuracy of the study, and read and approved the final manuscript.

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