



# Factors Influencing Urate-Lowering Therapy Prescriptions in Gout Patients : A Retrospective National Cohort Study

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\*Funded by the BK21 FOUR program of the National Research Foundation of Korea

## INTRODUCTION

Acute gout flares significantly affect patients’ quality of life, making their prevention a primary goal in gout management. Urate-lowering therapy (ULT) plays a crucial role in achieving this objective.

## OBJECTIVES

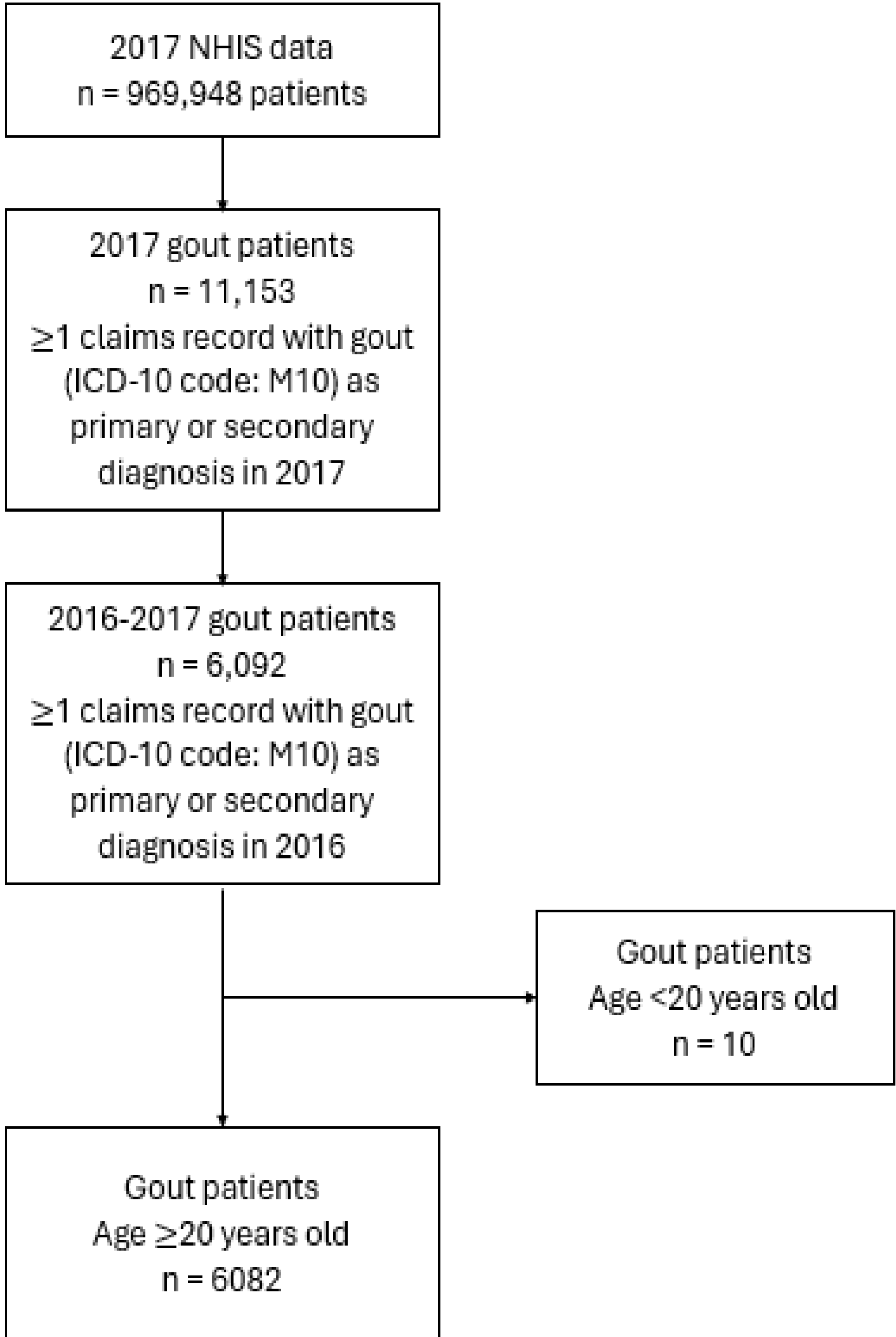
This study aimed to investigate ULT prescription rates among gout patients who are recommended for ULT, and to identify influencing factors.

## METHODS

This retrospective study utilized data from 2007 to 2018 from the National Health Insurance sample cohort, focusing on patients diagnosed with gout (ICD-10 code: M10) at least once both in 2016 and 2017 (two-year prevalent patients). To ensure that each patient was observed for at least one year, the observation period for ULT prescription status was set from January 1, 2017, to December 31, 2018. We examined the proportion of gout patients receiving ULT among those who met specific ULT prescription criteria: criterion 1, having ≥2 gout flares per year; criterion 2, a history of urolithiasis from 2007 to 2017; criterion 3, presence of comorbidities such as renal impairment, hypertension, ischemic heart disease, or heart failure; and criterion 4, age <40 years as of 2016. Logistic regression analysis was performed to identify factors associated with ULT prescription.

## RESULT

Out of 6,082 adult gout patients, 4,566 (75.1%) met at least one criterion, with the highest proportion meeting criterion 3 (50.6%), followed by criterion 4 (18.4%), criterion 1 (16.0%), and criterion 2 (11.6%). Among those meeting any criterion, 3,291 (72.1%) were prescribed ULT. Interestingly, ULT prescriptions did not increase linearly with the number of criteria met. Logistic regression analysis identified several factors significantly associated with the ULT prescription: meeting criterion 3 (odds ratio [OR]: 1.351, 95% confidence interval [CI] 1.098-1.662), being male (OR: 1.687, 95% CI: 1.294-2.2), income deciles 4-5 (OR: 1.479, 95% CI: 1.09-2.007), 8 (OR: 1.377, 95% CI: 1.005-1.887), 9 (OR: 1.524, 95% CI: 1.115-2.084), 10 (OR: 1.524, 95% CI: 1.12-2.074), metropolitan residence (OR: 0.808, 95% CI: 0.653-0.999), receiving gout care at hospitals vs. clinics (OR: 1.295, 95% CI: 1.042-1.609), and receiving gout care from internal medicine clinicians vs. orthopedics (OR: 1.352, 95% CI: 1.14-1.604).



NHIS: National Health Insurance Service

Figure 1. Steps to identify prevalent gout patients from 2016 through 2017

Table 1. Basic characteristics of the study subjects

Characteristics	No. patients (%)	Characteristics	No. patients (%)
Sex		Type of HC institutions treating gout	
Male	5,720 (94)	Tertiary-care hospitals	477 (7.8)
Female	361 (5.9)	General hospitals	813 (13.4)
Age, years		Hospitals	758 (12.5)
20-29	175 (2.9)	Clinics	3,993 (65.7)
30-39	831 (13.7)	Public healthcare centers	41 (0.7)
40-49	1,243 (20.4)	Type of medical specialties of HC providers treating gout	
50-59	1,406 (23.1)	Orthopedic surgery	3,463 (56.9)
60-69	1,297 (21.3)	Internal medicine	1,847 (30.4)
70-79	816 (13.4)	Family medicine	162 (2.7)
80+	314 (5.2)	Surgery	146 (2.4)
Type of NHS program enrolled		Anesthesiology/pain medicine	62 (1.0)
NHI	5,860 (96.3)	Neurosurgery	62 (1.0)
Medical Aid	221 (3.6)	Emergency medicine	29 (0.5)
Income decile.1)		General practitioner	31 (0.5)
0	221 (3.6)	Rehabilitation	24 (0.4)
1	387 (6.4)	Neurology	17 (0.3)
2	393 (6.5)	Pediatrics	13 (0.2)
3	381 (6.3)	Thoracic surgery	11 (0.2)
4	454 (7.5)	Otolaryngology	5 (0.1)
5	448 (7.4)	Dermatology	8 (0.1)
6	513 (8.4)	Urology	8 (0.1)
7	676 (11.1)	Radiology	5 (0.1)
8	736 (12.1)	Diagnostic laboratory medicine	1 (0.0)
9	829 (13.6)	Ophthalmology	1 (0.0)
10	932 (15.3)	Psychiatry	1 (0.0)
Missing	112 (1.8)	Obstetrics and Gynecology	1 (0.0)
Place of residence		1) The decile number gets larger as income level increases.	
Seoul (capital city)	982 (16.1)	*Data was missing for one person, each for sex, type of NHS program enrolled, and place of residence	
Metropolitan areas	1,659 (27.3)	HC: healthcare, NHI: National Health Insurance, NHS: National Health Service	
Other areas	3,440 (56.6)		

Table 2. Number of gout patients meeting individual criteria for urate-lowering therapy

Type of criteria	No. gout patients meeting criteria (%)
Any of the four criteria	4,566 (75.1)
Criteria1: ≥ 2 gout flare per year	974 (16.0)
Criteria 2: Experience of urolithiasis	707 (11.6)
Criteria 3: Comorbidities (renal impairment, hypertension, IHD, or HF)	3,077 (50.6)
Criteria 4: Young age (<40 years)	1,118 (18.4)

n=6,082 gout patients. HF: heart failure. IHD: ischemic heart disease

Table 3. Number of gout patients meeting combinations of criteria for urate-lowering therapy

Type of criteria	No. of patients (%)	Type of criteria	No. of patients (%)	Type of criteria	No. of patients (%)
Criteria 1 only	318 (7.0)	Criteria 1 & 2	45 (1.0)	Criteria 1, 2, & 3	56 (1.2)
Criteria 2 only	186 (4.1)	Criteria 1 & 3	398 (8.7)	Criteria 1, 2, & 4	14 (0.3)
Criteria 3 only	2,124 (46.5)	Criteria 1 & 4	123 (2.7)	Criteria 1, 3, & 4	18 (0.4)
Criteria 4 only	738 (16.2)	Criteria 2 & 3	321 (7.0)	Criteria 2, 3, & 4	18 (0.4)
		Criteria 2 & 4	65 (1.4)	Criteria 1, 2, 3, & 4	2 (0.0)
		Criteria 3 & 4	140 (3.1)		

n=6,082 gout patients

Figure 2. Proportion of gout patients receiving urate-lowering therapy by type of urate-lowering therapy criteria

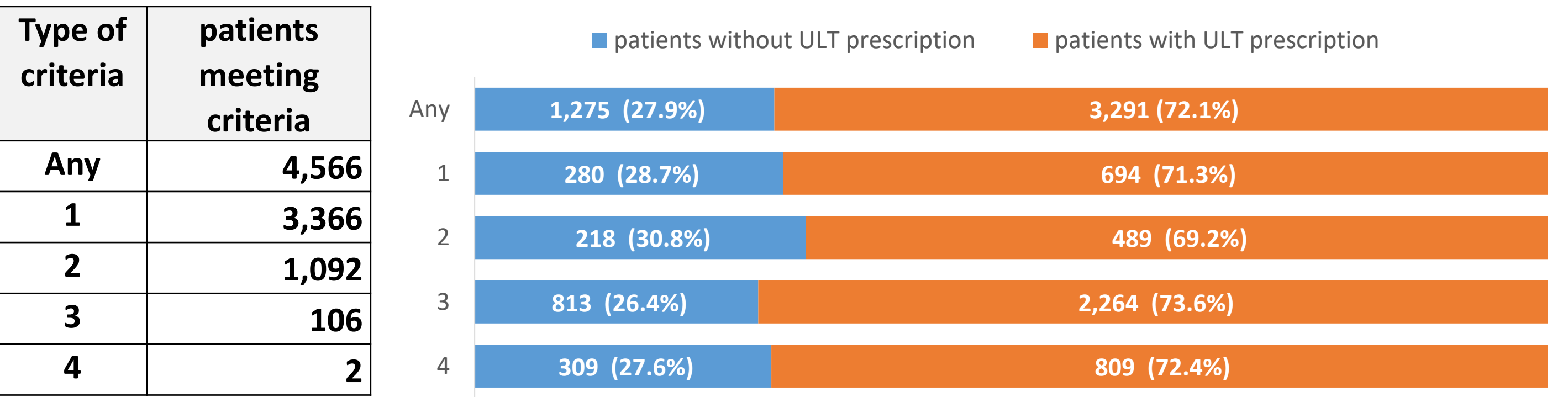
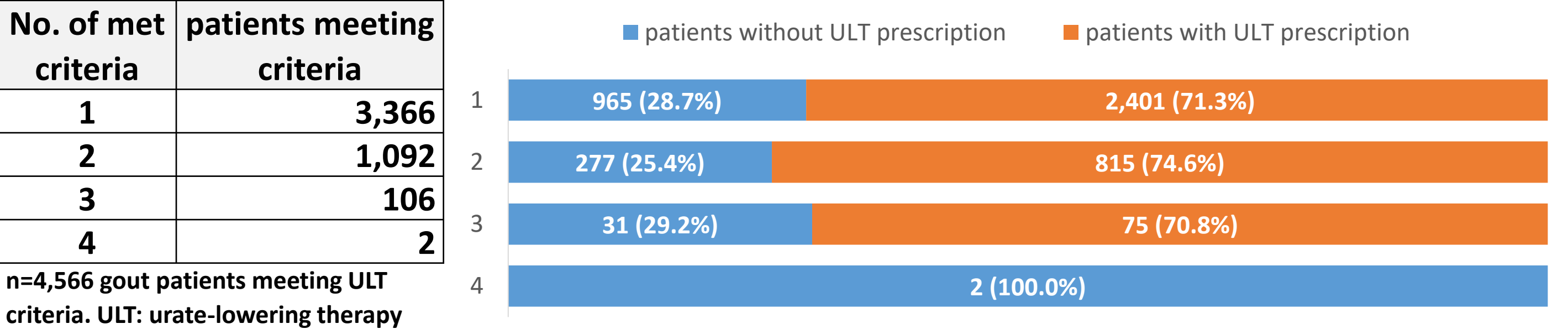


Table 4, Figure 3. Proportion of gout patients receiving urate-lowering therapy by number of criteria met for prescribing urate-lowering therapy



n=4,566 gout patients meeting ULT criteria. ULT: urate-lowering therapy

Table 5. Logistic regression analysis results of factors associated with the prescription of urate-lowering therapy in patients meeting urate-lowering therapy criteria

	n (%)	OR (95% CI)
Type of criteria		
Criteria 1 Yes	974 (21.3)	1.057 (0.885-1.263)
No	3,592 (78.7)	Ref
Criteria 2 Yes	707 (15.5)	0.883 (0.73-1.069)
No	3,859 (84.5)	Ref
Criteria 3 Yes	3,077 (67.4)	1.351 (1.098-1.662)
No	1,489 (32.6)	Ref
Criteria 4 Yes	1,118 (24.5)	1.386 (0.855-2.247)
No	3,448 (75.5)	Ref
Sex		
Male	4,283 (93.8)	1.687 (1.294-2.200)
Female	282 (6.2)	Ref
Age, years		
20-39	1,006 (22.0)	Ref
40-49	692 (15.2)	0.93 (0.589-1.470)
50-59	896 (19.6)	0.967 (0.577-1.618)
60-69	983 (21.5)	1.313 (0.783-2.202)
70-79	712 (15.6)	1.225 (0.723-2.075)
80+	277 (6.1)	1.038 (0.588-1.832)
Type of NHS program enrolled		
NHI	4,385 (96.1)	Ref
Medical Aid	180 (3.9)	1.21 (0.801-1.827)
Income decile		
0-1	468 (10.5)	Ref
2-3	571 (12.8)	1.304 (0.955-1.781)
4-5	692 (15.5)	1.479 (1.090-2.007)
6-7	910 (20.3)	1.284 (0.960-1.717)
8	563 (12.6)	1.377 (1.005-1.887)
9	605 (13.5)	1.524 (1.115-2.084)
10	668 (14.9)	1.524 (1.120-2.074)
Place of residence		
Seoul	740 (16.2)	Ref
Metropolitan	1,229 (26.9)	0.808 (0.653-0.999)
Other areas	2,596 (56.9)	1 (0.823-1.213)
Type of HC institutions treating gout		
Tertiary hospital	379 (8.3)	0.995 (0.755-1.312)
General hospital	638 (14.0)	0.933 (0.761-1.145)
Hospital	577(12.6)	1.295 (1.042-1.609)
Clinic or Healthcare facility	2,971 (65.1)	Ref
Type of medical specialties of HC providers treating gout		
Internal medicine	1,480 (33.4)	1.352 (1.140-1.604)
Orthopedic surgery	2,511 (56.7)	Ref
Family medicines	122 (2.8)	1.014 (0.678-1.516)
Others	313 (7.2)	0.892 (0.687-1.159)

n=4,566 gout patients meeting ULT criteria. HC: healthcare, NHI: National Health Insurance, NHS: National Health Service, OR: odds ratio

## CONCLUSION

Only 75% of gout patients who met the criteria for ULT recommendations were treated with ULT, highlighting the need to improve ULT prescription rates. Vulnerable groups, such as females, those with the lowest income, and individuals living in metropolitan areas compared to capital city were less likely to receive ULT. Meeting criterion 3 significantly increases the likelihood of receiving a ULT prescription. Therefore, greater attention should be given to patients meeting criteria 1, 2, and 4 to improve ULT provision.

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