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Sex and country differences in gout: cross-country comparison between Sweden and the UK

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Objective: Compare characteristics, sex differences, and management of gout in Sweden and the UK.

Method: The results from two separate primary care gout surveys from Sweden and the UK were compared. Participants aged ≥18 years with gout were sent a questionnaire asking about lifestyle, gout characteristics, urate-lowering therapy (ULT), comorbidities, disability, and disease impact. For sex comparison, participants were pooled across countries.

Results: In total, 784 (80% male) participants from Sweden and 500 (87% male) from the UK were included. Swedish patients were significantly older at gout onset, mean (SD) age 72 (12) versus 63 (13) years, (p<0.0001), with more comorbidities, and more frequent use of ULT (48% vs 35%, p=0.0005, age-adjusted). Use of alcohol and diuretics was significantly more common among UK patients, who also reported a higher number of gout flares, mean (SD) 2.2 (1.7) versus 1.6 (3.6), (p=0.003) age-adjusted. Females with gout were older at gout onset, mean (SD) age 67 (13) versus 56 (15), (p<0.0001), more often obese, and reported higher use of diuretics. Furthermore, females reported greater impact of gout, more pain and physical limitations, whereas no sex differences were seen in ULT or flares.

Conclusions: In the UK, gout was more frequently associated with modifiable risk factors. People with gout in Sweden were more commonly taking ULT and had lower frequency of gout flares and impact of gout. Females with gout more commonly took diuretics, had higher body mass index, and reported greater physical disability, which should be considered when managing gout in women.

Gout is the most common inflammatory joint disease, with a prevalence ranging from < 1% to 10% around the world and from 1% to 4% in western Europe (1). Raised serum urate levels result in the formation and deposition of monosodium urate (MSU) crystals in, and around, joints, triggering a pronounced acute inflammatory response, a gout flare. Gout is strongly associated with a wide range of comorbidities, including cardiovascular disease, chronic kidney disease, obesity, and hypertension (1, 2). Long-term treatment with urate-lowering therapy (ULT) 'cures' the disease and prevents flares.

Healthcare in Sweden and the UK is publicly funded, accounting for approximately 10% of the gross domestic product. In both countries, primary care services provide the first point of contact in the healthcare system, acting as the front door to the national health system, and patients are registered to a specific primary care provider. In Sweden, a consultation in primary care costs 10 Euro, while it is free in the UK. Gout is almost exclusively managed in primary care settings in both countries. The population of the UK is almost seven times that of Sweden, at 67 and 10 million people, respectively, but the two countries have similar age distributions and 5% of the population are aged 80 years or more (3). However, gout is more prevalent in the UK, with prevalence of 3.2% in adults in 2012 compared with 1.8% in Sweden (4, 5). This difference may partly be explained by a higher alcohol consumption (6) and higher mean body mass index (BMI) in the UK compared with Sweden (7). The British Society for Rheumatology 2017 gout guideline (8), the 2022 UK National Institute for Health and Care Excellence (NICE) gout guideline (9), and the Swedish Medical Products Agency gout guideline from 2016 (10) describe similar

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indications for ULT, with allopurinol being the recommended first-line ULT for the majority of patients. However, long-term management for gout is suboptimal in both countries (5, 11).

Gout is more common in men and less well studied in women. Females usually develop gout later in life than males (2, 12–19). Osteoarthritis, obesity, renal disease/failure, hypertension, and treatment with diuretics are more often seen in females with gout compared with males (2, 12–20), whereas alcohol consumption is lower in females (2, 12, 13, 15–20). Although the impact of gout is reported to be greater in women than men (11, 14), women less commonly receive ULT (21).

Comparing the characteristics of patients with gout, selected from similar settings (i.e. primary care), in different countries could provide useful insights into generic and country-specific patterns of clinical features, risk factors, and treatment patterns. Previous studies have examined differences in gout characteristics between different racial or ethnic groups (22), but there have been few between-country comparisons (23).

The objectives of this study were to compare disease characteristics, risk factors, and management of gout between the UK and Sweden, and between men and women.

Method

This analysis compared the study populations of two separate questionnaire studies performed in primary care settings in Sweden and the UK. Parts of this data have been used and published before (24, 25). Ethical approval was granted from the Ethical Review Board of Gothenburg, Sweden (ref no 519-16) and the North West – Liverpool East Research Ethics Committee (ref no 12/NW/0297).

Study population

Sweden. A questionnaire was mailed to 1444 individuals aged ≥ 18 years with at least one visit with a documented gout diagnosis [International Classification of Diseases, 10th Revision (ICD-10): M10] recorded by a physician during a 2 year period (2015–2017) at 12 primary care centres in the Western Sweden Health Care Region (24). Primary non-responders received a second mailing of the questionnaire after 4 weeks.

UK. A questionnaire was mailed to 1805 people with gout aged ≥ 18 years, identified by a gout diagnosis or a prescription for allopurinol or colchicine in their primary care medical record in a 2 year period (2010–2011) at 20 general practices in the West Midlands, UK (26). Only those respondents identified by a gout diagnosis (i.e. not those identified by a prescription for allopurinol or colchicine without a gout consultation in the preceding 2 years) were included in this analysis to ensure that the participant identification method was similar to the Swedish study. Primary non-responders received a reminder postcard after 2 weeks and a new copy of the questionnaire after another 2 weeks.

All participants were informed in writing that the reported data would be published, and that returning the questionnaire was considered informed consent.

For the comparison between men and women, participant data from the two countries were pooled.

Questionnaire and data collection

Sweden and UK. The questionnaires asked about sociodemographic and gout characteristics, including frequency of alcohol consumption, occupation, relationship status, educational level, self-reported height and weight, age at gout onset, disease duration (years from first diagnosis), number of flares during the past 12 months, and allopurinol use. Participants were also asked whether they had ever been diagnosed with or treated for diabetes mellitus, stroke, hypertension, dyslipidaemia, myocardial infarction, renal disease or failure, or kidney stones. Through a review of the medical records in the UK and by self-report in Sweden, participants' current use of the following anti-hypertensive medications was identified: thiazide diuretics, loop diuretics, losartan, non-losartan angiotensin receptor blockers, angiotensin-converting enzyme inhibitors (ACEi), beta-blockers, and calcium channel blockers.

The following patient-reported outcome measures (PROMs) for disability, illness perception, and self-reported quality of life were included: the 36-item Short Form Health Survey (SF-36) physical functioning subscale (PF-10) (27); Health Assessment Questionnaire Disability Index (HAQ-DI) (28); and the following six items selected from the Gout Impact Scale (GIS) (29): gout attack (flare) interference with mood, movement, sleep, work/recreation, life enjoyment, and ability to do what you want. Lower scores on the PF-10 (range 0–100) indicate greater limitations in physical activities because of health problems (27). Higher scores on the HAQ-DI (range 0–3) and GIS (range 0–100) indicate a greater limitation of activity and a higher impact of gout, respectively (28, 29). Two questions were selected from the Revised Illness Perception Questionnaire (IPQ-R): 'There is a lot I can do to control my gout' and 'Treatments are effective in controlling my gout', where a higher score indicates stronger agreement (range 0–5) (30). The PF-10 asks responders to rate limitations in physical activities at the time of questionnaire completion (27) and the HAQ-DI over the past week (28). The GIS assesses

the impact of gout during the last gout flare (29). Pain and general health for the past week were measured on a 0–10 numeric rating scale (NRS), irrespective of gout flare, where a higher score indicates more pain and worse general health, respectively.

Analysis

Data on anthropometry and gout characteristics were expressed as absolute counts and proportions for categorical variables, and as means ± standard deviation (sd) for continuous variables. Body mass index (BMI) was calculated and classified as: normal (≤ 24.9 kg/m^2), overweight (25–29.9 kg/m^2), obese (30–34.9 kg/m^2), and very obese (≥ 35 kg/m^2). Linear and (ordinal) logistic regression were used as appropriate to examine associations between groups and study variables. All analyses were adjusted for age, except for mean age and mean age of gout onset. In the sex comparison with participants pooled across countries, we also adjusted for country. Nominal p-values < 0.05 were considered statistically significant. All statistical analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC, USA).

Results

A total of 784 (54.3%) individuals responded to the questionnaire in Sweden. In the UK, 1184 (65.9%) individuals responded to the survey, 500 of whom had had a consultation for gout in the preceding 2 years and were included in this analysis. In both cohorts, most participants were male: n = 435 (87%) in the UK and n = 629 (80%) in Sweden. The mean ± sd age was significantly lower in the UK (63 ± 13 vs 72 ± 12 years in Sweden, p < 0.0001) (Table 1). The majority of participants in both populations were retired, and married or cohabiting. In the UK, 102 (21%) had undertaken further education, whereas in Sweden, 518 (69%) had completed > 9 years of education (Table 1).

Between-country comparison

Risk factors and comorbidities. Thirty-five per cent of the UK population were obese or very obese compared with 27% in Sweden, although neither this difference nor the difference in mean BMI was statistically significant (Table 1). Alcohol consumption was significantly higher in the UK (p < 0.0001, age-adjusted) (Table 1). Comorbidities were very common in both cohorts, but diabetes (22% vs 12%, p = 0.002, age-adjusted), stroke (10% vs 3%, p = 0.002, age-adjusted), and kidney stones (13% vs 7%, p = 0.001, age-adjusted) were more common in the Swedish cohort, whereas dyslipidaemia was more common in the UK (39% vs 32%, p = 0.001, age-adjusted) (Table 1). The prevalences of hypertension, myocardial infarction, and renal disease/failure were similar in Sweden and the UK (Table 1). Medication use for hypertension was very common in both cohorts (Sweden 66%, UK 54%) (Table 1). Losartan was more commonly used in Sweden (15% vs 4%, p < 0.0001, age-adjusted), while thiazide diuretics (15% vs 12%, p = 0.002, age-adjusted) and ACEi (34% vs 19%, p < 0.0001, age-adjusted) were more commonly used in the UK (Table 1).

Gout characteristics. The UK cohort had a significantly lower mean ± sd age of gout onset (55 ± 16 vs 60 ± 15 years, p < 0.0001) and a significantly shorter disease duration (9 ± 11 vs 11 ± 11 years, p < 0.0001, age-adjusted) (Table 2). Current allopurinol use was more common in Sweden than in the UK (48% vs 35%, p = 0.0005, age-adjusted). The mean ± sd number of gout flares in the past 12 months was lower in Sweden than in the UK (1.6 ± 3.6 vs 2.2 ± 1.7, p = 0.003, age-adjusted) (Table 2). The Swedish cohort reported a significantly higher pain NRS score in the past week than the UK cohort (mean ± sd 2.8 ± 2.6 vs 2.3 ± 2.8, p = 0.045, age-adjusted), while there was no difference in general health NRS score (2.9 ± 2.4 vs 2.6 ± 2.8, p = 0.9, age-adjusted) (Table 2). The UK cohort reported a significantly higher impact of gout on four of the six GIS items (Table 2). No differences were demonstrated regarding illness perception relating to gout, with both cohorts being uncertain about the possibility of self-care and effect of treatment on gout (Table 2). Limitations in physical activities because of health problems, measured by the PF-10, were low overall and not different between Sweden and the UK (Table 2). The UK cohort reported greater limitation on the HAQ-DI (mean ± sd 0.44 ± 0.66 vs 0.3 ± 0.50 in Sweden, p < 0.0001, age-adjusted) (Table 2).

Between-sex comparison

Females (n = 220) were significantly older than males (n = 1064) (mean ± sd 74 ± 12 vs 67 ± 13 years, p < 0.0001) (Table 3). Females were less commonly married/cohabitating (57% vs 80%, p < 0.0001, age- and country-adjusted). The majority of both sexes were retired, but a significantly higher proportion of the females were retired (Table 3).

Risk factors and comorbidities. The mean ± sd BMI was significantly higher in females (29.4 ± 5.1 vs 28.3 ± 4.5 kg/m^2 in males, p = 0.001, age- and country-adjusted). Females were more commonly obese or very obese compared with males (28% vs 20%, p = 0.001,

Table 1. Demographics, risk factors, and comorbidities in the Swedish and UK cohorts.

	Sweden			UK			p
	Total (n = 784)	Male (n = 629)	Female (n = 155)	Total (n = 500)	Male (n = 435)	Female (n = 65)	Total Sweden vs UK
Age (years)	72 ± 12	71 ± 12	76 ± 12	63 ± 13	62 ± 13	72 ± 12	< 0.0001
Education							
Undertook higher education > 9 years	518 (69)	440 (72)	78 (55)	102 (21)	91 (22)	11 (18)	
Relationship status							
Single (ref)	202 (26)	140 (23)	62 (42)	102 (21)	74 (17)	28 (44)	0.2
Married/cohabiting	564 (74)	480 (77)	84 (58)	390 (79)	355 (83)	35 (56)	0.61
Occupation							
Working	184 (24)	166 (27)	18 (12)	193 (40)	188 (45)	5 (8)	0.1
Unemployed	5 (0.5)	4 (0.5)	1 (1)	19 (4)	17 (4)	2 (3)	0.009
Retired	570 (75)	444 (72)	126 (86)	253 (52)	202 (48)	51 (81)	0.1
Other	6 (0.5)	5 (0.5)	1 (1)	20 (4)	15 (3)	5 (8)	0.002
BMI (kg/m^2)	28.1 ± 4.5	27.9 ± 4.3	29.0 ± 5.1	29.0 ± 4.9	28.9 ± 4.8	30.3 ± 4.9	0.1
BMI class (kg/m^2)							
Normal (≤ 24.9) (ref)	162 (23)	133 (23)	29 (22)	96 (20)	85 (20)	11 (19)	0.2
Overweight (25–29.9)	349 (50)	298 (53)	51 (38)	215 (45)	196 (47)	19 (32)	0.4
Obese (30–34.9)	132 (19)	93 (16)	39 (29)	117 (24)	102 (24)	15 (25)	0.5
Very obese (≥ 35)	57 (8)	43 (8)	14 (11)	52 (11)	38 (9)	14 (24)	0.5
Alcohol (standard drinks/week)							
< 1 (ref)	281 (37)	178 (29)	103 (71)	5 (1)	4 (1)	1 (3)	0.002
1–4	199 (26)	168 (27)	31 (21)	96 (24)	75 (21)	21 (62)	< 0.0001
5–9	189 (25)	179 (29)	10 (7)	85 (22)	80 (22)	5 (15)	< 0.0001
10–14	62 (8)	61 (10)	1 (1)	62 (16)	56 (16)	6 (18)	< 0.0001
≥ 15	29 (4)	28 (5)	1 (1)	147 (37)	146 (40)	1 (3)	< 0.0001
Comorbidities							
HT	504 (64)	401 (64)	103 (66)	278 (56)	232 (53)	46 (71)	0.9
DM	178 (22)	144 (23)	34 (22)	61 (12)	48 (11)	13 (20)	0.002
Dyslipidaemia	251 (32)	196 (31)	55 (35)	195 (39)	172 (40)	23 (35)	0.001
MI	115 (15)	98 (16)	17 (11)	51 (10)	46 (11)	5 (8)	0.9
Stroke	75 (10)	61 (10)	14 (9)	13 (3)	12 (3)	1 (2)	0.002
Renal disease/failure	58 (7)	43 (7)	15 (10)	21 (4)	15 (3)	6 (9)	0.2
Kidney stone	104 (13)	96 (15)	8 (5)	35 (7)	31 (7)	4 (6)	0.001
Medication							
Any anti-hypertensive medication	517 (66)	418 (66)	99 (64)	272(54)	219 (50)	53 (82)	0.7
Thiazide diuretics	94 (12)	72 (11)	22 (14)	76 (15)	56 (13)	20 (31)	0.002
Loop diuretics	131 (17)	93 (15)	38 (25)	62 (12)	45 (10)	17 (26)	0.3
Losartan	118 (15)	100 (16)	18 (12)	22 (4)	13 (3)	9 (14)	< 0.0001
ARB	103 (13)	78 (12)	25 (16)	40 (8)	33 (8)	7 (11)	0.08
ACE	152 (19)	134 (21)	18 (12)	172 (34)	148 (34)	24 (37)	< 0.0001
Beta	306 (39)	238 (38)	68 (44)	134 (27)	109 (25)	25 (38)	0.2
CCB	198 (25)	161 (26)	37 (24)	109 (22)	86 (20)	23 (35)	0.7

Data are shown as mean ± sd or n (%). Groups were compared with linear and (ordinal) logistic regression adjusted for age (except for age).
BMI, body mass index; HT, hypertension; DM, diabetes mellitus; MI, myocardial infarction; ARB, angiotensin II receptor blocker except losartan; ACE, angiotensin-converting enzyme inhibitor; Beta, beta-blocker; CCB, calcium channel blocker.

age- and country-adjusted, and 15% vs 8%, p = 0.0003, age- and country-adjusted, respectively) (Table 3). Alcohol consumption was significantly higher in males (p < 0.0001, age- and country-adjusted) (Table 3). Comorbidity was very common in both sexes. After adjusting for differences in age and country, the only significant differences were higher frequencies of myocardial infarction and kidney stones in males compared with females (14% vs 10%, p = 0.005, age- and country-adjusted, and 12% vs 5%, p = 0.002, age- and country-adjusted, respectively) (Table 3). Taking any medication for hypertension was very common (females 69%, males 60%) (Table 3). After adjusting for differences in age and country, thiazide and loop

Table 2. Gout characteristics and patient-reported outcome measures in the Swedish and UK cohorts.

	Sweden			UK			p
	Total (n = 784)	Male (n = 629)	Female (n = 155)	Total (n = 500)	Male (n = 435)	Female (n = 65)	Total Sweden vs UK
Age at onset (years)	60 ± 15	59 ± 15	67 ± 13	55 ± 16	53 ± 15	67 ± 12	< 0.0001
Disease duration (years)	11 ± 11	12 ± 11	8 ± 9	9 ± 11	10 ± 11	3 ± 4	< 0.0001
No. of flares	1.6 ± 3.6	1.6 ± 3.1	1.8 ± 5.3	2.2 ± 1.7	2.2 ± 1.7	2.0 ± 1.7	0.003
Last week pain	2.8 ± 2.6	2.6 ± 2.4	3.8 ± 2.9	2.3 ± 2.8	2.1 ± 2.7	3.8 ± 2.8	0.045
Last week pain	2 [10]	2 [10]	4 [10]	1 [10]	1 [10]	3 [10]	
General health	2.9 ± 2.4	2.6 ± 2.2	3.8 ± 2.7	2.6 ± 2.8	2.5 ± 2.8	3.9 ± 2.5	0.9
General health	2 [10]	1 [10]	4 [10]	2 [10]	1 [10]	4 [9]	
Allopurinol use	379 (48)	304 (48)	75 (48)	173 (35)	156 (36)	17 (26)	0.0005
GIS:* During your last attack – affected your							
Mood	36.6 ± 27.2	36.4 ± 27.1	38.0 ± 27.8	44.8 ± 30.2	44.2 ± 29.9	48.8 ± 31.8	0.02
Mood	25 [0–100]	25 [0–100]	25 [0–100]	50 [0–100]	50 [0–100]	50 [0–100]	
Ability to move	57.1 ± 31.4	56.7 ± 31.2	59.0 ± 32.4	61.8 ± 30.5	61.3 ± 30.5	65.3 ± 30.1	0.9
Ability to move	50 [0–100]	50 [0–100]	75 [0–100]	75 [0–100]	75 [0–100]	75 [0–100]	
Sleep	39.5 ± 31.9	38.4 ± 30.8	45.0 ± 36.1	55.3 ± 32.3	54.5 ± 32.5	60.3 ± 30.7	< 0.0001
Sleep	25 [0–100]	25 [0–100]	50 [0–100]	50 [0–100]	50 [0–100]	75 [0–100]	
Work/recreation	53.0 ± 33.8	53.1 ± 33.4	52.4 ± 35.7	62.5 ± 31.7	61.8 ± 32.1	67.5 ± 29.0	0.04
Work/recreation	50 [0–100]	50 [0–100]	50 [0–100]	75 [0–100]	75 [0–100]	75 [0–100]	
Life enjoyment	46.3 ± 31.9	45.4 ± 31.4	50.4 ± 34.2	55.3 ± 31.8	55.0 ± 31.7	58.1 ± 32.6	0.02
Life enjoyment	50 [0–100]	50 [0–100]	50 [0–100]	50 [0–100]	50 [0–100]	75 [0–100]	
Ability to do what you want	50.7 ± 33.6	50.3 ± 33.3	52.6 ± 35.2	57.8 ± 32.4	57.3 ± 32.6	61.3 ± 31.2	0.3
Ability to do what you want	50 [0–100]	50 [0–100]	50 [0–100]	75 [0–100]	75 [0–100]	75 [0–100]	
IPQ-R*:† Illness perceptions							
Control over my gout	3.2 ± 1.5	3.2 ± 1.5	3.0 ± 1.5	3.4 ± 0.9	3.4 ± 1.0	3.2 ± 0.8	0.9
Control over my gout	4 [1–5]	4 [1–5]	3 [1–5]	3 [1–5]	4 [1–5]	3 [1–5]	
Treatments are effective	3.6 ± 1.4	3.6 ± 1.4	3.5 ± 1.4	3.7 ± 0.9	3.7 ± 0.9	3.7 ± 1.0	0.5
Treatments are effective	4 [1–5]	4 [1–5]	4 [1–5]	4 [1–5]	4 [1–5]	4 [1–5]	
PF-10	70.8 ± 28.0	74.0 ± 26.0	56.8 ± 31.8	78.4 ± 24.7	81.3 ± 23.5	58.1 ± 23.6	0.95
HAQ-DI	0.3 ± 0.5	0.25 ± 0.48	0.59 ± 0.66	0.44 ± 0.66	0.4 ± 0.6	1.0 ± 0.8	< 0.0001

Data are shown as mean ± sd, median [range], or n (%). Groups were compared with linear and (ordinal) logistic regression adjusted for age (except for age at onset).
*Higher scores on the Gout Impact Scale (GIS) (range 0–100) indicate a higher impact of gout. †Higher scores on the Revised Illness Perception Questionnaire (IPQ-R) (range 0–5) indicate stronger agreement.
PF-10, 36-item Short Form Health Survey physical functioning subscale; HAQ-DI, Health Assessment Questionnaire Disability Index.

diuretics were more commonly used by females than males, whereas males more commonly used ACEi (Table 3).

Gout characteristics. The mean age ± sd of gout onset was higher in females than males, 67 ± 13 vs 56 ± 15 years, p = 0.001) and disease duration was shorter (Table 4). There was no difference in the number of gout flares experienced between females and males. However, females reported significantly greater mean pain NRS scores (3.8 ± 2.8 vs 2.4 ± 2.6, p < 0.0001, age- and country-adjusted) and worse general health during the past week (3.8 ± 2.6 vs 2.6 ± 2.5, p < 0.0001, age- and country-adjusted) (Table 4). Furthermore, females reported a significantly higher impact of gout on four of the six GIS items during the last flare compared with males (Table 4). Females displayed significantly more disability, measured by the HAQ, and limitation in physical activities, measured by the PF-10, compared with males (mean ± sd 0.76 ± 0.76 vs 0.31 ± 0.55, p < 0.0001, age- and country-adjusted, and 57.1 ± 29.8 vs 76.7 ± 25.3, p < 0.0001, age- and country-adjusted, respectively) (Table 4). There were sex differences in some illness perceptions, but not in current allopurinol use (Table 4).

Discussion

Using data from two comparable primary care studies of people with gout, we compared demographics, risk factors and comorbidities, gout characteristics, and management between Sweden

Table 3. Demographics, risk factors, and comorbidities in the merged male/female group from the Swedish/UK cohorts.

	Male vs female: Sweden + UK		
	Male (n = 1064)	Female (n = 220)	p
Age (years)	67 ± 13	74 ± 12	< 0.0001
Relationship status			
Single (ref)	214 (20)	90 (43)	0.96
Married/cohabiting	835 (80)	119 (57)	< 0.0001
Occupation			
Working	354 (34)	23 (11)	0.96
Unemployed	21 (2)	3 (1)	0.4
Retired (ref)	646 (62)	177 (85)	0.01
Other	20 (2)	6 (3)	0.003
BMI (kg/m^2)	28.3 ± 4.5	29.4 ± 5.1	0.001
BMI class (kg/m^2)			
Normal (≤ 24.9) (ref)	218 (22)	40 (21)	0.7
Overweight (25–29.9)	494 (50)	70 (36)	0.7
Obese (30–34.9)	195 (20)	54 (28)	0.001
Very obese (≥ 35)	81 (8)	28 (15)	0.0003
Alcohol (standard drinks/week)			
< 1 (ref)	182 (19)	104 (58)	0.8
1–4	243 (25)	52 (29)	< 0.0001
5–9	259 (27)	15 (8)	< 0.0001
10–14	117 (12)	7 (4)	< 0.0001
≥ 15	174 (18)	2 (1)	< 0.0001
Comorbidities			
HT	633 (59)	149 (68)	0.2
DM	192 (18)	47 (21)	0.6
Dyslipidaemia	368 (35)	78 (35)	0.5
MI	144 (14)	22 (10)	0.005
Stroke	73 (7)	15 (7)	0.2
Renal disease/failure	58 (5)	21 (10)	0.2
Kidney stone	127 (12)	12 (5)	0.002
Medication			
Any anti-hypertensive medication	637 (60)	152 (69)	0.7
Thiazide diuretics	128 (12)	42 (19)	0.035
Loop diuretics	138 (13)	55 (25)	0.02
Losartan	113 (11)	27 (12)	0.8
ARB	111 (10)	32 (15)	0.2
ACE	282 (27)	42 (19)	0.009
Beta	347 (33)	93 (42)	0.5
CCB	247 (23)	60 (27)	0.8

Data are shown as mean ± sd or n (%). Groups were compared with linear and (ordinal) logistic regression adjusted for age (except for age) and country.
BMI, body mass index; HT, hypertension; DM, diabetes mellitus; MI, myocardial infarction; ARB, angiotensin II receptor blocker except losartan; ACE, angiotensin-converting enzyme inhibitor; Beta, beta-blocker; CCB, calcium channel blocker.

Table 4. Gout characteristics and patient-reported outcome measures in the merged male/female group from the Swedish/UK cohorts.

	Male vs female: Sweden + UK		
	Male (n = 1064)	Female (n = 220)	p
Age at onset (years)	56 ± 15	67 ± 13	0.001
Disease duration (years)	11 ± 11	6 ± 8	0.0003
No. of flares	1.9 ± 2.6	1.9 ± 4.4	0.7
Last week pain	2.4 ± 2.6	3.8 ± 2.8	< 0.0001
Last week pain	2 [10]	4 [10]	
General health	2.6 ± 2.5	3.8 ± 2.6	< 0.0001
General health	2 [10]	4 [10]	
Allopurinol use	460 (43)	92 (42)	0.3
GIS:* During your last attack – gout affected your			
Mood	39.7 ± 28.6	41.6 ± 29.6	0.06
Mood	50 [0–100]	50 [0–100]	
Ability to move	58.6 ± 31.0	61.1 ± 31.8	0.01
Ability to move	75 [0–100]	75 [0–100]	
Sleep	45.2 ± 32.5	50.1 ± 35.0	0.0005
Sleep	50 [0–100]	50 [0–100]	
Work/recreation	56.8 ± 33.1	57.7 ± 34.1	0.055
Work/recreation	50 [0–100]	75 [0–100]	
Life enjoyment	49.5 ± 31.8	53.0 ± 33.8	0.004
Life enjoyment	50 [0–100]	50 [0–100]	
Ability to do what you want	53.3 ± 33.1	55.6 ± 34.0	0.01
Ability to do what you want	50 [0–100]	50 [0–100]	
IPQ-R:† Illness perceptions			
Control over my gout	3.3 ± 1.3	3.1 ± 1.3	0.08
Control over my gout	4 [1–5]	3 [1–5]	
Treatments are effective	3.7 ± 1.2	3.5 ± 1.2	0.03
Treatments are effective	4 [1–5]	4 [1–5]	
PF-10	76.7 ± 25.3	57.1 ± 29.8	< 0.0001
HAQ-DI	0.31 ± 0.55	0.76 ± 0.76	< 0.0001

Data are shown as mean ± sd, median [range], or n (%). Groups were compared with linear and (ordinal) logistic regression adjusted for age (except for age at onset) and country.
*Higher scores on the Gout Impact Scale (GIS) (range 0–100) indicate a higher impact of gout. †Higher scores on the Revised Illness Perception Questionnaire (IPQ-R) (range 0–5) indicate stronger agreement.
PF-10, 36-item Short Form Health Survey physical functioning subscale; HAQ-DI, Health Assessment Questionnaire Disability Index.

and the UK, and between the sexes. Swedish patients were older at gout onset, had more comorbidities, and had more frequent use of losartan and ULT, which probably explains the lower frequency of gout flares reported. Modifiable risk factors, such as obesity, alcohol intake, and use of diuretics, were more common among the UK patients, and they also reported a greater impact of gout. Females with gout were older, were more often obese, had a higher use of diuretics, and reported more pain, greater impact of gout, and larger physical limitations, while males consumed more alcohol, and more commonly had a history of myocardial infarction and renal stones.

Demographic characteristics

The peak incidence age of gout is over 80 years in both Sweden and the UK (4, 5), but in our study the UK cohort developed gout significantly earlier in life, which might be explained by higher alcohol consumption and BMI in the UK cohort, since both of these factors have been associated with earlier age at gout onset (31, 32). In our study, females had a later age of gout onset than males, in accordance with previous studies (2, 11–19). Greater health benefit from marriage has been shown in men compared to women in the general population (33), and in our study we found that females were less commonly married/cohabitating compared with males. There are reports on individuals with gout being married to a lesser degree, but to our knowledge there are no data on sex differences in marital status (34).

ULT

Gout is one of the few 'curable' rheumatic diseases, but in spite of this ULT is underutilized internationally, including in both Sweden and the UK. In our study, 35–48% of patients were on ULT, and this is in concordance with data on ULT usage from 2012/2013 in both countries (4, 5, 11). A register study from Dalarna, Sweden, reported that 21–25% of prevalent gout cases received allopurinol during 2014–2018, with no significant change over time (35). However, this could be explained by long time period for case ascertainment in the register study. The Swedish cohort displayed significantly greater use of ULT than in the UK and reported fewer gout flares and lower impact of gout, consistent with previous studies (36). Differences in ULT use may also reflect the different healthcare systems in these countries, although the guidelines for gout management are similar. A study from 2015 assessing between hospital variation regarding the use of guidelines and clinical outcomes for acute myocardial infarction in Sweden and the UK found a higher variation in 30 day mortality, which was associated with greater variation in use of guidelines, in the UK (37). We found no sex differences in receiving ULT, consistent with a US national cohort study of gout patients cared for by rheumatologists (13), while in two population-based register studies from the USA in 2006 and Sweden in 2017, male sex increased the likelihood of receiving ULT (11, 14).

Risk factors

The vast majority of risk factors for gout exert their effect by increasing urate; thus, they are primarily risk factors for hyperuricaemia, which is a prerequisite for gout onset. Alcohol leads to increased urate through inhibition of the renal secretion of urate, increased purine nucleotide degradation, and the high purine content of some beverages (38), but has also been shown to increase the risk of urate crystal deposition in the joint (39). BMI has a strong positive association with urate, and weight loss after bariatric surgery is associated with a reduced incidence of hyperuricaemia and gout (40). The mechanism by which weight loss can lower urate levels is poorly understood (41), but causality between gout/hyperuricaemia and obesity is supported by Mendelian randomization studies (42). In our study, alcohol intake was higher in the UK cohort. A higher alcohol intake and BMI are also seen on a national level comparing the two countries' populations (6, 7). These environmental risk factors may contribute to the higher occurrence and earlier age at onset of gout in the UK compared with Sweden. After adjusting for age differences, alcohol consumption was higher in men, whereas a higher BMI and thiazide use were more common in females. These modifiable risk factors thus have different relative importance in men and women, respectively. Modification of excessive alcohol consumption and obesity could also benefit other morbidities in addition to gout. Diuretic use was more common in females, in line with previous reports (2, 12–18, 20), providing an opportunity to consider switching to the uricosuric drug losartan.

PROMs for disability, illness perception, and self-reported quality of life

Disability was overall modestly impaired, as measured by the HAQ-DI, with females having more disability compared with males. The HAQ score has been shown to be a valid measure of disability in gout, but floor effects, with many patients scoring 0, have been reported (43, 44). In our study, 40% of patients scored 0 on the HAQ-DI, contributing to the overall low scores. Physical function, measured by the PF-10, produced results similar to the HAQ, with females reporting poorer function than males. Furthermore, women experienced a significantly higher impact of gout flares, as measured by the GIS. These results are in line with findings from a qualitative US study from 2014 measuring the impact of gout on quality of life, where females reported more concern regarding problems with shoes, dependency, and joint/limb deformity (21). Other contributing factors to worse scoring on the HAQ and PF-10 in women could be an increased prevalence of osteoarthritis (12, 13, 17), the higher age in the females in our study, and a general tendency for females to score more highly on PROMs (45–47).

Strengths of our study are the population-based primary care setting, ensuring relevance to the majority of patients with gout who are managed entirely in primary care, and the use of comparable methods in the two countries. A limitation is the response rates of 54.3% in Sweden

and 65.9% in the UK, which may hamper generalizability, particularly since the response was slightly skewed with regard to age and sex. A second limitation of our study could be the limited validity of a primary care diagnosis of gout (48), although our previous work have shown a high validity for such diagnosis in primary care (24, 49, 50). A third limitation is the different time points at which the questionnaire studies were performed. The UK study was performed in 2010–2011 and the Swedish one in 2017, and this could have favoured the Swedish cohort if uptake of ULT had improved over the past 10 years; however, a 2022 study showed no improvement of ULT use from 2014 to 2019 in the Swedish region of Dalarna (35). Fourthly, current use of anti-hypertensive medications was retrieved through medical records in the UK, while it was self-reported in Sweden, which may have led to under-ascertainment on the latter. Fifthly, we lack data on some risk factors for hyperuricaemia and gout, such as diet and genetics, and we have no biochemical data on renal function and serum urate levels. Furthermore, education was not assessed in the same way in the two cohorts. Also, allopurinol was the only urate-lowering drug asked about in both questionnaires, and this may have led to an underestimation of ULT use in the study. Finally, the study was performed in localized areas of Sweden and the UK, and these may not be generalizable to the whole countries.

Studies comparing the course and management of gout between countries are quite rare, although they offer new perspectives on the disease. In the sex comparison in this study, we have shown differences in the profile of risk factors, perception, and consequences of gout, with females experiencing far more pain, a greater impact of gout on daily living, and more physical limitations. These are important items to consider in the management of gout, and warrant further research.

Conclusion

In this study on the characteristics and management of gout in two primary care gout cohorts from Sweden and the UK, we found lower age at gout onset in the UK, accompanied by more frequent modifiable risk factors, whereas Sweden had a higher use of ULT, lower frequency of recent gout flares, and lower impact of gout. Females with gout were older at gout onset, took diuretics more commonly, had higher BMI, and reported greater physical disability; therefore, these factors should be especially considered in women.

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