*Holistic Nursing and Health Science*
*Vol. 8, No. 1, Juni 2025 (p. 32-41)*
Online at https://ejournal2.undip.ac.id/index.php/hnhs

# Location of Signs and Symptoms of Gout Arthritis Patients

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***Abstract***

Gouty arthritis is a joint disorder that is on the rise among adults worldwide experiencing pain and swelling. Gouty arthritis often causes significant pain and swelling that can limit physical activity due to joint damage. Recently, lack of detailed information regarding the location pain and swelling. Therefore, this study aimed to identify characteristics (age, gender, BMI, and alcohol consumption), pain location and swelling location in patients with gouty arthritis at a private hospital in Western Indonesia. This study used quantitative methods with a retrospective documentation design. The sampling technique was total sampling, involving 47 medical records from one of the private hospitals in Western Indonesia. Instrument, data analysis The results of the study showed that pain most frequently occurred in the infrapatellar bursa (34%), while swelling was not found in 34% of patients with gout arthritis. The instrument used was a form sheet consisting of demographic data and information regarding location of pain and swelling. The data was analyzed using univariate analysis. Results show that the most pain and swelling were found in the infrapatellar bursa. Further research is recommended to explore effective interventions for managing these symptoms. The high incidence of gouty arthritis in individuals aged 55–65 years highlights the importance of prioritizing screening and early detection efforts for this age group. Given the high frequency of pain and swelling complaints among patients, further research on appropriate management strategies is essential for individuals with gouty arthritis.

***Keywords:*** Gout arthritis; patient; pain; swelling



## INTRODUCTION

Gout arthritis is the result or product of purine metabolism, a component of nucleic acid in the nucleus of body cells, and its levels are not excessive in the body (Ragab et al., 2017; Zahroh & Faiza, 2018). Normal uric acid levels in adult males are 3.4-7.0 mg/dl, in female adults, are 2.5-5.7 mg/dl, and in children are 2.8-4.0 mg/dl (Sani et al., 2019). Gout arthritis is one of the joints that attack adults and currently increasing both globally and in Indonesia. Based on data from the World Health Organization, the prevalence of gout arthritis increased by 3.9% in the United States and the United Kingdom by 3.2%, and in Indonesia by 24.7% (Punjwani et al., 2024). Gout arthritis is a disease that affects the joints and can provide several signs and symptoms, such as pain, swelling, burning of the skin, redness, body aches, and

DOI: 10.14710/hnhs.8.1.2025.32-40
Received: 23 January 2024; Revised: 20 June 2025; Accepted: 24 June 2025; Online: 30 June 2025

fatigue (Musta'in et al., 2023). Advanced stages can give signs and symptoms of tingling in several joint areas and severe pain, commonly called chronic pain. Signs and symptoms that emerge are swelling, warmth to the touch, redness, and stiffness in the joints, and what is most felt by people with gout arthritis is severe pain in the joints that are being affected (Nugroho & Anisah, 2022). Pain is a subjective sensory stimulus and unpleasant emotional experience due to actual or potential tissue damage (Rosya, 2019). Chronic pain is a sensory and emotional experience due to actual or potential tissue damage that is felt suddenly or slowly and lasts more than 3 months. Joint pain that is felt usually appears when you wake up, the ankle and big toe feel like burning, swelling, and pain. According to Radharani (2020), pain in gouty arthritis patients mostly occurs in the ankle joint, big toe joint (hallux), elbow joint (olecranon bursa), and knee joint (infrapatellar bursa), where the pain occurs due to the accumulation of purine substances which results in the formation of crystals. It is supported by Weaver et al., (2022) which states that generally gouty arthritis occurs in the joints of the hind legs, ankles, thumbs (padogra), wrists, feet (monoarthritic), tarsal joints of the feet, olecranon bursa at the elbow, and knees.

Determining the exact location of pain can help in proper pain management because if pain is not treated immediately it can interfere with daily activities, for example, a decrease in physical activity. The focus of treatment in patients with gouty arthritis is controlling the pain experienced, reducing the risk of joint damage, and improving and maintaining the function and quality of life of sufferers (Radharani, 2020). Another sign and symptom of gouty arthritis according to Hannan et al., (2019) is swelling. Swelling in gouty arthritis is a sign and symptom caused by the accumulation of uric acid crystals in the joints or soft tissues for a very long time. If this swelling is not resolved, it can damage the joint and cause injury to the skin surface. Wounds on the skin surface will usually secrete fluid containing monosodium urate (MSU) (Sari et al., 2017). Hannan et al., (2019) explains that swelling in patients with gouty arthritis is often found in the Achilles tendon, olecranon bursa (elbow), infrapatellar bursa (knee), forearm extensor surface, and ear helix. Swelling in patients with gouty arthritis can be found in the bursa, tendon, cartilage, and synovial. In addition, it can also be found in soft tissue, the bicuspid valve, the laryngeal myocardium, and the eye retina.

The high prevalence of gouty arthritis, obtained from data collected from patients undergoing treatment and reporting pain and swelling in the previous year at a private hospital in Western Indonesia, is not matched by optimal understanding and management of the main symptoms, such as pain and swelling. The lack of detailed information regarding the location of pain and swelling and characteristics of age, gender, BMI, and alcohol consumption in gouty arthritis patients. This approach is still rarely applied in Indonesia, so this study is expected to contribute to more effective interventions in the management of gouty arthritis. Therefore, this study aims to identify characteristics (age, gender, BMI, and alcohol consumption), pain and swelling location in patients with gouty arthritis at a private hospital in Western Indonesia.

## METHODS

This study uses quantitative methods with retrospective documentation design to identify characteristics (age, gender, BMI, and alcohol consumption), pain location and swelling location in patients with gouty arthritis. The study population used medical records of patients with gout arthritis who were both inpatients and outpatients during January-December 2022 at one Western Indonesian Private Hospital. The sampling technique used total sampling with a sample size of 47 patient medical records with primary and comorbid diagnoses of gout arthritis conducted from February to March 2023. The small number of respondents was due to limited time of the study and the researcher's permission process. The instrument used was a form sheet, which included fields for the respondent's name (initials), age, gender, BMI

(height and weight), alcohol consumption, pain location, and swelling location. Before the study was conducted, and to improve the accuracy of data collection, the researchers conducted a calibration session to ensure that all researchers had a consistent understanding of how to complete the form sheets. This study was analyzed by univariate analysis to identify the characteristics of respondents and signs and symptoms of gout arthritis. This study has also been through the ethical review process by the ethics committee of FoN UPH with ethical number 036/KEPFON/II/2023. This research applied the principle of confidentiality to protect respondents' personal data only for research purposes. The principle of veracity was applied through honest communication and informed consent. The principle of justice was upheld by providing equal opportunities and fair treatment to all respondents.

## RESULTS

**Table 1.** Characteristics of Respondents (n=47)

| Variable | f | % | Mean | SD |
|---|---|---|---|---|
| Age | | | 59.02 | 13.54 |
| < 45 years | 9 | 19.2 | | |
| 45-54 year | 6 | 12.8 | | |
| 55-65 year | 16 | 34 | | |
| 66-74 year | 11 | 23.4 | | |
| 75-90 year | 5 | 10.6 | | |
| Gender | | | | |
| Male | 39 | 83 | | |
| Female | 8 | 17 | | |
| Body Mass Index (BMI) | | | 23.93 | 4.40 |
| Underweight | 4 | 8.5 | | |
| Normal | 25 | 53.2 | | |
| Overweight | 14 | 29.8 | | |
| Obesity | 4 | 8.5 | | |
| Alcohol Consumption | | | | |
| Yes | 3 | 6.4 | | |
| No | 44 | 93.6 | | |

Table 1 shows the age of most respondents in this study (34%) was aged 55-65 years, the most gender was male (83%), most respondents (53.2%) had a normal BMI. Most respondents in this study did not consume alcohol as much as 93.6%.

**Table 2.** Pain and Swelling Location in Gout Arthritis Patient (n=47)

| Location of symptoms | Pain Location | | Location of swelling | |
|---|---|---|---|---|
| | f | % | f | % |
| Hallux | 10 | 21.3 | 6 | 12.8 |
| Pollex | 4 | 8.5 | 2 | 4.3 |
| Infrapatellar Bursa | 16 | 34 | 9 | 19.1 |
| Olecranon Bursa | 3 | 6.4 | 6 | 12.8 |
| Ankle | 9 | 19.2 | 7 | 14.9 |
| Carpal | 4 | 8.5 | 1 | 2.1 |
| Glenohumeral | 1 | 2.1 | 0 | 0 |
| None | 0 | 0 | 16 | 34 |

Table 2 shows that the location of the most pain was found in the infrapatellar bursa (34%). The most location of swelling in this location as well (19.1%), meanwhile 34% respondents did not experience swelling.

## DISCUSSION

### Characteristics Based on Age

Age is the length of life of an individual in years calculated from the time he was born until his birthday (Dyussenbayev, 2017). The results of research that have been conducted by researchers, obtained the results that the most patients experiencing gouty arthritis are in the age range 55-65 years with the average age of respondents being 60 years. The results of this study are in line with research conducted by Salmiyati and Asnindari, (2020) that most patients who experience gouty arthritis are aged 55-65 years. The prevalence of gouty arthritis increases with age, especially affecting individuals aged between 55 and 65 years. Based on analysis from the Global Burden of Disease Study 2021 that in 2020, the global prevalence of gout was 659.3 per 100,000 people, with prevalence increasing with age (Punjwani et al., 2024). The increasing age the higher the risk of developing gouty arthritis, where this occurs due to an increase in uric acid levels and a decrease in the body's work processes (Punjwani et al., 2024). The results of this study are supported by a research from Dehlin et al., (2020) showing that the incidence and prevalence of gout increases every decade of life, reaching a prevalence of up to 11-13% in individuals older than 80 years. This happens because the aging that a person experience will have an impact on his quality of life, where there is a decrease in the body's work process, namely the kidneys, resulting in an increase in uric acid levels in the body. The increased risk of gout in older adults is associated with factors such as decreased kidney function, which impairs the body's ability to excrete uric acid, leading to its accumulation. In addition, comorbidities such as hypertension and chronic kidney disease, which are more common in older populations, further complicate management and increase the uric acid values of patients with gout (Cross et al., 2024; Dehlin et al., 2020). This finding is in line with the statement that individuals aged 55-65 years have a higher risk of developing gouty arthritis due to age-related physiological changes and comorbid conditions (Singh & Gaffo, 2020).

### Characteristics Based on Gender

Based on gender, most people who experience gouty arthritis are men. This is supported by previous study (Rhama et al., 2018), which shows that men are more at risk of developing gouty arthritis than women. This increased risk in men is due to higher levels of uric acid in their blood and the absence of the hormone estrogen, which helps remove uric acid from the body through urine. Similarly, Astawan et al. (2020), highlight that men experience a progressive increase in uric acid levels with age, which further contributes to their risk, in contrast, women have a lower risk before menopause due to the protective effect of estrogen, but their risk increases significantly after menopause when estrogen levels decrease. This is because hyperuricemia, a major factor in gout, is more common in men than women due to differences in acid metabolism (McCormick et al., 2022). Postmenopausal women have a significantly increased risk of gout, which emphasizes the role of estrogen in reducing serum uric acid levels. the increased incidence of gout is almost three times higher in men than women, especially during the premenopausal phase in women (Lee et al., 2023; McCormick et al., 2022). This underscores the important role of biological and hormonal factors in differentiating gout risk between the sexes. While men are more susceptible due to higher baseline uric acid levels and the absence of estrogen, women experience a marked increase in risk after menopause, further supporting gender-based disparities in the prevalence of gouty arthritis (Taneja et al., 2022).

**Characteristics based on body mass index (BMI)**

The results of this study indicate that the BMI (Body Mass Index) of patients who experience gouty arthritis is mostly in the normal category with an average BMI of 24 kg/m$^2$. The results of this study are in line with Astawan et al. (2020) which shows that most IMT who experience gout arthritis are in the normal category. This can occur in someone with a normal BMI due to high purine intake and followed by unhealthy living behaviors such as rarely doing exercise and not controlling purine intake. The results of the study are also in line with research conducted by Leokuna and Malinti (2020) which shows that the average BMI of respondents is 24.10 kg/m$^2$.

The study findings are not in line with a research conducted by Astarifa et al. (2024) which shows that most BMI who experience gouty arthritis are in the obese category. A person who has excessive body weight can lead to the onset of gout due to an unbalanced diet (Raharjo & Andiana, 2022). BMI is a measurement tool to monitor nutritional status in adults, adolescents, and children related to excess and underweight (Herdiani, 2019). BMI status does not describe the intake of purines in the body, but only describes the intake of fat, carbohydrates and uric acid clearance status. High purine intake does not only occur in someone who has an obese BMI category but can also occur in someone with a normal BMI (Raharjo & Andiana, 2022). This is supported by a study by (Dehlin et al., 2020)found that gout cases can be associated with overweight or obesity (BMI ≥25), where BMI plays an important role in the development of gout. In addition, Dalbeth et al. (2020) show that high BMI is closely associated with hyperuricemia and gout precursors, indicating that overweight and obesity affect serum uric acid levels through increased uric acid production and decreased renal uric acid clearance. However, although BMI is an important factor in assessing the risk of gout, individuals with normal BMI are not exempt from the development of gout, especially if they have high purine intake and live a sedentary lifestyle. Therefore, it is crucial to consider dietary habits and physical activity levels in gout prevention and management strategies (Dalbeth et al., 2020; Dehlin et al., 2020; Raharjo & Andiana, 2022).

**Location of Pain**

The results of this study indicate that the location of pain in patients with gouty arthritis mostly occurs in the knee joint. There are two studies that support that the location of most pain is in the knee (Irina et al., 2020; Musta'in et al., 2023).The results of this study indicate that the knee joint is the location that most often experiences pain in gouty arthritis patients because this joint is the joint that has a greater load than other joints. This happens because a person's body weight will rest on the knee joint (Hannan et al., 2019). Pain location is the place or location where the pain is felt which can provide clues to the cause of pain in terms of sensory response (Talbot et al., 2019).

These results are supported by several previous studies which say that gouty arthritis often manifests with complaints of pain in the knee area, especially affecting the infrapatellar bursa. The results showed that gout patients had a higher prevalence and severity of knee osteoarthritis (OA) compared to control subjects, namely 68% of gout patients had knee OA and this means that there is a significant relationship between gout and knee joint complications (Howard et al., 2015). There is a significant correlation between gout and radiographic evidence of knee OA, from the results of this study it can be seen that a person with gout is more likely to experience OA in the knee (Neogi et al., 2019; Talbot et al., 2019). Other findings are also in line with this because the knee joint, which supports significant body weight, is very susceptible to pain and complications in gout patients, and the infrapatellar bursa located under the kneecap will often experience inflammation due to pressure and deposition of urate crystals associated with uric acid, which causes pain in this area or more briefly because the knee joint, especially the infrapatellar bursa, is a common site of pain in

patients with gouty arthritis, as supported by previous study that highlight the prevalence and severity of knee involvement in this condition (Neogi et al., 2019).

**Location of Swelling**

Studies have shown that patients with gouty arthritis have more swelling than those without. Among the joints affected, the knee joint is the most common site of swelling in patients with gouty arthritis. Rhama et al., (2018) supports this finding by showing that swelling is more prevalent in the knee joint compared to other joints. This may be due to the mechanical nature of the knee joint itself, which carries a greater body load compared to other joints. As the joint that is the focus of many physical activities, the knee is more susceptible to stress, which can exacerbate inflammation in people with gouty arthritis. Furthermore, Hannan et al. (2019) also explains that the knee joint, as a joint that receives a greater load from the body, is particularly at risk of swelling in conditions such as gouty arthritis. This swelling occurs due to the buildup of urate crystals in the joint space, which triggers inflammation and pain. This study is in line with Ragab et al. (2017) who explained that the location of swelling in the joint is the area that feels the direct effects of inflammation, which is more clearly detected in the knee joint. In addition, gouty arthritis causes significant inflammation in the joints, including swelling, with higher severity in joints that receive heavy loads, such as the knee.

Rhama et al., (2018) also mentioned that the main influence of this swelling comes from the crystallization of uric acid that occurs within the joint. Swelling in the knee joint can be influenced by several factors, including the mechanical load received by the joint and the body's response to the buildup of uric acid crystals that trigger inflammation. This inflammatory response of the body plays a role in worsening the condition of swelling and pain, thus making the knee joint the most affected area in patients with gouty arthritis. Overall, swelling of the knee joint in patients with gouty arthritis results from a combination of mechanical and biochemical factors. The heavy load received by the knee joint, coupled with the body's inflammatory reaction to uric acid crystals, makes the knee the most common location for swelling and pain in patients with gouty arthritis. This study has limitations in a relatively small sample size, so the results cannot be widely generalized. Therefore, it is recommended that further research involve a larger sample size to obtain more representative results and strengthen the validity of the findings.

## CONCLUSION AND RECOMMENDATION

The results of this study showed that most patients were in the age range of 55-65 years, this is because at this age there is a high risk of increased uric acid levels and decreased kidney function, and men are more susceptible to gout, while the risk for women increases after menopause. The results also showed that most patients with gouty arthritis had a normal BMI, indicating that lifestyle factors such as diet and inactivity play a greater role than body weight alone. The knee joint, especially the infrapatellar bursa, is the place that most often experiences pain and inflammation, due to mechanical loads and urate crystal build up. Therefore, this study recommends the need for appropriate prevention and treatment management strategies given the high prevalence of gouty arthritis in the 55-65 years age group. In addition, it can prioritize screening and early diagnosis and further research on effective interventions to manage pain and swelling in patients with gouty arthritis needs to be conducted. Interventions in managing pain and swelling in patients with gout arthritis can be conducted.

**ACKNOWLEDGMENTS**

The authors would like to thank the Faculty of Nursing, Universitas Pelita Harapan, the research hospital, and LPPM UPH for helping in this study; without several people's guidance, support, and prayers, this study could not have been completed on time.

**AUTHOR CONTRIBUTIONS**

All authors in this study contributed to the research design, data collection, analysis, manuscript writing, and review, as well as the revision process.

**CONFLICT OF INTEREST**

All authors declare that there are no conflicts of interest in this article.

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