

Description of gouty arthritis in the elderly at the Pasar Kuok Batang Kapas health center

Yuliza Birman^{1*}, Nancy Claudea Pachuary², Budi Yulhasfi Febrianto³

^{1,2,3} Faculty of Medicine, Baiturrahmah University, Padang, Indonesia

ARTICLE INFO

Article history:

Received Jun 6, 2023
Revised Jun 8, 2023
Accepted Jun 30, 2023

Keywords:

Body Mass Index
Complaints
Gender
Gouty Arthritis
Uric Acid Levels

ABSTRACT

Gout is a type of arthritis that occurs due to increased levels of uric acid in the body. This is due to the body's inability to normally secrete uric acid. The prevalence of gout arthritis in Indonesia is increasing every year. In 2011 it reached 29.35%, in 2012 it was 39.47% and in 2013 it was 45.59%. To describe the incidence of gouty arthritis in the elderly at the Batang Kapas Health Center in 2021. The scope of this research is rheumatology. The research was conducted in June-August 2021. The type of research is descriptive categorical. The affordable population in this study were all elderly people who visited the Pasar Kuok Batang Kapas Health Center in 2021. The sample size was 38 samples using the total sampling technique. Univariate data analysis was presented in the form of a frequency distribution and data processing using the computerized SPSS program IBM version 25.0. Patients with gout arthritis with the most gender were women, namely 21 people (55.3%), the most uric acid levels were high, namely 28 people (73.7%), the highest body mass index was pre-obesity, namely 22 people (57.9%), and the most common complaint was joint pain, namely 19 people (50%). The majority of gout arthritis patients were female, with high uric acid levels, pre-obesity body mass index, and complaints of joint pain.

This is an open access article under the [CC BY-NC](https://creativecommons.org/licenses/by-nc/4.0/) license.



Corresponding Author:

Yuliza Birman,
Medical School,
Baiturrahmah University,
Jalan By Pass, Aie Pacah, Kec. Koto Tengah, Padang City, West Sumatra, Indonesia, 25586
Email: yulizabirman@fk.unbrsh.ac.id

INTRODUCTION

One of the diseases that is often suffered by the elderly is *gout* (Ardhiatma F, Rosita A, 2017). Gout is a group of *arthritis* happen due to increased levels of uric acid in the body, which is caused by the body's inability to excrete uric acid levels normally (Ida Ayu Made Sri Arjani, 2018). Gout occurs when the deposits of uric acid crystals that precipitate in joints increase. This increase can be caused by the kidneys having trouble removing large amounts of uric acid (Ardhiatma F, Rosita A, 2017).

Uric acid comes from crystals that form from purine results. purine is part of the nucleic acid components found in the nucleus of body cells. Purines can be obtained from foods such as nuts, vegetables and also animals such as crabs, shrimp and anchovies. The normal level of uric acid in the blood of a man is 3.5-7.5 mg/dl and in a woman it is 2.6-6.0 mg/dl. The incidence of

gout in the elderly is characterized by sudden, recurring attacks accompanied by *arthritis* which feels very painful due to deposits of monosodium urate crystals or uric acid that collect in the joints as a result of high levels of uric acid in the blood (hyperuricemia). (Wahyu Widyanto F, 2017; Curie P, 2019) .

Gouty arthritis can be found worldwide and in all human races (Sholihah FM, 2014) . *World Health Organization* (WHO) data on the prevalence of *gout arthritis* in the world is 34.2%. *Gouty arthritis* often occurs in developed countries like America. The prevalence of *gouty arthritis* in America is 26.3% of the total population. The increase in the incidence of *gout arthritis* does not only occur in developed countries, but an increase has also occurred in developing countries, one of which is Indonesia (Inspiration, 2020) . Indonesia experienced an increase in the incidence of *gouty arthritis* in 2011, the prevalence of which reached 29.35%. year 2012 as big 39.47% And year 2013 as big 45.59%. Prevalence *gouty arthritis* by age ie aged 45-54 years by 11.1%. The highest prevalence of *gout arthritis* sufferers is in Bali, reaching 19.3%. North Sulawesi is also one of the highest prevalence of *gout arthritis*, reaching 10.3%. (Madoni A, 2018) . West Sumatra has a prevalence of *arthritis gout* of 21.8% (Safitri, 2018) . Pesisir Selatan Regency itself is ranked 2nd highest out of 19 regencies/cities in West Sumatra Province. Data at the Health Center Salido in January-December 2016 253person sufferer *arthritis gout*. In January-December 2017 data was obtained from 276 *gout arthritis sufferers*. In January-April 2018 there were 107 people. Not yet to describe *gout arthritis* in other areas of Pesisir Selatan found in previous research (Ibrahim, Andika H, 2018) .

According to Songgilan et al, 2019, cases of *gout arthritis* have increased in their research on *relationships* diet and level of knowledge with blood uric acid levels in *gout arthritis sufferers* at the Ranotana Weru Health Center, research results it was found that most of the 93 respondents had a low level of knowledge with a total of 39 people (41.9%). The same results were also found in Ardhiatma et al.'s 2017 study regarding the relationship between knowledge about *gout arthritis* on *arthritis prevention behavior* *gout* in the elderly that most of the elderly have sufficient and insufficient knowledge, namely 40% lacking and 40% sufficient. Lack of knowledge can influence a person to understand the process of *gout arthritis*. Lack of knowledge will cause a person to be unable to prevent *gout arthritis* , this is very dangerous sufferer *arthritis gout*, Complications of this disease can spread to other organs such as the kidneys (Songgilan AMG; Kundre R, 2019) .

Research on *gout arthritis sufferers* in Batang Kapas District has not been found in previous studies, At the moment coast South is in second place for the highest number of sufferers diagnosed or with symptoms of *gout arthritis* from 19 regencies/cities in West Sumatra Province. Pasar Kuok is the capital of Batang Kapas District, geographically the Kuok Health Center is located there and is a health facility for the community. The high prevalence of *gouty arthritis* in patients aged 55 to 75 years or older and the findings of *gouty arthritis* in studies have not been found. area Regency coast South, apart from the Salido Health Center, it was a factor for researchers to conduct research on the description of *gout arthritis sufferers* in the elderly at the Pasar Kuok Health Center. Based on background behind in on, researchers are interested in doing research about the description of *gout arthritis sufferers* at the Pasar Kuok Health Center, Batang Kapas District, Pesisir Selatan Regency, West Sumatra Province.

RESEARCH METHOD

The scope of this research is rheumatology. This research was carried out in room record medical center at Pasar Kuok Batang Kapas Health Center in June-August 2021. The type of research used in this study is a categorical descriptive research. The research design used was *cross sectional*. The data source in this study was secondary data taken from the medical records of patients suffering from *gouty arthritis* at Pasar kuok Batang Kapas Health Center. The population that was the target of the research were all the elderly who visited the Pasar Kuok Batang Kapas

Health Center in 2021. The affordable population in this study were the elderly who visited the Pasar Kuok Health Center Kuok Stem Cotton Year 2021 who suffer from *gouty arthritis*.

In this study the sampling method used a *total sampling technique*, namely patients taking samples based on predetermined criteria by researcher. Amount sample which was obtained at the Pasar Kuok Batang Kapas Health Center and met the criteria inclusion of 38 samples. The data were obtained from the medical records of the Pasar Kuok Batang Kapas Health Center and processed using SPSS.25 the data that has been obtained. Then the description of the incidence of *arthritis gout* at the health center was calculated Market quok Stem Cotton. Data is presented in tables and narratives.

RESULTS AND DISCUSSIONS

Results

The distribution of the frequency of *gouty arthritis* in the elderly by gender at the Pasar Kuok Batang Kapas Health Center in 2021 can be described as following:

Table 1. Frequency Distribution of *Gouty Arthritis* in the Elderly by Type Sex In Kuok Market Health Center Stem Cotton Year 2021

Gender	f	%
Man	17	44.7
Woman	21	55.3
Total	38	100.0

Based on Table 1. it can be concluded that of the 38 people, gender the most is Woman namely 21 people (55.3%).

1. Uric Acid Levels

The distribution of the frequency of *gouty arthritis* in the elderly based on uric acid levels at the Pasar Kuok Batang Kapas Health Center in 2021 can be described as follows:

Table 2. Frequency Distribution of Elderly *Gouty Arthritis* Based on Uric Acid Levels In Kuok Market Health Center Stem 2021 Cotton

Uric Acid Levels	f	%
Low	0	0.0
Normal	10	26.3
Tall	28	73.7
Total	38	100.0

Based on Table 2, it can be concluded that out of 38 people, the highest levels of uric acid were high, namely 28 people (73.7%).

2. Body Mass Index

Distribution of the frequency of *gouty arthritis* in the elderly based on body mass index at the Pasar Kuok Batang Kapas Health Center year 2021 can outlined as follows:

Table 3. Frequency Distribution of Elderly *Arthritis Gout* based on body mass index at Pasar Kuok Batang Kapas Health Center in 2021

Body mass index	f	%
Underweight	0	0.0
Normalweight	9	23.7
Pre-Obesity	22	57.9
Obesity Class I	6	15.8
Obesity Class II	0	0.0
Obesity Class III	1	2.6

Total	38	100.0
-------	----	-------

Based on Table 3. it can be concluded that out of 38 people, the highest body mass index was pre-obesity, namely 22 people (57.9%).

3. Clinical Symptoms

The distribution of the frequency of *gouty arthritis* in the elderly based on clinical symptoms at the Pasar Kuok Batang Kapas Health Center in 2021 can be described as following:

Table 4. Frequency Distribution of Arthritihis Gout in Elderly Based on Clinical Symptoms at Pasar Kuok Batang Kapas Health Center in 2021

Clinical Symptoms	F	%
Redness of the joints, swelling of the joints	4	10.5
Redness of the joints, swelling of the joints, Tofi	4	10.5
Joint pain	19	50.0
Redness in the joints, pain in the joints	4	10.5
Redness of the joints, swelling of the joints, Pain in the joints	7	18.4
Total	38	100.0

Based on Table 4. it can be concluded that out of 38 people, the most clinical symptom was joint pain, namely 19 people (50%).

Discussions

1. Distribution of the frequency of gout arthritis in the elderly by sex at the Pasar Kuok Batang Kapas Health Center in 2021

Based on the research, the results obtained from 38 respondents, the most gender was female, namely 21 people (55.3%) in elderly *gout arthritis* at Pasar Kuok Batang Kapas Health Center in 2021. This can be compared with previous research conducted by Novianti in 2019 that *arthritis gout* in the elderly based on the sex of the research subjects (85.5%) gender Woman And Also Untar research year 2017 found the most frequent elderly *gouty arthritis* are women (71.4%) and also the 2015 Lumunon study found that the sex of most elderly *gouty arthritis* was women (75%) (Lumunon O; Bidjuni H; Hamel R, 2015; Untari I; S. Sarifah; Sulastri, 2017; Novianti A; Ulfi E; Hartati LS, 2019).

The sex in the elderly who experience increased uric acid is generally male, but women have a higher risk than before (Breuer GS; Schwartz Y; Freier-Dror Y; Neshet G, 2017). Serum uric acid basically has different levels based on gender. In men it is higher from women and will increase when they are old, while women will experience a decrease in the hormone estrogen when they are old which results in a decrease in uric acid excretion so that they are at risk of experiencing gout arthritis. This risk can be higher if the elderly adopt the wrong diet and lifestyle, therefore the health of the elderly needs to be a major concern (Rokhimah Puji harlina, Arifin MZ, 2016). Another theory also mentions that in general men have higher uric acid levels than women. Rate uric acid in boys increases during puberty to adulthood (Ariani, 2016). However, postmenopausal women are at risk of developing gout arthritis is higher than men, this is due to a decrease in the hormone estrogen. The hormone estrogen functions as uric acid excretion through urine (Setiawan, A. D & Adrian, 2014).

2. Distribution frequency of gouty arthritis in the elderly based on uric acid levels at the Batang Kapas Health Center in 2021

Based on the research, the results obtained from 38 respondents, the highest uric acid level was high, namely 28 people (73.7%) in elderly *gouty arthritis* at the Pasar Kuok Batang Kapas Health Center in 2021. In line with Harlina's research year 2020 about Description Rate Sour Tendon On Elderly (Study at the Maospati Health Center, Magetan District) was found most Lots rate gout elderly is tall that is (85%) and Also Arjani's research year 2018 about overview of uric acid levels and levels knowledge elderly in Samsam Village Subdistrict District

Gathering Tabanan obtained as much 50 person (87.72%) of respondents Which have i levels of acid tendon tall And Also Silviana's research year 2017 in House Tugurejo Hospital Semarang obtained acid level tendon patient the most is more (72.7%) (Silviana H, Bintanah S, 2015; Rokhimah Puji harlina, Arifin MZ, 2016; Arjani, SIAM, Mastra, N., & Merta, 2018) .

Normal uric acid in the body, namely women 2.4 mg/dl-5.7 mg/dl, men 3.4 mg/dl-7 mg/dl, and children 2.8 mg/dl-4 mg/dl dl (Prayogi, 2017) . The increase in uric acid levels in the elderly agrees with the theory which suggests that uric acid is affected by a number of factor namely: secondary, predisposing and primary factors. Factors related to research This is factor one of the predispositions is age, the older a person is the more susceptible to disease this is related to the decrease in the working mechanism of the body's organs, namely a decrease in the hormone estrogen which causes a decrease in uric acid excretion through urine so that it becomes a cause of hyperuricemia (Princess, 2017) .

According to (Arjani et al., 2018) increasing one's age can interfere with the body's performance in the synthesis of the enzyme Hypoxantine Guanine Phosphoribosyl Transferase (HGRT) which has the role of converting purines into purine nucleotides, the cause of high levels of uric acid in the blood, namely purines are not metabolized properly by the enzyme Hypoxantine Guanine Phosphoribosyl Transferase (HGRT) so that the purine will be metabolized by the enzyme Xanthine oxidase become sour tendon. Decline organ performance in the elderly become the risk of hyperuricemia, then adopting a healthy lifestyle can be a preventive measure to various diseases that affect the elderly (Arjani, SIAM, Mastra, N., & Merta, 2018) .

Patients who experience bone pain but normal uric acid levels, because pain is the main complaint they suffer by para respondent And often take them to ask for help from the health team, even though maybe before that the joint was stiff and changed its shape. Usually joint pain is increased by movement and slightly relieved by rest. Obstacles to the movement of the joints of the legs are increasing increase slowly along with increasing pain (Arjani, SIAM, Mastra, N., & Merta, 2018) .

3. Distribution frequency of gouty arthritis in the elderly based on the Body Mass Index at the Batang Kapas Health Center in 2021

Based on the research, the results obtained from 38 respondents, the highest body mass index was pre-obesity, namely 22 people (57.9%) in elderly *gout arthritis* at the Pasar Kuok Batang Health Center Cotton of 2021. Previous research conducted by Lumunon in 2015 on the elderly at the Wawonasa Health Center in Manado found that most of the elderly had an obese nutritional status, 27 respondents (45%) and also Silviana's 2017 study on outpatient hyperuricemia patients at Tugurejo Hospital, Semarang). it was found that the most nutritional status was fat (54.5%) and also study Sofyana in Jember in 2017, an overview of the nutritional status obtained from the results of the study showed some respondent own nutrition more namely 20 respondents (52.6%) (Lumunon O; Bidjuni H; Hamel R, 2015; Silviana H, Bintanah S, 2015; Sofyana, 2017).

The risk of gout will increase if it is accompanied by an unbalanced eating pattern. The amount food tall purine Which will be consumed increase the risk of gout in women carry on age with decreased immunity due to the hormone estrogen which is no longer produced and decreased metabolic power of the body increases the risk occurrence of gout (Lumunon O; Bidjuni H; Hamel R, 2015) . Increased uric acid levels are caused by several factors, including being overweight. Matter This in accordance with theory which was revealed by (Wurangian V, GN et al. (2013) that excess body weight is a risk factor for the occurrence of fat in the body so that obese people produce more uric acid. ⁴⁷ Increased uric acid levels in the elderly with pre-obese nutritional status can be caused by consumption of foods high in purines. In addition, it is reinforced by the theory explained by Damayanti (2013) which explains that the factors that cause gout are divided become three Wrong only one namely factor special Which explain that the cause

of uric acid in the elderly is due to excessive consumption of carbohydrates and high protein foods (Damayanti, 2013).

4. Distribution of the frequency of arthritis gout in the elderly based on clinical symptoms at the Batang Kapas Health Center in 2021

Based on the research, the results obtained from 38 respondents, the most common complaint was joint pain, namely 19 people (50%) in elderly gout arthritis at the Pasar Kuok Batang Kapas Health Center in 2021. Previous research conducted by Richard in 2017 concerning Manifestations of Uric Acid in the Elderly at the Puskesmas The City of the Southern Region of Kediri City found (48.6%) complaints of gout was continuous joint pain and also Rosyiani's research in 2015 found complaints of gout in the elderly at the elderly Posyandu in Pelemgadung Karangmalang Sragen Village was pain in the joints, namely (85%) and Desverisca's 2019 study regarding the Characteristics of Patients with Gout Arthritis, it was found that 49.15% had joint pain (Rosyiani YET, 2015; Richard SD, 2017; Desverisca L, Karim D, 2019).

Stage Asymptomatic disease sour tendon on usual start be marked with increase in uric acid levels. Patients in the asymptomatic stage No feel same pain very and No accompanied pain symptoms, arthritis, tophus nor kidney stones or uric stones throughout the bladder. The acute stage of gout usually occurs when an attack occurs inflammation joints accompanied with intense pain, swelling, redness and heat at the base of the big toe. Usually attack appear in the middle Evening and approaching Morning day. Stage Intercritical sour tendon is stage intervals in between two acute attack. Usually happen after one up two year Then. Chronic stage _ on stage chronic This marked with formation tofi and deformation or change in shape at the joints Which No can change to form like beginning. Matter these are called irreversible symptoms or chronic gouty arthritis. In this condition the frequency of relapse will be more frequent. conditions too accompanied flavor Sick Keep going continuously which more torturing And temperature body can be tall When thereby, can cause sufferer No can walk or know paralysed Because joint becomes stiff can not be bent (Fauzi, 2014) Height rate sour tendon blood can cause arthritis gout which result in painful on joints, the risk of metabolic abnormalities and hemodynamic abnormalities . Mechanism of onset of pain based on by process multiple ie nociception sensitization central, excitability ectopic, reorganization structure and decreased inhibition. Between the tissue injury stimulus and the subjective experience of pain there are four process alone that is transduction, transmission, modulation and perception (Sholihah FM, 2014) .

CONCLUSION

Based on the results of research on the description of the incidence of gout arthritis in the elderly at the Batang Kapas Health Center in 2021, it can be concluded that the most gender is female, namely 21 people (55.3%), the highest uric acid level is high, namely 28 people (73.7 %), the highest body mass index was pre-obesity, namely 22 people (57.9%) and the most common complaint was joint pain, namely 19 people (50%). The limitations of this research are the first in terms of time, namely this research was carried out only for three months, namely from June to August 2021. These two studies were only carried out in one health center, namely the Pasar Kuok Batang Kapas Health Center. Based on these limitations, suggestions for further research are that it is necessary to conduct research with a longer period of time and in more places in order to obtain more varied results.

References

- Ardhiatma F, Rosita A, L.R. (2017) 'Hubungan antara Pengetahuan tentang Gout Arthritis terhadap Perilaku Pencegahan Gout Arthritis pada Lansia', *Glob Heal Sci*, 2, pp. 111-6.
- Ariani, S. (2016) *Stop! gagal ginjal dan gangguan-gangguan ginjal lainnya*. Yogyakarta: Istana Media.

- Arjani, S. I. A. M., Mastra, N., & Merta, I.W. (2018) 'Gambaran Kadar Asam Urat Dan Tingkat Pengetahuan Lansia Di Desa Samsam Kecamatan Kerambitan Kabupaten Tabanan', *Meditory*, 6, pp. 46-55.
- Breuer GS; Schwartz Y; Freier-Dror Y; Neshet G (2017) 'Uric acid level as predictor of mortality in the acute care setting of advanced age population', *Eur J Intern Med*, pp. 5-7.
- Curie P, G.B. (2019) 'Gambaran Pengetahuan Lansia Berdasarkan Karakteristik Tentang Penyakit Asam Urat Di Puskesmas Pancur Batu Kabupaten Deli Serdang Tahun 2019', *Keperawatan*, pp. 1-9.
- Damayanti, D. (2013) *Sembuh Total Diabetes Asam Urat Hipertensi Tanpa Obat*. Yogyakarta: Pinang Merah Publisher.
- Desverisca L, Karim D, W.R. (2019) 'Gambaran Karakteristik Pasien Dengan Gout Arthritis', *JOM FKp*, 6(1), pp. 244-53.
- Fauzi, I. (2014) *Buku Pintar Deteksi Dini Gejala & Pengobatan Asam Urat, Diabetes & Hipertensi*. Yogyakarta: Araska.
- Ibrahim, Andika H, M.P.R. (2018) 'The Effect of Honey Consumption on Uric Acid Levels on Gout Arthritis Patients in the Working Area Surantih Puskesmas', *J Kesehatan Sainika Meditory*, 1, pp. 79-88.
- Ida Ayu Made Sri Arjani, N.M.I. (2018) 'Gambaran Kadar Asam Urat dan Tingkat Pengetahuan Lansia di Desa Samsam Kecamatan Kerambitan Kabupaten Tabanan', *Meditory*, 6, pp. 46-55.
- Ilham (2020) 'Pengaruh Kompres Hangat Menggunakan Jahe Merah Terhadap Penurunan Skala Nyeri Pada Penderita Gout Arthritis', *Bina Generasi; Jurnal Kesehatan*, 2, pp. 14-9.
- Lumunon O; Bidjuni H; Hamel R (2015) 'Hubungan Status Gizi Dengan Gout Arthritis Pada Lanjut Usia Di Puskesmas Wawonasa Manado', *J Keperawatan UNSRAT*, 3(3).
- Madoni A (2018) 'Pengaruh kompres hangat memakai parutan jahe terhadap penurunan intensitas nyeri gout arthritis pada lansia di wilayah kerja Puskesmas Lubuk Begalung tahun 2017', *Menara Ilmu*, xii, pp. 1-7.
- Novianti A; Ulfi E; Hartati LS (2019) 'Hubungan jenis kelamin, status gizi, konsumsi susu dan olahannya dengan kadar asam urat pada lansia', *J Gizi Indonesia*, 7(2), pp. 133-7.
- Prayogi, G. (2017) 'Kadar Asam Urat Pada Wanita Menopause', *ICME Journal* [Preprint].
- Putri, N. (2017) 'Pengukuran Kadar Asam Urat Pada Perempuan Usia >40', *ICME Journal* [Preprint].
- Richard SD, K. (2017) 'Manifestasi asam urat pada lansia di Puskesmas Kota Wilayah Selatan Kota Kediri', *J STIKES*, 10(1), pp. 1-6.
- Rokhimah Puji harlina, Arifin MZ, R.A. (2016) 'Gambaran kadar asam urat pada lansia', *Lab Penelit dan Pengemb Farmaka Trop Fak Farm Univ Mualawarman, Samarinda, Kalimantan Timur* [Preprint].
- Rosyiani YET (2015) 'Gambaran Kualitas Hidup Lanjut Usia Yang Mengalami Sakit Asam Urat (Gout) Di Posyandu Lanjut Usia Desa Pelemgadung', *Keperawatan Gerontik*, pp. 1-20.
- Safitri, E. (2018) 'Gambaran Tingkat Pengetahuan dan Kepatuhan Konsumsi Purin Pasien yang Menderita Penyakit Arthritis Gout di Wilayah Kerja Puskesmas Lubuk Begalung'.
- Setiawan, A. D & Adrian, F.. (2014) *Tumbuhan sakti atasi asam urat*. Jakarta: Penebar Swadaya.
- Sholihah FM (2014) 'Diagnosis and Treatment Gout Arthritis', *J Major*, 4, pp. 10-7.
- Silviana H, Bintanah S, I.J. (2015) 'Hubungan Status Gizi, Asupan Bahan Makan Sumber Purin dengan Kadar Asam Urat pada Pasien Hiperuresemia Rawat Jalan di Rumah Sakit Tugurejo Semarang', *J Gizi Univ Muhammadiyah Semarang*, 4(2), pp. 29-35.
- Sofyana (2017) 'Hubungan Status Gizi Dengan Kadar Asam Urat Pada Lansia Di Rw 16 Kelurahan Mangli Kecamatan Kaliwates Kabupaten Jember', *Repository universitas jember* [Preprint].
- Songgigilan AMG; Kundre R (2019) 'Hubungan pola makan dan tingkat pengetahuan dengan kadar asam urat dalam darah pada penderita gout arthritis di Puskesmas Ranotana Weru', *Jurnal keperawatan*, 7, pp. 1-8.
- Untari I; S. Sarifah; Sulastri (2017) 'Hubungan antara Penyakit Gout dengan Jenis Kelamin dan Umur pada Lansia', *The 6th University Research Colloquium 2017 Universitas Muhammadiyah Magelang*, pp. 267-72.
- Wahyu Widyanto F (2017) 'Arthritis Gout Dan Perkembangannya', *Saintika Med*, 10, p. 145.