ORIGINAL RESEARCH REPORT

Pattern of Rheumatic Diseases in the Division of Rheumatology, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, between November 2021 and March 2022

Afifur Rafi Hilmi Aziz[1], Yuliasih[2,3*], Imam Subadi[4]
[1]Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia
[2]Rheumatology Division of Internal Medicine Department, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia; Dr. Soetomo General Academic Hospital, Surabaya, Indonesia
[3]Indonesian Society of Internal Medicine
[4]Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Universitas Airlangga; Dr. Soetomo General Academic Hospital, Surabaya, Indonesia

Article Info

Article history:
Received 05-12-2022
Revised 10-03-2023
Accepted 08-06-2023
Published 10-07-2023

Keywords:
Rheumatic diseases
Epidemiology
Clinical manifestations
Human & health

***Corresponding author**:
Yuliasih
yuliasih@fk.unair.ac.id

ABSTRACT

Background: The epidemiology of rheumatic diseases plays an important role in the spread of rheumatic diseases worldwide. Epidemiology data of rheumatology diseases in Dr. Soetomo General Academic Hospital remains unclear as there are some problems such as rheumatic drug depletion and imperfect medical recording. **Objective:** This study aimed to analyze the pattern of rheumatic diseases at the Division of Rheumatology, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia. **Material and Method:** This prospective descriptive study used secondary data from medical records between November 2021 and March 2022 at the Division of Rheumatology, Dr. Soetomo General Academic Hospital. The variables of this study were gender, age, occupation, education level, disease duration, and clinical manifestations. **Results:** Secondary data was provided by 109 patients in this study. Gender was dominated by women as much as 96 (88%), age was dominated by age groups 26-35 years and 46-55 years, each as much as 26 (23.8%), educational level was dominated by senior high school as much as 24 (22%), and employment was dominated by housewives as much as 39 (35.7%) in the Divison of Rheumatology, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia. Based on disease incidence, 42 patients (38.5%) had systemic lupus erythematosus, and 38 patients (34.8%) had ankylosing spondylitis. **Conclusion:** Rheumatology patients at Dr. Soetomo General Academic Hospital Surabaya are predominantly female, aged 26-55, with senior high school education. The diseases mostly affect housewives and have a higher frequency of systemic lupus erythematosus and ankylosing spondylitis.

How to cite:
Aziz, A. R. H., Yuliasih., Subadi, I. 2023. Pattern of Rheumatic Diseases in the Division of Rheumatology, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, between November 2021 and March 2022. Majalah Biomorfologi, 33(2): 82-91.

Majalah Biomorfologi (Biomorphology Journal) p.ISSN:0215-8833, e.ISSN: 2716-0920
doi: 10.20473/mbiom.v33i2.2023.82-91

Highlights

1. Rheumatic diseases, like many others, are often misdiagnosed and treated late in life, resulting in the increase of rheumatic diseases incidence.
2. Gender, age, level of education, and occupation all play crucial roles in the onset of rheumatic disorders.

BACKGROUND

Rheumatoid arthritis is an autoimmune and autoinflammatory illness that can damage the joint or the soft tissues around the joint. Most symptoms are arthritis-related, such as joint inflammation (Fraenkel, et al., 2021). Epidemiology plays an important role in understanding various rheumatic diseases worldwide by describing morbidity, mortality, type of disease, and incidence. In developing countries, the population and health facilities need to be balanced. Many patients receive late diagnosis and treatment, especially for rheumatic diseases. Such condition increases morbidity and mortality, especially in rheumatic diseases (Chauhan, et al., 2023).

Patients with musculoskeletal diseases will increase in the coming years. In 2010, patients with rheumatic diseases were estimated to number around 355 million people in the world, or about 1 in 6 of the world's population. A study reported a total of 5136 rheumatic patients at the Singapore General Hospital, which included new and old patients. The most common rheumatic diseases were rheumatoid arthritis, osteoarthritis, systemic lupus erythematosus, and spondylitis (Ng, et al., 2013)

In the epidemiology data of rheumatology diseases at Dr. Soetomo General Academic Hospital, issues such as rheumatic drug depletion and imperfect medical recording are present. Based on this, it is necessary to expand and update epidemiological studies in order to solve the musculoskeletal problems among the patients in the coming years. This study's findings can be implemented as a policy to establish hospital care, enhance hospital services, develop research and development materials, and provide references for enhancing services and developing treatments for rheumatic patients.

OBJECTIVE

This study aimed to examine the rheumatic disease pattern in the Division of Rheumatology, Dr. Soetomo General Academic Hospital in Surabaya, Indonesia.

MATERIAL AND METHOD

This was a prospective descriptive study using secondary data from medical records of the patients diagnosed with any type of rheumatic disease between November 2021 and March 2022 in the Division of Rheumatology, Dr. Soetomo General Academic Hospital. A total of 109 samples were taken during this research.

In the Division of Rheumatology, Dr. Soetomo General Academic Hospital Surabaya, the following disorders were defined as rheumatic diseases: rheumatoid arthritis, systemic lupus erythematosus, scleroderma, ankylosing spondylitis, psoriatic arthritis, reactive arthritis, gout arthritis, and osteoarthritis. The variables of this study were gender, age, occupation, education level, disease duration, and clinical manifestation.

This study used Microsoft Excel 2013 for Windows (Microsoft Inc., Redmont, WA, USA) to present the data. Using Microsoft Excel 2013, the researchers were able to separate the inclusion and exclusion criteria.

RESULT

The total number of patients with rheumatic disease was 109. Table 1 shows the distribution of age, gender, level of education, and occupation of the patients. Most patients' ages ranged from 26 -<35 and 46 -<55 (23.8%). Most patients were in the middle of their second, third, fourth, or fifth decade of life.

Patients aged above 65 years old comprised 9 patients (8.2%); ankylosing spondylitis had 7 patients above 65 years old. The most common age of onset for systemic lupus erythematosus is in the range of 26–35, and ankylosing spondylitis is in the range of 46–55. Based on gender, female patients comprised 96 patients (88%). One hundred percent of all female patients suffered from rheumatoid arthritis, scleroderma, reactive arthritis, and osteoarthritis.

Table 1. Characteristics of rheumatology patients in the Division of Rheumatology, Dr. Soetomo General Academic Hospital Surabaya (n=109).

	Categories	n (%)
Gender	Male	10 (9.1%)
	Female	96 (88%)
	No data	3 (2.7%)
Age	11 – <16	1 (0.9%)
	16 – <25	11 (10.9%)
	26 – <35	26 (23.8%)
	36 – <45	20 (18.3%)
	46 – <55	26 (23.8%)
	56 – <65	12 (11%)
	>65	9 (8.2%)
	No data	2 (1.8%)
Education level	Not completing primary school	0 (0%)
	Primary school	3 (2.7%)
	Junior high school	13 (11.9%)
	Senior high school	24 (22%)
	Diploma	4 (3.6%)
	Bachelor	22 (20.1%)
	No Data	43 (39.4%)
Occupation	Housewife	39 (35.7%)
	Civil servant	6 (5.5%)
	Private employees	19 (17.4%)
	Entrepreneur	13 (11.9%)
	Student	8 (7.3%)
	Unemployment	6 (5.5%)
	No data	18 (16.5%)

The highest level of education was senior high school (22%). The most common level of education for systemic lupus erythematosus and ankylosing spondylitis was senior high school. The majority of patients' occupations were housewives (35.7%) and private employees (17.4%). Housewives dominate almost all rheumatic diseases. In systemic lupus erythematosus, most of them were housewives, private employees, students, and entrepreneurs. In ankylosing spondylitis, most of the patients were housewives.

Table 2. Incidence of subtype rheumatic disease in the Division of Rheumatology, Dr. Soetomo General Academic Hospital Surabaya (n=109).

Disease subtypes	n (%)
Rheumatoid arthritis	11 (10.9%)
Systemic lupus erythematosus	42 (38.5%)
Scleroderma	2 (1.8%)
Ankylosing spondylitis	38 (34.8%)
Psoriatic arthritis	11 (10.9%)
Reactive arthritis	4 (3.6%)
Gout arthritis	0 (0%)
Osteoarthritis	1 (0.9%)

Table 2 presents the distribution of patients based on their diagnoses. The most common diseases were systemic lupus erythematosus (38.5%), ankylosing spondylitis (34.8%), psoriatic arthritis (10.9%), rheumatoid arthritis (10.9%), reactive arthritis (3.6%), scleroderma (1.8%), osteoarthritis (0.9%), and gout arthritis (0%).

DISCUSSION

Characteristics of rheumatology patient in the Divison of Rheumatology, Dr. Soetomo General Academic Hospital Surabaya

Females were dominant in this study; there were 96 patients (88%). The other study showed higher rates in females. In Iran (64.2%) and Spain (50.6%), rheumatic diseases were common in females (Jokar & Jokar, 2018; Larrosa Padró, et al., 2022). The male and female sex ratios in each disease are different. Based on this study's results, the sex ratios varied for each type of disease. Overall, rheumatic diseases commonly affect women. The highest age distribution was in the age groups 26-<35 and 46-<55 years (23.8%). The second was 36-<45 years (18.3%). In Iran, the age range of rheumatic diseases was 1–93 years, with a mean age of 41.17 ± 39.7 years (Jokar & Jokar, 2018). In Spain, most of the patients are from 45 to 75 years. This study was in line with the Jokar & Jokar (2018) study in Iran, but different from Larrosa Padró, et al.,'s (2022) study in Spain. The risk of rheumatic diseases will increase along people getting older.

Most of the patients had high education. Senior high school (22%) and bachelor's level (20.1%) were the most studied in this study. In Indonesia, at least one patient has a senior high school education (Yanih, 2016). In another study in Canada, most patients had 12 years of study in school. This study confirmed that of Yanih (2016) in Indonesia and Vitturi et al.,'s (2020) study in Canada. Education level was not a direct risk factor for the development of diseases. In this study, many patients (35.7%) and private employees (17.4%) became housewives. In RSUP H. Adam Malik in Indonesia, rheumatic diseases predominated among students and housewives (Anggi, 2018). In the Netherlands, it is dominated by industrial employees (Chorus, 2002).

Incidence of subtype rheumatic disease in the Divison of Rheumatology, Dr. Soetomo General Academic Hospital Surabaya

Based on Table 2, systemic lupus erythematosus (38.5%) and ankylosing spondylitis (34.8%) were dominant in the Divison of Rheumatology at Dr. Soetomo General Academic Hospital Surabaya. A previous study in Iran in 2018 showed that rheumatic diseases were dominated by rheumatoid arthritis, spondyloarthritis, systemic lupus erythematosus, gout, and vasculitis (Jokar & Jokar, 2018). Incidence rates of osteoarthritis and gout arthritis were higher than systemic lupus erythematosus in Yunani (Anagnostopoulos, et al., 2010).

Many factors make the distribution of diseases in every area different. Epidemiological triads such as agent, host, and environmental factors play critical roles in disease distribution. Rheumatic disease is a complex disease. Environmental exposure in every area is different, so the types of diseases in each area are different (Romão & Fonseca, 2021).

Rheumatoid arthritis

The total number of patients with rheumatoid arthritis was eleven. All the patients were female. A previous study in Indonesia showed that the comparison between females and males was 8:3. In China, females are 4-5 times more likely than males to suffer from rheumatoid arthritis. In females, increased estrogen and decreased androgen in synovial fluid play a role in the inflammatory immune response. This explains why rheumatoid arthritis commonly happens in women (Fauzi, 2019; Yu, et al., 2020). In this study, rheumatoid arthritis patients began at the age of 16, whereas the average age of onset is between 56 and 65 years old. Prevalence peaked at 1-3% of the population in the fourth and fifth decades. Patients under 50 years old in China are predominantly female. Males predominate between the ages of 60 and 70. Rheumatoid arthritis can affect the elderly and young children (Yu, et al., 2020; Nilsson, et al., 2021).

In this study, most patients were undergraduates. In Jordan, all the patients were above the high school level. Education level had a connection with disease activity and development, and most patients were housewives. A previous study showed that most patients were farmers and miners (Zeng, et al., 2017; Alawneh, et al., 2020).

Based on this study, most patients have already been diagnosed for over 5 years, and the second longest was 4-<5 years for 3 patients. Long disease duration had shown little progress from the health assessment questionnaire disability index. Besides that, disease duration had a connection between clinical response and cost (Aletaha, et al., 2019).

Polyarthritis mostly happens in this study. Joints affected by rheumatoid arthritis will have inflammation. This caused irreversible erosive joint damage. In a previous study in Taiwan, all rheumatoid arthritis patient's suffered from polyarthritis (Chen, et al., 2019; Lin, et al., 2019). Another clinical manifestation was stiffness in the morning. This clinical manifestation is still used to differentiate arthritis inflammation and arthritis degenerative. Synovial atrophy and fibril in a rheumatoid arthritis patient's caused prolonged stiffness in the morning. Joint capsule, tendon, ligament, vascular, cartilage, and bone played a role in this clinical manifestation (Orange, et al., 2020).

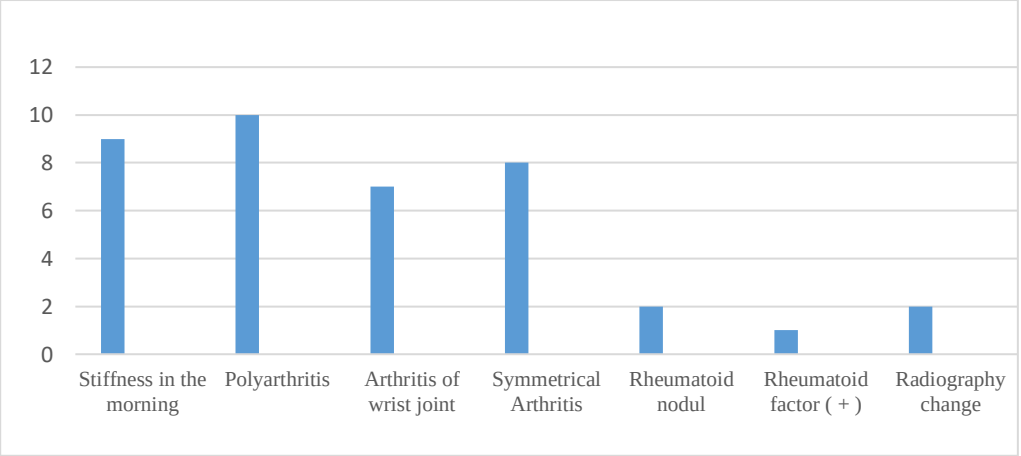

Figure 1. Clinical manifestation of rheumatoid arthritis.

Systemic lupus erythematosus

The total number of patients with systemic lupus erythematosus was 42. Forty-one of the patients were female. A previous study in the USA showed a comparison between females and males of 8:1 (Almaani, et al., 2017). In Indonesia, 267 of 280 patients were female. Basically, the incidence of systemic lupus erythematosus by gender in other countries is quite varied (Anggi, 2018). The clinical expression of systemic lupus erythematosus is influenced by the sex hormone factor. Systemic lupus erythematosus commonly happens in females (Kim, et al., 2022). In this study, systemic lupus erythematosus patients started at 11 years old but commonly happened in the 16-<45 years range. A previous study in Indonesia

showed systemic lupus erythematosus commonly happens in females aged 15–45 years. Age is one of the main factors that influence the clinical manifestation and the patient's prognosis. However, systemic lupus erythematosus can develop at any age (Ministry of Health of the Republic of Indonesia, 2017).

The positive result of the ANA test mostly happens in this study. A previous study showed that 143 148 patients had an ANA test of >1 (Li, et al., 2012). That study showed that the sensitivity of the ANA test was 96.62%. But with a higher ANA test titer, the prevalence will decrease. The ANA test becomes a specific test for systemic lupus erythematosus. Arthritis non-erosive and cytopenia dominated the clinical manifestations of systemic lupus erythematosus in this study. A previous study showed that 95% of patients had arthritis. Most of them experienced pain in the small hand joints. The patient's hand must be inspected on physical examination (Mohammed & Bhutta, 2023). Leukopenia, lymphopenia, anemia, and thrombocytopenia are part of cytopenia. A previous study showed lymphopenia prevalence between 15%-82%. The frequency of lymphopenia varied in another study (Rusman, et al., 2020).

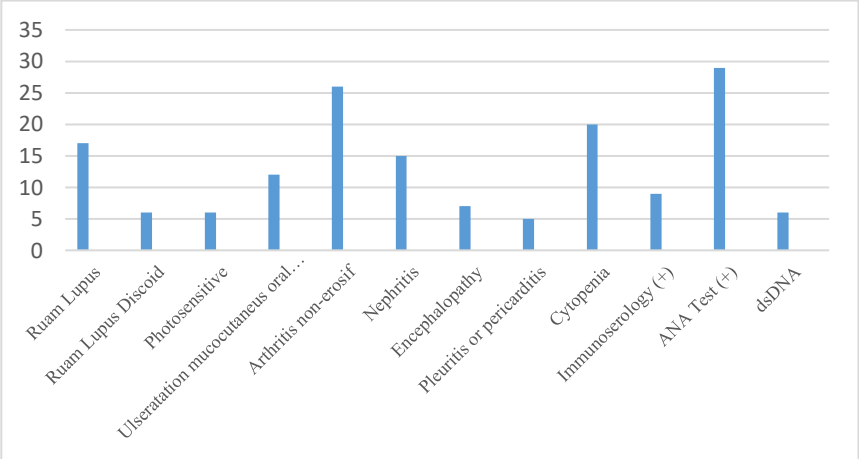

Figure 2. Clinical manifestation of systemic lupus erythematosus

Ankylosing spondylitis

The total number of patients with ankylosing spondylitis was 38. Twenty-eight of the patients were female. A previous study showed that the comparison between males and females was 2.3:1. This study showed different results from López-Medina & Moltó's (2018) study. Another study explained that HLA-B27 had a connection with a genetic predisposition in ankylosing spondylitis. HLA – B27 is more commonly found in males than females (Rusman, et al., 2020). In this study, ankylosing spondylitis patients started at 26 years but commonly happened at 46-<55 years. A previous study in Sweden showed that the average age of ankylosing spondylitis was 53 years. Males were on average 55 years old, while females were 51 years old. Disease onset in males was younger than in females (Haglund, et al., 2017).

Low back pain mostly happens in this study. A previous study showed that 57% of people get low back pain (Wang & Ward, 2018). The other study in America showed that 90% of patients had low back pain, which was the most common in ankylosing spondylitis patients. Chronic low back pain dominated this study's clinical manifestation of ankylosing spondylitis (Ebrahimiadib, et al., 2021). A previous study showed that 46.8% of patients had chronic low back pain. Chronic low back pain occurs for more than 3 months. Bilateral sacroiliitis is the hallmark of ankylosing spondylitis (Ossum, et al., 2018).

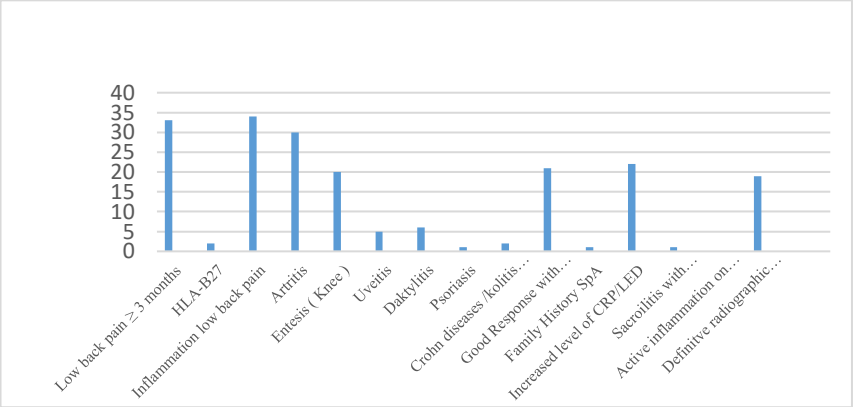

Figure 3. Clinical manifestation of ankylosing spondylitis.

Psoriatic arthritis

The total number of patients with psoriatic arthritis was eleven. Psoriatic arthritis patients were dominated by females. A previous study showed that the comparison between males and females was 1.5:1.3 (Solmaz, et al., 2018). Another study in Turkey showed there were 677 female patients and 351 male patients (Eder & Chandran, 2012). This study and Duruöz, et al., (2020) study showed that females were more dominant than males. Gender had an impact on the psoriatic arthritis manifestation. Males often had axial disorders, and females had peripheral polyarticular disorders. In this study, psoriatic arthritis patients started at 16 years old but it commonly occurs in the range of 26-<55 years. A previous study in Turkey showed the average age of psoriatic arthritis was 47 years. Psoriatic arthritis developed after about 10 years of psoriasis. The risk factors that can develop psoriatic arthritis are obesity, hyperlipidemia, and hyperuricemia (Solmaz, et al., 2018).

In this study, the patients were dominated by those from senior high school level. In Turkey, most of them were in primary school. Education level did not directly correlate with the onset of psoriatic arthritis. Most patients were housewives and private employees (Eder & Chandran, 2012). A previous study showed that workers who lift heavy objects and stand up for more than 30 minutes often develop psoriatic arthritis. Based on that, workers who lift heavy objects are associated with the development of psoriatic arthritis (Eder, et al., 2011).

Psoriasis nail disorders mostly happen in this study. Ten of the eleven patients in this study had psoriasis nail disorders. A previous study in Canada showed that 109 of 159 patients had psoriasis nail disorders (Eder, et al., 2011). Psoriasis nail disorders are associated with an increased risk of psoriatic arthritis. Psoriasis nail disorders represent an abnormal inflammatory process that affects anatomical structure (Solmaz, et al., 2018). Radiographic photos were one of the most dominant clinical manifestations of psoriatic arthritis in this study. Four of eleven patients in this study showed radiographic signs of psoriatic arthritis. A previous study in Canada showed that 78.2% of patients had radiographic photos. Psoriatic arthritis is associated with peripheral and axial joint lesions and is also associated with joint inflammation, dactylitis, and increased inflammatory signs in psoriatic arthritis (Zhou, et al., 2019).

Strength and limitations

Through this study, age, gender, occupation, education level, disease duration, and clinical manifestations of rheumatic diseases in the Division of Rheumatology, Dr. Soetomo General Academic Hospital Surabaya, were almost identified. Some medical records were not completely filled out. For example, data on the occupation and education level of the patients were incomplete. This study was the first epidemiology study at the Division of Rheumatology at Dr. Soetomo General Academic Hospital Surabaya.

CONCLUSION

Based on the characteristics of rheumatology patients at the Division of Rheumatology at Dr. Soetomo General Academic Hospital Surabaya, the distribution of the patients was dominated by females and those aged between 26-<35 years and 46-<55 years. Most of the patients' education was senior high school. The rheumatic disease affects mostly housewives. This study also found higher frequency of systemic lupus erythematosus and ankylosing spondylitis.

Acknowledgment
Special thanks to the Division of Rheumatology, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, for their assistance in collecting medical records and providing the needed research environment to make this research possible.

Conflict of Interest
The author declared there is no conflict of interest.

Ethic Consideration
This study received ethical clearance from Ethical Committee for Health Research Dr. Soetomo General Academic Hospital Surabaya (No. 0670/LOE/30.4.1/X/2021) on 29-10-2021.

Funding Disclosure
This study did not receive any funding.

Author Contribution
ARHA contributes to conception and design, analysis and interpretation of the data, drafting of the article, critical revision of the article for important intellectual content, and final approval of the article. Y contributes to conception and design, critical revision of the article for important intellectual content, and final approval of the article. Y contributes to conception and design and final approval of the article.

REFERENCES

Alawneh, K., Madanat, W. Y., Alawneh, D., Smadi, M. S. 2020. Prevalence of rheumatoid arthritis among hospital workers in the north of Jordan: Preliminary report of a hospital-based cohort study. Annals of Medicine and Surgery, 60: 579–582. doi: 10.1016/j.amsu.2020.11.043.

Aletaha, D., Maa, J. F., Chen, S., Park, S. H., Nicholls, D., et al. 2019. Effect of disease duration and prior disease-modifying antirheumatic drug use on treatment outcomes in patients with rheumatoid arthritis. Annals of the Rheumatic Diseases, 78(12): 1609–1615. doi: 10.1136/annrheumdis-2018-214918.

Almaani, S., Meara, A., Rovin, B. H. 2017. Update on lupus nephritis. Clinical Journal of the American Society of Nephrology, 12(5): 825–835. doi: 10.2215/CJN.05780616.

Anagnostopoulos, I., Zinzaras, E., Alexiou, I., Papathanasiou, A. A., Davas, E., et al. 2010. The prevalence of rheumatic diseases in central Greece: a population survey. BMC Musculoskeletal Disorders, 11(1): 98. doi: 10.1186/1471-2474-11-98.

Anggi, S. 2018. Karakteristik penderita Systemic Lupus Erythematosus (SLE) yang dirawat inap di RSUP H. Adam Malik Medan Tahun 2015-2017. Universitas Sumatera Utara. Available at: http://repositori.usu.ac.id/handle/123456789/11348.

Chauhan, K., Jandu, J. S., Brent, L. H., Al-Dhahir, M. A. 2023. Rheumatoid arthritis, StatPearls. Available at: http://www.ncbi.nlm.nih.gov/pubmed/32176395.

Chen, K.-L., Chiu, H. Y., Lin, J. H., Ye, J. D., Cho, Y. H., et al. 2019. Prevalence, clinical features and treatment pattern of patients with concurrent diagnoses of rheumatoid arthritis and psoriatic disease: results of a 14-year retrospective study in a tertiary referral center. Therapeutic Advances in Chronic Disease, 10: 204062231984790. doi: 10.1177/2040622319847900.

Chorus, A. M. J. 2002. Employment perspectives of patients with ankylosing spondylitis. Annals of the Rheumatic Diseases, 61(8): 693–699. doi: 10.1136/ard.61.8.693.

Duruöz, M. T., Gezer, H. H., Nas, K., Kilic, E., et al. 2020. The impact of fatigue on patients with

psoriatic arthritis: a multi-center study of the TLAR-network. Rheumatology International, 40(11): 1803–1815. doi: 10.1007/s00296-020-04628-y.
Ebrahimiadib, N., Berijani, S., Ghahari, M., Golsoorat Pahlaviani, F. 2021. Ankylosing spondylitis. Journal of Ophthalmic and Vision Research. doi: 10.18502/jovr.v16i3.9440.
Eder, L., Law, T., Chandran, V., et al. 2011. Association between environmental factors and onset of psoriatic arthritis in patients with psoriasis. Arthritis Care & Research, 63(8): 1091–1097. doi: 10.1002/acr.20496.
Eder, L., Chandran, V. 2012. Why investigate gender-related difference?, Future Medicine. Available at: www.futuremedicine.com.
Fauzi, A. 2019. Rheumatoid Arthritis. Jurnal Kedokteran Universitas Lampung, 3(1). doi: https://doi.org/10.23960/jkunila31167-175.
Fraenkel, L., Bathon, J. M., England, B. R., St.Clair, E. R., Arayssi, T., et al. 2021. 2021 American college of rheumatology guideline for the treatment of rheumatoid arthritis. Arthritis & Rheumatology, 73(7): 1108–1123. doi: 10.1002/art.41752.
Haglund, E., Bremander, A., Bergman, S., Larsson, I. 2017. Educational needs in patients with spondyloarthritis in Sweden – a mixed-methods study. BMC Musculoskeletal Disorders, 18(1): 335. doi: 10.1186/s12891-017-1689-8.
Jokar, Mohammadhassan., Jokar, Mina. 2018. Prevalence of inflammatory rheumatic diseases in a rheumatologic outpatient clinic: Analysis of 12626 cases. Rheumatology Research, 3(1): 21–27. doi: 10.22631/rr.2017.69997.1037.
Kim, J.-W., Kim, A. H., Suh, C. H., Jung, J. Y. 2022. Sex hormones affect the pathogenesis and clinical characteristics of systemic lupus erythematosus. Frontiers in Medicine, 9. doi: 10.3389/fmed.2022.906475.
Larrosa Padró, M., Inoriza, J. M., Valls Garcia, R., Armengol Pérez, E., et al. 2022. Prevalence of rheumatic diseases in Baix Empordà. Reumatología Clínica (English Edition), 18(9): 551–556. doi: 10.1016/j.reumae.2021.07.007.
Li, X., Sundquist, J., Sundquist, K., Zöller, B. 2012. Occupational risk factors for systemic lupus erythematosus: A nationwide study based on hospitalizations in Sweden. The Journal of Rheumatology, 39(4): 743–751. doi: 10.3899/jrheum.110789.
Lin, J., Liang, J. J., Ma, J. D., Li, Q. H., Mo, . Q., et al. 2019. Myopenia is associated with joint damage in rheumatoid arthritis: a cross-sectional study. Journal of Cachexia, Sarcopenia and Muscle, 10(2): 355–367. doi: 10.1002/jcsm.12381.
López-Medina, C., Moltó, A. 2018. Update on the epidemiology, risk factors, and disease outcomes of axial spondyloarthritis. Best Practice & Research Clinical Rheumatology, 32(2): 241–253. doi: 10.1016/j.berh.2018.10.006.
Microsoft Corporation. 2018. Microsoft Excel. Available at: https://office.microsoft.com/excel.
Ministry of Health of the Republic of Indonesia. 2017. Situasi lupus di Indonesia, Kemenkes. Available at: https://www.kemkes.go.id/article/view/17091200003/situasi-lupus-di-indonesia.html.
Mohammed, R. H., Bhutta, B. S. 2023. Hand and wrist rheumatoid arthritis, StatPearls. Available at: http://www.ncbi.nlm.nih.gov/pubmed/29736302.
Ng, X., Low, A. H. L., Chew, L. C., Chong, Y. Y., et al. 2013. Disease patterns of rheumatology outpatients seen in a tertiary hospital serving a multi-ethnic, urban Asian population in Singapore. International Journal of Rheumatic Diseases, 16(3): 273–278. doi: 10.1111/1756-185x.12016.
Nilsson, J., Andersson, M., Hafström, I., et al. 2021. Influence of age and sex on disease course and treatment in rheumatoid arthritis. Open Access Rheumatology: Research and Reviews, 13: 123–138. doi: 10.2147/OARRR.S306378.
Orange, D. E., Blachere, N. E., DiCarlo E. F., Mirza, S., et al. 2020. Rheumatoid arthritis morning stiffness is associated with synovial fibrin and neutrophils. Arthritis & Rheumatology, 72(4): 557–564. doi: 10.1002/art.41141.
Ossum, A. M., Palm, Ø., Lunder, A. K., Cvancarova, M., Banitalebi, H., et al. 2018. Ankylosing spondylitis and axial spondyloarthritis in patients with long-term inflammatory bowel disease: Results from 20 years of follow-up in the IBSEN study. Journal of Crohn's and Colitis, 12(1): 96–104. doi: 10.1093/ecco-jcc/jjx126.
Romão, V. C., Fonseca, J. E. 2021. Etiology and risk factors for rheumatoid arthritis: A state-of-the-art review. Frontiers in medicine, 8: 689698. doi: 10.3389/fmed.2021.689698.

Rusman, T., van Bentum, R. E., van der Horst-Bruinsma, I. E. 2020. Sex and gender differences in axial spondyloarthritis: myths and truths. Rheumatology, 59(Supplement_4): iv38–iv46. doi: 10.1093/rheumatology/keaa543.

Solmaz, D., Eder, L. Aydin, S. Z. 2018. Update on the epidemiology, risk factors, and disease outcomes of psoriatic arthritis. Best Practice & Research Clinical Rheumatology, 32(2): 295–311. doi: 10.1016/j.berh.2018.09.006.

Vitturi, B. K., Suriano, E. S., Pereira de Sousa, A. B., Torigoe , D. Y. 2020. Cognitive impairment in patients with ankylosing spondylitis. Canadian Journal of Neurological Sciences / Journal Canadien des Sciences Neurologiques, 47(2): 219–225. doi: 10.1017/cjn.2020.14.

Wang, R., Ward, M. M. 2018. Epidemiology of axial spondyloarthritis: an update. Current Opinion in Rheumatology, 30(2): 137–143. doi: 10.1097/BOR.0000000000000475.

Yanih, I. 2016. Quality of life in patient with Systemic Lupus Erythematosus (SLE). Jurnal Berkala Epidemiologi, 4(1): 1. doi: 10.20473/jbe.V4I12016.1-12.

Yu, C., Liu, C., Jiang, J., Li, H., et al. 2020. Gender differences in rheumatoid arthritis: Interleukin-4 plays an important role. Journal of Immunology Research. Edited by E. Rigopoulou, 2020: 1–12. doi: 10.1155/2020/4121524.

Zeng, P., Chen, Z., Klareskog, L., Alfredsson, L., et al. 2017. Amount of smoking, duration of smoking cessation and their interaction with silica exposure in the risk of rheumatoid arthritis among males: results from the Swedish Epidemiological Investigation of Rheumatoid Arthritis (EIRA) study, Annals of the Rheumatic Diseases, p. annrheumdis-2017-212145. doi: 10.1136/annrheumdis-2017-212145.

Zhou, W., Chandran, V., Cook, R., Gladman, D. D., Eder, L. 2019. The association between occupational-related mechanical stress and radiographic damage in psoriatic arthritis. Seminars in Arthritis and Rheumatism, 48(4): 638–643. doi: 10.1016/j.semarthrit.2018.06.001.