



## Knowledge, prevalence and risk factors of rheumatoid arthritis among middle-aged and old aged population

Sachin Aditya B<sup>1</sup>, Karthik Ganesh Mohanraj\*<sup>1</sup>, Vishnu Priya V<sup>2</sup>

<sup>1</sup>Department of Anatomy, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai – 600 077, Tamil Nadu, India

<sup>2</sup>Department of Biochemistry, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai – 600 077, Tamil Nadu, India

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### ABSTRACT

Rheumatoid Arthritis is a chronic disorder and affects the lining of joints and functioning of various other vital organs like the heart, kidneys and lungs. It is an autoimmune disorder where the body's immune system attacks its tissues. Most patients experience a chronic fluctuating course of a disease that, despite therapy, may result in progressive joint destruction, deformity, disability, and even premature death. Joints most commonly affected are those with the highest ratio of synovium to articular cartilage. It is more common in women than in men. Its symptoms include tender and warm joints which may lead to joint deformities in extreme cases. This study involved 100 participants of age ranging from 16-55 years. A well-structured questionnaire based on personal, socioeconomic information along with symptoms and treatment of RA was prepared and circulated online through Google forms among the participants. The results showed that most of the participants were aware of the common symptoms of RA and their risk factors and more than 60% of participants were students, over 90% of respondents said it is genetic. Smoking can increase the chance of attaining it. Disability from RA causes major economic loss and can have a profound impact on families. However, it can be managed treated and even remitted in some cases if proper habits like exercise are followed. It should be diagnosed as early as possible for better chances of remission.



\*Corresponding Author

Name: Karthik Ganesh Mohanraj  
Phone: +91 99405 45168  
Email: karthikm.sdc@gmail.com

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### INTRODUCTION

Rheumatoid arthritis (RA) is a chronic inflammatory disease which affects mostly the various joints of the body. In some conditions, it can also affect the other systems of the body such as the eyes, skin, lungs, and even the heart and blood vessels related to it ([Scott and Andkingsley, 2007](#)). RA is one of the serious diseases of the body, which can impair primarily the synovial joints, which are structurally and functionally active ([Swales et al., 2010](#)). It is an autoimmune disorder which, by wrong feedback, the body's immune system attacks the own cells and tissues in the body leading to a deleterious impact on the targeted organ.

Being an autoimmune disorder, rheumatoid arthri-

tis primarily damages the lining layers of the joints like the articular cartilages and the synovial membranes (Giles *et al.*, 2012). Unlike the regular osteoarthritis of joints where the joints become wear and tear due to erosion, rheumatoid arthritis affects the synovial membrane and articular cartilage covering the joints without any wear and tear or erosion. But affects the normal tissues to undergo damage that can eventually result in erosion of bones, cartilages, etc., and leads to severe joint deformities (Smolen and Aletaha, 2015).

The inflammation associated with rheumatoid arthritis is what can damage other parts of the body as well (Hyndman, 2017). The major problem associated with RA is that it causes enormous joint pain due to severe inflammation of the joints. Though new types of medications have been under practice in the medical world, and also these therapeutic interventions have improved treatment options universally, severe rheumatoid arthritis can still cause physical disabilities for an individual (Kumar, 2016). Few common signs and symptoms include tender and warm joints which will be swollen and joint stiffness that is usually worse in the mornings, and after inactivity, fatigue, fever and loss of appetite are also recorded in some cases (Bingham and Andbartlett, 2020). As the RA disease progresses, symptoms often spread to the wrist, knees, ankles, elbows, hips and shoulders (Finckh *et al.*, 2017).

In most cases, the symptoms occur in the same joints on both sides of your body (Katz and Yelin, 1995). About 40% of the people who have rheumatoid arthritis also experience signs and symptoms that don't involve the joints, Rheumatoid arthritis can affect many non-joint structures other than joints, they are skin, eyes, lungs, heart, kidney, salivary gland etc., (Sundbaum *et al.*, 2020). Rheumatoid arthritis signs and symptoms may vary in severity and may even come and go over time. It can cause joint deformities and shift out of place.

Many studies have been done on rheumatoid arthritis, like on its diagnosis, management and causes, where the majority of them agreed that women who smoke or having family history if those diseases are most commonly affected (Emery, 2011) and the likelihood of occurrence increase with the number of small joints. With the advancements in medicine, clinical outcomes seemed to improve dramatically and remission was made possible in many cases (Wang and Sun, 2017). The pathogenesis of this disease is not completely understood, which may be involved in genetic variations, gene expression and post-translational modifications.

However, various techniques that developed in recent years have opened up new possibilities for clarifying disease pathways and thereby facilitating early diagnosis and specific therapy (Song and Lin, 2017). There remains a lacuna in fulfilling the completeness or complete cure of some diseases. The thorough pathophysiology lying behind some diseases needs to be investigated thoroughly. If the mechanism of damage of the disease in the human body systems is understood clearly, the treatment modalities can be studied effectively thereby the progress and cure of the disease can be made effectively (Johnson *et al.*, 2020).

Previously our team had conducted numerous original studies and review studies (Menon and Andthenmozhi, 2016). Apart from these our college has also carried out several specific research studies such as the anthropometric studies with forensic implications, in vivo animal studies, in vitro studies, genetic analysis of various diseases, survey studies, bioinformatics analysis of hypertension and related diseases, etc., (Hafeez and Thenmozhi, 2016). Now we are focusing on applying this knowledge to conduct epidemiological survey studies due to the interest in the well-being of the society. Although a lot of studies are being carried out regarding rheumatoid arthritis, almost every study claims that there are less chances of complete remission from it though advancement in therapies came to some help, they come with challenges (Samuel and Andthenmozhi, 2015). Thus this survey aims to assess knowledge, prevalence and risk factors of rheumatoid arthritis among the middle aged and old aged population.

## MATERIALS AND METHODS

### Study Setting

The present survey was as an online survey study. Survey studies are believed to have a wider reach, gather large data, quick interpretation and involve a heterogeneous population. This survey has been approved by the Scientific Review Board, Saveetha Dental College and Hospitals, Chennai. The sample size of this survey includes 100 adults in the age group of 15-55 years old. The measures taken to minimize sampling bias are by checking both internal and external validity and minimize error in sampling bias.

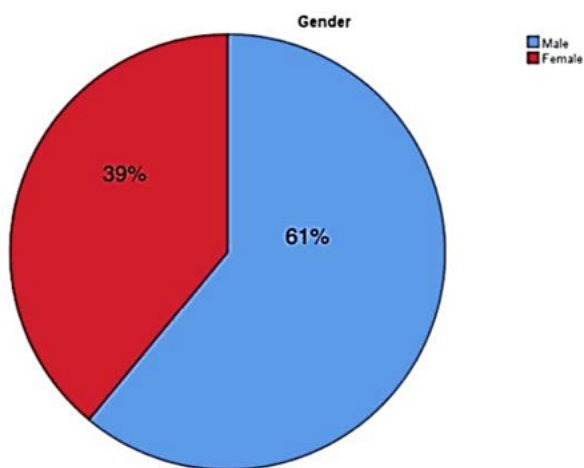
### Data Collection

A self-structured questionnaire, comprising 15 questions were asked. The data was collected online using survey planet link, which contains outputs such as demographic information, application, advantages, method of representing each output

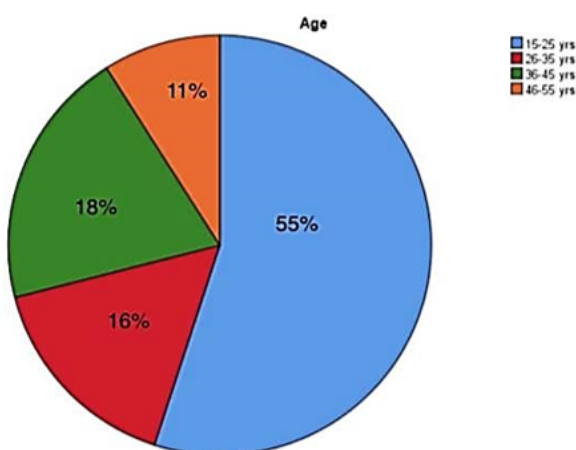
variable includes pie charts and bar diagrams.

**Data Analysis**

The statistical test used as a student’s unpaired test and software used is SPSS and Independent variables include demographics such as age, gender, Dependent variable includes- Awareness, knowledge, perception. For statistical analysis, SPSS version 23.0 was used. Type of analysis used for correction and association was the Chi-square test. All the observed data was analyzed and represented graphically using pie charts and bar charts.



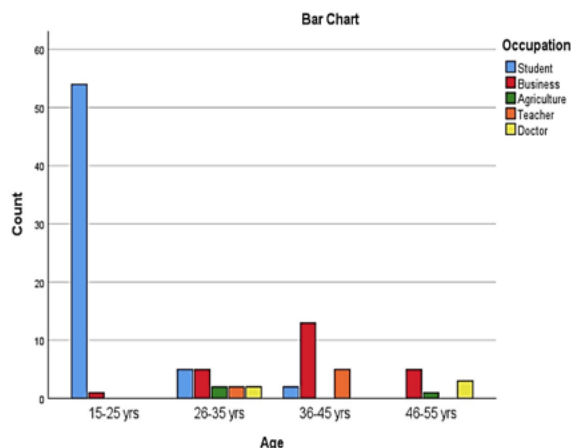
**Figure 1: Pie chart represents the gender of participants**



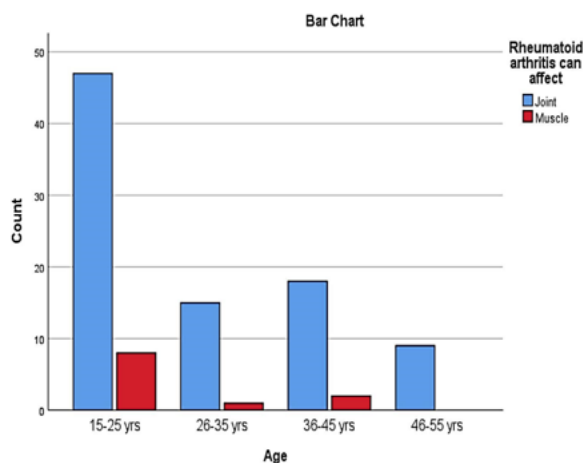
**Figure 2: Pie chart represents the age group of respondents**

**RESULTS AND DISCUSSION**

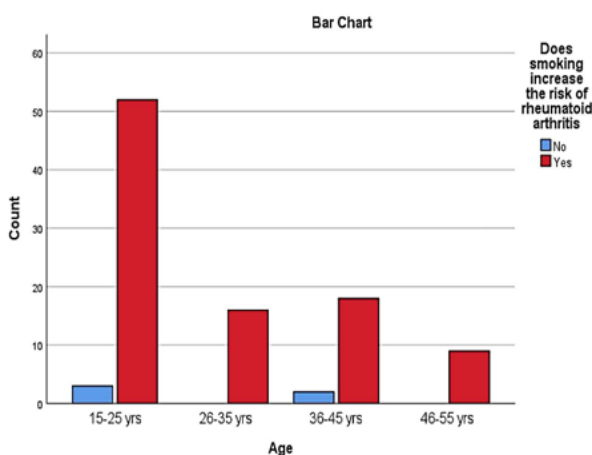
The frequency distribution of gender in the survey population depicted 61% were male and 39% were females and rheumatoid arthritis patients are mostly women than men (Figure 1). 61% were male (blue) and 39% were females (red). This was similar to an earlier study by Scott and Kingsley, 2007



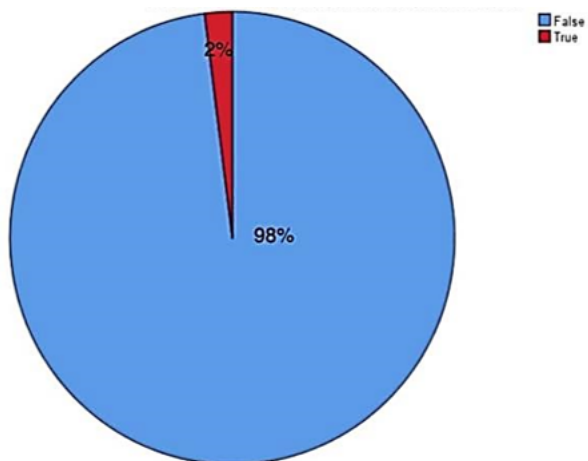
**Figure 3: Bar chart represents the association between age and occupation**



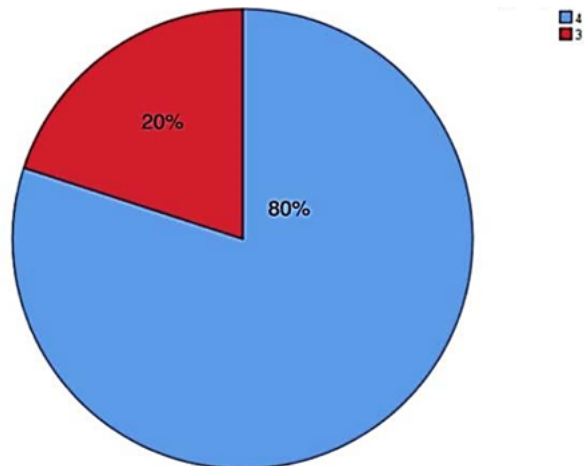
**Figure 4: Bar chart represents the association between age and target area of RA**



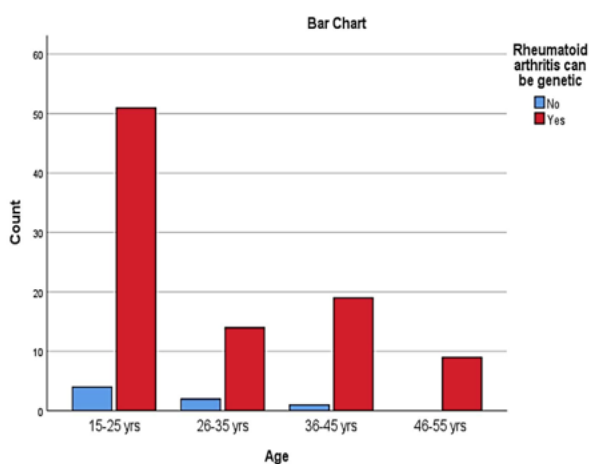
**Figure 5: Bar chart represents the association between age and effect of smoking on RA**



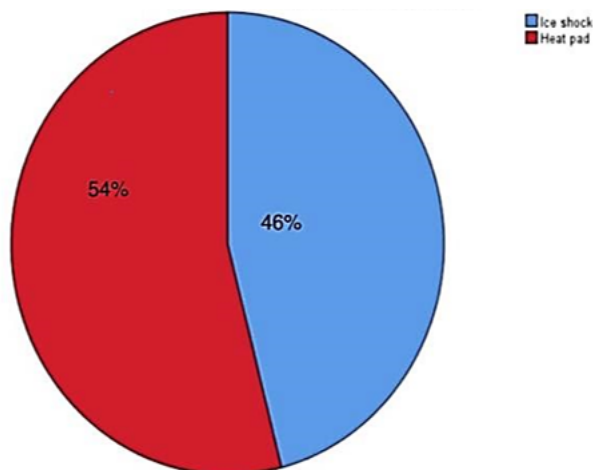
**Figure 6:** Pie chart represents whether bone marrow can be safe from RA or not. 98% said true (red) and 2% said false (blue)



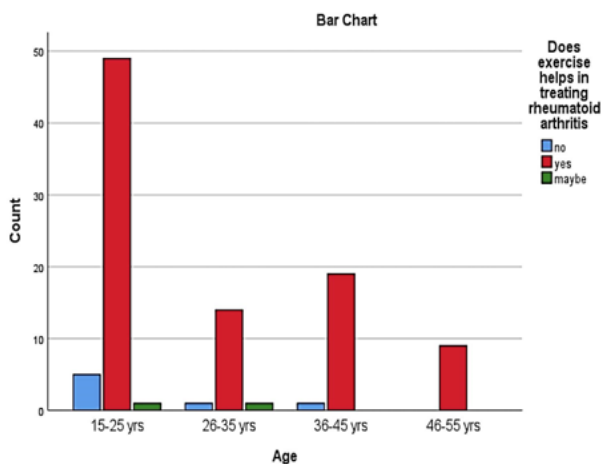
**Figure 9:** Pie chart represents the classification of RA. 80% said 4 types (blue), 20% said 3 types (red)



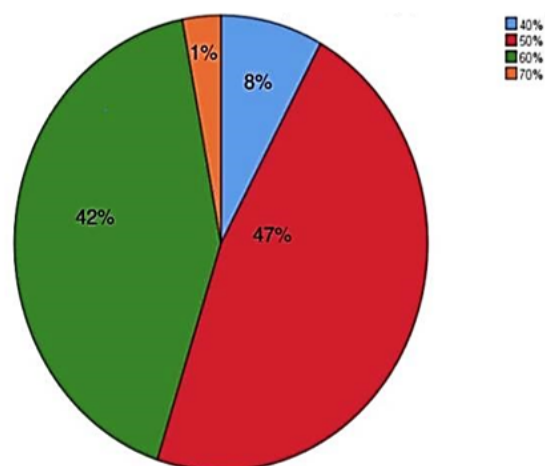
**Figure 7:** Bar chart represents the association between age and whether RA can be genetic



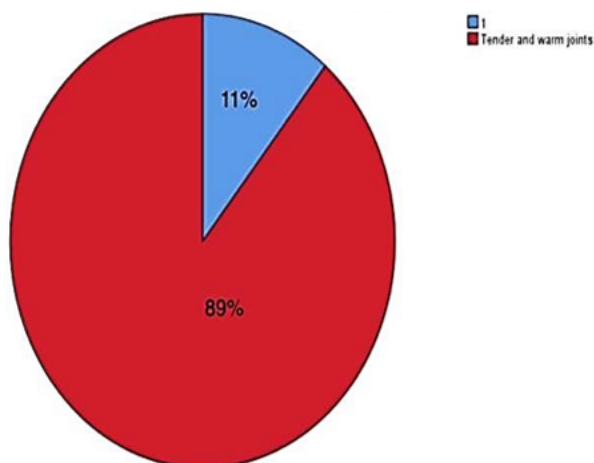
**Figure 10:** Pie chart represents the common treatment done for RA. 46% said ice shock (blue), 54% said heat pad (red)



**Figure 8:** Bar chart represents the association between age and whether exercise helps in treating RA



**Figure 11:** Pie chart represents the percentage of RA



**Figure 12: Pie chart represents the common symptoms for RA**

(Scott and Kingsley, 2007). Figure 2 represents the age group of respondents in which 55% of them belonged to the age group of 15-25 years old, 16% were from the age group of 26-25 years old, 18% were from the age group of 36-45 years old and 11% were 46-55 years old, this shows that most of the people participated in this survey are young. 55% belonged to 15-25 years old (blue), 16% were 26-35 years (red), 18% were 36-45 years (green), 11% were 46-55 years old (orange)

Figure 3 represents the occupation of the respondents in which 60% were students, for 24% of them it was business, for 3% it was agriculture, 7% were teachers and 6% were doctors, this shows that most of the people participating in this survey were students. Chi-square test showing  $p=0.288$  ( $p>0.05$ ) indicating statistically not significant.

From the survey data it was found that, for the question, the areas where rheumatoid arthritis can affect, the participants responses are 89% said in joints and 11% said muscles (Figure 4). Pearson chi-square test showing  $p=0.530$  ( $p>0.05$ ) indicating statistically not significant.

This was in accordance with the previous study (Sekar, 2019). Figure 6 represents whether bone marrow can be completely safe from rheumatoid arthritis, for which 98% said false and 2% said true, this shows the lack of awareness of rheumatoid arthritis among the public. For the question, whether the risk of attaining rheumatoid arthritis increases because of smoking for which 98% said yes and 2% said no (Figure 6). This data was similar to the earlier findings on RA population (Aletaha, 2015).

Figure 5, Chi-square test showing,  $p=0.495$  ( $p>0.05$ ) indicating statistically not significant.

From the survey, it was observed that, for the question whether rheumatoid arthritis can be genetic or not, the responses for which are 93% said 'yes' and 7% said 'no' (Figure 7) (Subashri and Thenmozhi, 2016). Chi-square test showing  $p=0.730$  ( $p>0.05$ ) indicating statistically not significant.

Whether exercise helps in the treatment of rheumatoid arthritis, for this the responses were 91% said 'yes', 7% said 'no' and 2% said 'maybe' (Figure 8). For the classification of types of rheumatoid arthritis for which 80% said it's of 4 types and 20% said it's of 3 types (Figure 9) (Thejeswar and Thenmozhi, 2015).

Regarding the common treatment done for rheumatoid arthritis, for which 46% said ice shock treatment and 54% said heat pad treatment (Figure 10). These observations are slightly variable when compared to the earlier studies (Sriram *et al.*, 2015). Regarding the symptoms of rheumatoid arthritis shown in areas other than joints for infected persons in percentage for which 8% said 40%, 47% people said 50%, 42% people said 60% and 1% said 70% people show such symptoms (Figure 11) (Keerthana and Thenmozhi, 2016).

As far as rheumatoid arthritis is concerned, several signs and symptoms exist between individuals. Majority of the symptoms are severe joint pain with warm sensations on the affected joints, which is regarded as tender and warm joints in RA (Kannan and Andthenmozhi, 2016). Figure 12 represents the common symptoms for rheumatoid arthritis, for which 89% said tender and warm joints and 11% said fever and cold. These observations were slightly varying from the previous study report (Seppan *et al.*, 2018).

According to the result represented on Figure 1, 61% of the participants were male and 39% of them were female, In a similar survey conducted by Bostworth *et al.*, 89% of the participants were female and 11% were male (Aletaha, 2015). In another survey performed by Smolen *et al.*, almost 3 times of women: men were there as rheumatoid arthritis ratio (Smolen and Aletaha, 2015). This shows women are often at a higher risk of rheumatoid arthritis.

According to Figure 12, many people said more than 50% of affected persons show symptoms other than in joints (Pratha and Thenmozhi, 2016). 89% said Tender and warm joints (red) and 11% said fever and cold (blue).

But according to a similar study performed 40% showed symptoms other than in joints and 57% told body fatigue appeared and 4% never showed

any symptoms, this shows that the symptoms of rheumatoid arthritis depends upon many factors and varies from person to person (Choudhari and Andthenmozhi, 2016).

Figure 11, patients with symptoms other than in joints. Among all, in 50% of RA patients, showed symptoms other than in joints which were 47% (red).

In Figure 12, the common symptoms of rheumatoid arthritis were 89% tender and warm joints and 11% were fever and cold, when compared to a similar study it shows that 76% of the public are not aware of the chronic symptoms associated with rheumatoid arthritis (Krishna and Babu, 2016).

In Figure 7, the responses for the question about exercise helping in the treatment of rheumatoid arthritis, 91% of them said yes and 7% said no. The rest said maybe, which agrees with another similar survey which shows most (44%) of the patients are depressed and stressed since exercise is proven to reduce stress, it can be a great factor to treat rheumatoid arthritis (Nandhini, 2018).

Figure 8, Chi-square test showing  $p=0.771$  ( $p>0.05$ ) indicating statistically not significant.

In Figure 5, according to the responses obtained 89% said joints were mainly affected because of rheumatoid arthritis, in a similar study 37% of rheumatoid arthritis patients reported thyroid disease and showed elevated levels of thyroid hormones (Shiroky et al., 1993). In Figure 3, the pie chart represents the age groups of the participants, where the majority of them belonged to the age group of 15-25 years old, whereas in a similar survey on age-standardized point prevalence and annual incidence rates of rheumatoid arthritis, UK had the highest rate of 95%, this shows that early diagnosis and treatment is required to reduce the burden on this ongoing issue (Safiri, 2019).

## CONCLUSION

Rheumatoid arthritis is a major global public health challenge. Earlier diagnosis of rheumatoid arthritis allows for earlier treatment and increased chance of remission, especially among females. The quality of health data also needs to be improved for better monitoring of the disease burden. Thus, we conclude that though the people are relatively aware of rheumatoid arthritis, the risk factors and the possible preventive and therapeutic interventions are not much awareness among them. A proper even more knowledge and awareness has to be made among the public at the primary health care centers, direct interventional strategies and by government medi-

cal policies.

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## Conflict of Interest

The authors declare that they have no conflict of interest for this study.

## REFERENCES

- Aletaha, D. 2015. Classification of rheumatoid arthritis. *Atlas of Rheumatoid Arthritis*, pages 3–21.
- Bingham, C., Andbartlett, S. 2020. Having Patients and Providers Identify Meaningful Changes in Rheumatoid Arthritis Symptoms. *Patient-Centered Outcomes Research Institute (PCORI)*, pages 1–81.
- Choudhari, S., Andthenmozhi, M. S. 2016. Occurrence and Importance of Posterior Condylar Foramen. *Research Journal of Pharmacy and Technology*, 9(8):1083–1085.
- Emery, P. 2011. Diagnosis of rheumatoid arthritis. *Pocket Reference to Early Rheumatoid Arthritis*, pages 7–13.
- Finckh, A., Alpizar-Rodriguez, D., Roux-Lombard, P. 2017. Value of Biomarkers in the Prevention of Rheumatoid Arthritis. *Clinical Pharmacology & Therapeutics*, 102(4):585–587.
- Giles, J. T., Fert-Bober, J., Park, J., et al. 2012. Myocardial citrullination in rheumatoid arthritis: a correlative histopathologic study. *Arthritis Research & Therapy*, 14(1):1–8.
- Hafeez, N., Thenmozhi 2016. Accessory foramen in the middle cranial fossa. *Research Journal of Pharmacy and Technology*, 9(11):1880–1882.
- Hyndman, I. J. 2017. Rheumatoid arthritis: past, present and future approaches to treating the disease. *International Journal of Rheumatic Diseases*, 20(4):417–419.
- Johnson, J., et al. 2020. Computational identification of MiRNA-7110 from pulmonary arterial hypertension (PAH) ESTs: a new microRNA that links diabetes and PAH. *Hypertension Research*, pages 360–362.
- Kannan, R., Andthenmozhi, M. S. 2016. Morphometric Study of Styloid Process and its Clinical Importance on Eagle's Syndrome. *Research Journal of*

- Pharmacy and Technology*, 9(8):1137–1139.
- Katz, P. P., Yelin, E. H. 1995. The development of depressive symptoms among women with rheumatoid arthritis the role of function. *Arthritis & Rheumatism*, 38(1):49–56.
- Keerthana, B., Thenmozhi, M. S. 2016. Occurrence of foramen of huschke and its clinical significance. *Research Journal of Pharmacy and Technology*, 9(11):1835–1836.
- Krishna, R. N., Babu, K. Y. 2016. Estimation of stature from physiognomic facial length and morphological facial length. *Research Journal of Pharmacy and Technology*, 9(11):2071–2073.
- Kumar, L. D. 2016. Advancement in contemporary diagnostic and therapeutic approaches for rheumatoid arthritis. *Biomedicine & Pharmacotherapy*, 79:52–61.
- Menon, A., Andthenmozhi, M. S. 2016. Correlation between thyroid function and obesity. *Research Journal of Pharmacy and Technology*, pages 1568–1568.
- Nandhini, J. S. T. 2018. Size, Shape, Prominence and Localization of Gerdy's Tubercle in Dry Human Tibial Bones. *Research Journal of Pharmacy and Technology*, 11(8):3604–3608.
- Pratha, A. A., Thenmozhi, M. S. 2016. A Study of Occurrence and Morphometric Analysis on Meningo Orbital Foramen. *Research Journal of Pharmacy and Technology*, 9(7):880–882.
- Safiri, S. 2019. Global, regional and national burden of rheumatoid arthritis 1990-2017: a systematic analysis of the Global Burden of Disease study 2017. *Annals of the Rheumatic Diseases*, pages 1463–1471.
- Samuel, A. R., Andthenmozhi, M. S. 2015. Study of impaired vision due to Amblyopia. *Research Journal of Pharmacy and Technology*, pages 912–914.
- Scott, D. L., Andkingsley, G. H. 2007. Rheumatoid arthritis. *Inflammatory Arthritis in Clinical Practice*. London: Springer London, pages 1–31.
- Sekar, D. 2019. Methylation-dependent circulating microRNA 510 in preeclampsia patients. *Hypertension Research*, pages 1647–1648.
- Seppan, P., Muhammed, I., Mohanraj, K. G., Lakshmanan, G., Premavathy, D., Muthu, S. J., Shimray, K. W., Sathyanathan, S. B. 2018. Therapeutic potential of *Mucuna pruriens* (Linn.) on ageing induced damage in dorsal nerve of the penis and its implication on erectile function: an experimental study using albino rats. *The Aging Male*, pages 1–14.
- Shiroky, J. B., Cohen, M., Ballachey, M. L., Neville, C. 1993. Thyroid dysfunction in rheumatoid arthritis: a controlled prospective survey. *Annals of the Rheumatic Diseases*, 52(6):454–456.
- Smolen, J. S., Aletaha, D. 2015. Rheumatoid arthritis therapy reappraisal: strategies, opportunities and challenges. *Nature Reviews Rheumatology*, 11(5):276–289.
- Song, X., Lin, Q. 2017. Genomics, transcriptomics and proteomics to elucidate the pathogenesis of rheumatoid arthritis. *Rheumatology International*, pages 1257–1265.
- Sriram, N., Thenmozhi, Yuvaraj, S. 2015. Effects of Mobile Phone Radiation on Brain: A questionnaire based study. *Research Journal of Pharmacy and Technology*, 8(7):867–870.
- Subashri, A., Thenmozhi, M. S. 2016. Occipital Emissary Foramina in Human Adult Skull and Their Clinical Implications. *Research Journal of Pharmacy and Technology*, 9(6):716–718.
- Sundbaum, J. K., Baecklund, E., Eriksson, N., Hallberg, P., Kohnke, H., Wadelius, M. 2020. MTHFR, TYMS and SLC01B1 polymorphisms and adverse liver effects of methotrexate in rheumatoid arthritis. *Pharmacogenomics*, 21(5):337–346.
- Swales, C., Wordsworth, P., Luqmani, R. 2010. The pathogenesis of rheumatoid arthritis. In and others, editor, *Rheumatoid Arthritis (Oxford Rheumatology Library)*. Oxford University Press.
- Thejeswar, E. P., Thenmozhi, M. S. 2015. Educational Research-iPad System vs Textbook System. *Research Journal of Pharmacy and Technology*, 8(8):1158–1160.
- Wang, Q., Sun, X. 2017. Recent advances in nanomedicines for the treatment of rheumatoid arthritis. *Biomaterials Science*, 5(8):1407–1420.