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Research Article

APPRAISAL OF THE IMPACT OF RHEUMATOID ARTHRITIS ON THE QUALITY OF LIFE USING SF-36: A CROSS SECTIONAL STUDY

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ABSTRACT

Rheumatoid arthritis is a progressive systemic autoimmune disease. The untreated RA can lead to joint damage and loss of function. The major complications include. The main aim and objectives of our work are to evaluate the respondent's quality of life using a standard questionnaire, to assess the knowledge over the disease condition, to report the number of unreported cases of rheumatoid arthritis, to educate and counsel individual respondent. A cross-sectional study was conducted in a population of 1650 and 38 respondents with rheumatoid arthritis positive were obtained. Among the 38 respondents, we have noticed 7 unreported cases of rheumatoid arthritis. It was confirmed by the algorithm of the World health organization. All the 38 respondents were made to answer the 36 questions as per the protocol and the data were recorded. Later the score was calculated using a software- online SF-36 calculator. In our study it was found that females were suffering more than males and experiencing a low quality of life, whereas the extra-articular manifestations were more reported in males, and the respondents on regular medication were doing better and 7 respondents were unaware of having rheumatoid arthritis.32 respondents were unaware of the concept that the physical illness affects the mental health. Finally, all the patients were counseled as per the objectives of our study. Thus our study brings to notice about the burden of rheumatoid arthritis in India, need to provide the necessary knowledge about the disease state and the self-assessment of the quality of life.

Keywords: Rheumatoid arthritis, Short form 36, Online SF-36 calculator, Counseling, Quality of life.

INTRODUCTION

Rheumatoid arthritis (RA) is an autoimmune degenerative disease that can cause joint pain and progressive damage throughout the body. It is a chronic systemic disease affecting the muscles, fibrous tissue, joints, tendons, and the connective tissues. Thus leading to a chronic disabling condition often causing pain, inflammation and deformity. Joint damage happens bilaterally, so if a unilaterally joint is affected the same joint in the other arm or leg will probably be affected too, leading to the bilateral joint complications. RA strikes during the most productive years of adulthood between the 20-40 years of age[1]. The prevalence of RA varies between 0.3% and 1% around the globe and 0.28- 0.7% in India[2] as it is more commonly found in women[1] . In the year 2016, a study reported by the global burden of disease (GBD) proves that the musculoskeletal diseases accounted for the second highest contribution for the disability around the world. There are around 20-33% of people around the globe with a painful musculoskeletal condition[3].

RA symptoms occur bilaterally throughout the body, the hallmark symptoms of RA are morning stiffness, joint pain, warmth, joint swelling, joint stiffness and loss of joint function. Symptoms may vary from mild to severe. The symptoms of rheumatoid arthritis can aggravate from various triggers which include environmental factors and intrinsic gene factors[4].The risk factors of rheumatoid arthritis include Sex - Round the globe the females are at higher risk of developing RA than males[5,6].Age - RA can occur at any age, but it is usually reported in between 20-40 years of age, Family history- Having the family history of RA, may lead to an increased risk of RA in the further generations[6].Smoking-Tobacco increases the risk of developing RA and even promotes the disease severity, is

particularly associated with a genetic predisposition the risks of developing the RA are too high. Environmental exposures-environmental exposures to particles such as asbestos or silica aggravate the risk of developing RA, although the study over the environmental exposures[7] Obesity – obesity has been one among the major risk factors of RA. Particularly in women when diagnosed with the disease at the age of 55 or younger.

Complications of Rheumatoid arthritis increases the risk of developing, osteoporosis, rheumatoid nodules, dry eyes and mouth, infections, abnormal body composition, carpal tunnel syndrome, CVD[5,6,8,9,10]

Considering all the above factors we set the following as the main objectives of our study to measure the outcomes in the biological, emotional and psychosocial factors measured as QOL (quality of life) as assessed by questionnaire among the respondents, to evaluate unreported and undiagnosed prevalent RA cases, to assess awareness about the disease conditions and knowledge about the impact of physical illness on mental health among our respondents and to provide necessary counseling to each individual respondent about the importance of knowledge over the disease RA, disease monitoring, and self-assessment of QOL.

METHODS

A review of observations based on the cross-sectional study is conducted and assessed for the awareness of the symptoms, disabilities, and complications caused due to RA. Individual respondent's consent to participate in the study was taken prior to the assessment. The assessment on the QOL of the respondents was calculated and awareness of the impact of physical illness on the mental health was also enquired among

our respondents. Information from the respondents of the Guntur rural and urban areas was collected based on the 36 questions in the questionnaire form SF-36 and the data was recorded.

Institutional Ethical Clearance Number: IHEC/SIMS/2017/013
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Inclusion criteria

People who are aware of being suffering from RA, and also those who have the symptoms of RA but are unaware of the disease state, such unaware people were made to answer symptom-based questions and the related algorithm to access prevalent arthritis, developed as part of the WHO's Study on Global Ageing and adult health(SAGE) wave[5].

Question number	Question text and algorithm
1.	During the last 12 months, have you experienced pain, aching, stiffness or swelling in or around the joints (like arms, hands, legs or feet) which were not related to an injury and lasted for more than a month?
2.	During the last 12 months, have your experienced stiffness in the joint in the morning after getting up from bed, or after a long rest of the joint without movement?
3.	Did this stiffness last for more than 30 min?
4.	Did this stiffness go away after exercise or movement in the joint?
Algorithm	If a participant responded with 'yes' to questions 1 and/or 2, and responded with 'yes' to question 3 and 'no' to question 4, then the participant was categorized as having arthritis

Exclusion criteria

1. People who are not willing to answer or those who are not responding.
2. All the respondents who have failed to answer less than 20 questions.

Medical Outcome Study Short – Form Health Survey (SF-36)

W.H.O defines health as the state of complete mental, physical and social well – being not just the mere absence of the disease[11]. For the purpose of quantifying the health status in a community, a validated and reliable tool is necessary. The short form -36 health surveys is a genuine, authorized and definitive parameter containing 36 items, for patient report survey of health. SF-36 is generally used as a variable in quality- life adjustment life year calculation, commonly used in health economics. The SF-36 was designed by RAND Corporation an American non-profit global policy of the medical outcome study (MOS)[12]. As the quality assessment of life includes physical, mental and social-well being details about the necessary parameters were essential for the assessment of the quality of life of the respondents and so is the SF-36 health survey form containing 8 domains which are widely used to evaluate the Quality of life (QOL). The eight measuring domains are vitality, physical functioning, bodily pain, general health perception, and physical role functioning, emotional role functioning, social role

functioning, mental health. And so we have chosen SF-36 proforma as it covers all the parameters regarding the QOL. All the eight domains enable to evaluate individual respondent's health status, compare and monitor health burden, and to provide the necessary counseling. For the more reliable and adaptive use of the SF-36 questions are translated into several languages worldwide including India. It was translated into India s National language Hindi in 2013 to assess the disease outcome in the population[13].All the questions were answered and the respective scoring was calculated using online software[14].

Scoring

The eight domains present in the SF-36 have an equivalent score. The scale is directly calculated from 0-100 and each question carrying equal weight age. The high score implies less disability and the low score implies more disability. A score of 0 represents to the maximum disability and a score of 100 represents to no disability. The score calculated using an online software – online SF-36 calculator[15,16]. A brief introduction session was done initially followed by the explanation of the objectives of our research study. The respondents who were willing to participate were considered and an informed consent was taken, later they were enquired about their QOL as per the SF-36 questions. A brief symptomatic interview regarding the age, education, co-morbidities, medication history, extra-articular manifestations, were also collected.

RESULTS

Table no.1 - Measuring domains and scoring for the unreported cases

S.No	Measuring domains	No. of unreported respondents(UR) and scoring in percentages						
		1UR	2UR	3UR	4UR	5UR	6UR	7UR
1.	Physical functioning	75	70	80	70	50	70	80
2.	Role limitation due to physical health	50	25	75	33	50	25	75
3.	Role limitation due to emotional health	100	100	100	67	100	100	100
4.	Energy /Fatigue	45	65	70	65	60	65	70
5.	Emotional well being	68	68	64	56	50	68	64
6.	Social functioning	75	75	88	88	38	75	88
7.	Pain	68	78	22	58	45	78	22
8.	General health	60	55	75	40	50	55	75
9.	Heath change	25	25	25	25	0	25	25

Table no.2 - Measuring domains and scoring for the 1-10 respondents

S.No	Measuring domains	No. of respondents (R) and scoring in percentages									
		1R	2R	3R	4R	5R	6R	7R	8R	9R	10R
1.	Physical functioning	15	20	22	31	30	6	5	20	78	60
2.	Role limitation due to physical health	0	0	0	0	0	0	0	0	0	50
3.	Role limitation due to emotional health	0	0	0	0	0	0	0	0	67	50
4.	Energy / Fatigue	20	25	20	25	40	10	10	25	45	50
5.	Emotional well being	20	12	12	25	24	36	20	12	52	48
6.	Social functioning	0	25	25	0	13	0	0	25	50	50
7.	Pain	13	23	23	21	23	23	0	23	45	45
8.	General Health	20	20	20	15	25	5	0	20	40	35
9.	Health change	0	25	25	25	25	25	0	25	50	25

Table no. 3 - Measuring Domains and scoring for the 11-20 respondents

S.No	Measuring domains	No. of respondents(R) and the scoring percentage									
		11R	12R	13R	14R	15R	16R	17R	18R	19R	20R
1.	Physical functioning	35	85	50	75	65	75	70	75	60	72
2.	Role limitation due to physical health	0	75	25	75	0	100	100	100	50	50
3.	Role Limitation due to emotional health	0	0	67	33	67	33	100	100	67	67
4.	Energy/ Fatigue	45	65	45	73	60	75	85	80	45	55
5.	Emotional well being	36	76	60	70	64	68	84	72	52	60
6.	Social functioning	50	88	88	75	88	75	88	100	50	38
7.	Pain	23	78	90	88	78	78	88	78	45	45
8.	General Health	30	70	80	85	80	80	85	75	40	45
9.	Health Change	50	100	100	75	75	75	75	100	75	50

Table no. 4 - Measuring domains and scoring for 21-31 Respondents

S.No	Measuring domains	No. of respondents (R) and scoring percentage										
		21R	22R	23R	24R	25R	26R	27R	28R	29R	30R	31R
1.	Physical functioning	80	80	55	75	35	78	50	80	55	65	78
2.	Role limitation due to physical health	50	75	50	100	0	0	50	50	50	33	0
3.	Role limitation due to emotional health	33	100	33	67	0	67	100	33	33	67	67
4.	Energy /Fatigue	70	50	55	50	45	45	50	70	55	45	45
5.	Emotional well being	64	48	56	60	36	52	68	64	56	56	52
6.	Social well being	63	63	50	63	50	50	63	63	50	50	50
7.	Pain	40	45	45	55	23	45	68	40	45	68	45
8.	General health	50	60	65	69	30	40	75	60	65	60	40
9.	Health change	60	75	50	75	50	50	75	50	50	75	50

Table no.5 - Socio-demographic and clinical attributes of the respondents

S.No	variables	No. of respondents	Percentage
I	**Sex:**		
1.	Males	11	31
2.	Females	20	52
3.	Males (new)	1	2
4.	Females (new)	6	15
II	**Age :**		
5.	20- 40	7	18.42
6.	41-60	20	52.63
7.	61-80	11	28.95
III	**Education:**		
1	No school	8	21.05
2	Primary education	13	34.21
3	Secondary education	9	23.68
4	Tertiary education	5	13.16
5	Missing information	3	7.90
IV	**Marital status**		
1.	Never married	4	10.52
2.	Married	28	73.68
3.	Separated\ widow\ widower	6	15.8
V	**Medication Adherence** (calculated for 31 respondents)		
1.	On irregular medication	13	41.93
2.	On regular medication	18	58.07
VI	**No. of unaware patients on irregular OTC medication**	5	71.42
VII	**Co-morbidities**		
1.	Musculo–skeletal disorders	29	76.31
2.	Diabetes	18	47.36

3.	Hypertension	12	31.57
4.	Extra-articular manifestations	8	21.0
5.	Musculo–skeletal disorders and Hypertension	9	23.68
6.	Diabetes and hypertension	9	23.68
7.	Musculo- skeletal disorders and Diabetes	12	31.57
5.	Other symptoms	3	7.89
VII	**Residential area**		
1.	Villages	21	55.26
2.	Suburbs	11	28.94
3.	City	6	15.8

DISCUSSION

Out of all the 1650 people approached, 38 cases of RA positive were reported (Table:2,3,4). Out of which 7 respondents were unaware of having RA (Table:1). Known cases of RA positive patients contained 11 male respondents and 20 female respondents, and in the case of 7 unaware respondents, 6 female respondents and only 1 male respondent were found. Such 7 unaware respondents were initially identified by their symptoms, like bilaterally joint pains and morning stiffness[1]. They were made to answer symptom-based questions and the related algorithm. To access prevalent arthritis, developed as part of the W.H.O sage wave[17]. After the confirmation through the algorithm, the patients were made to answer SF-36. According to the data collected it was observed that the majority of the patients were experiencing changes in their physical health, like role limitation in physical activities, loss of energy, pain, and slight variations in the emotional well-being and social functioning, and no considerable change was observed in the role limitations due to emotional health, that shows most of the unaware patients were uninterrupted in their activities due to emotional health, almost every unaware patient confessed of using OTC medication during painful episodes, and 4 females respondents agreed for neglecting their symptoms like pain, and morning stiffness to be age-related degenerative changes and not the disease symptoms, and 6 respondents confessed of their financial crisis the reason for not approaching for medical help. All 7 new respondents of RA were approached and counseled personally about the precautions and the care to be taken. Foods to be avoided, the importance of early treatment, adequate mental support was also given (Table: 1).

As enquired through the SF36 questionnaire[18] about all the 8 domains, it was found that female respondents suffering from the RA are more than double the number of male respondents. It is important to notice that the majority of patients of RA suffer from co-morbidities, which plays an important role in their QOL. In our study we found that co-morbidities and extra-articular manifestations were found more in men, during the last few years it was acknowledged that RA is the independent cause for the CVD, hence men with chronic RA are more prone to CVD's[19]. But the physical pain, co-morbidities, extra-articular manifestations didn't seem to majorly limit the regular activities, physical functioning, and psychosocial relationships of our male respondents, that shows male respondents are having a better QOL.

Chronic RA can affect the mood, auto-esteem and psychosocial conditions as well. In our study, we found that female respondents were exhibiting more depressive symptoms and the least participation in social activities. And as verified by the questionnaire it was found that female respondents are more prone to the physical health issues and are having more painful experiences. Exactly as suggested by studies based on the sex differences that women with RA do more worse than men with the same disease[20]. The difference must be due to the physical and emotional strength variations between males and females, in addition, menopause and pre-menopause stage females are naturally prone to low estrogen related bone density disorders like osteoporosis and joint damage[21] .Hence women with chronic RA are at higher risks of osteoporosis and depression. As the data shows the female respondents due to their physical, mental, psychosocial issues are going through a low QOL (Table 2, 3, 4).

Data as reported for the socio demographic and clinical attributes of the respondents (Table 5) shows that in the severe condition of the disease state both the genders were showing the same manifestations but females respondents were shown to develop the early degenerative changes, accounted for due to physical work and might be due to the predisposing menopause conditions, and other reasons include conditions in men that they have higher bone mineral density, muscle strength, skin thickness and so on due to which men tend to experience less suffering than women[22].As shown in the socio-demographic details our study includes the respondents between 20-80 years and respondents between 60-80 years were observed to be in the severe disease condition, the reason might be due to the predisposing degenerative changes with the elder age, and the co-morbidities – majority of the respondents were suffering from muscular-skeletal disorders like painful joints, restricted movement, occasional swelling, fatigue, warmth etc and extra-articular manifestations are a serious complications, which must be monitored and treated immediately, the extra-articular manifestations observed in our study involve skin rashes, skin dryness, nodular formations[10] and 3 patients reported of the persistent symptoms of dry mouth and eyes, abnormality of oral sensations, dry skin, rash, dry vagina which might be the symptoms for the Sjogren's syndrome which is needed to be clinically evaluated and treated[23] .Extra-articular manifestations state the active phase of the disease when left untreated for a long time can affect the vital organs like eyes, lungs etc. In our study, the extra-articular manifestations were found to be more in male respondents. Work lead by Manole Cojocaru, Inimioara Mihaela Cojocaru on extra-articular manifestations has shown that extra-articular manifestations are more common in males[24]. In this research it was observed that the rural population was identified to be suffering more with the RA as compared to the urban population, from a standard prevalence data for age and gender ,the authors of the urban Pune studies Joshi VL, Chopra A suggested that in India, RA may be more prevalent in the rural areas than the urban and the reason may be probably unknown although it is mentioned that micro trauma to the musculoskeletal tissues resulting due to the overuse of the joints because of the various occupational methods might be the cause[25]. We have collected information related to socio-demographic details of our respondents as well, like marital status, educational qualifications. The data on the socio-demographic details didn't help us much to relate it with the respondents QOL, except in the cases of the chronic RA conditions where 7 respondents were completely dependent on their family members to carry out their regular activities including bathing, dressing, cooking etc. Most of the respondents hesitated to respond for social habits like smoking,

alcohol, betel nut consumption etc. hence the data related to the social habits couldn't be included in our study.

The results generated have shown the variations of how different respondents are going through the disease RA, in this research it was found that the people who have improved their QOL since last one year are those who are on regular medication. And a few unimproved and deteriorated cases of RA have confessed of being on irregular medication. Which is the major reason for their low QOL. Hence this study brings to attention the importance of regular medication. After the data collection, as per our study objectives, all the respondents were questioned about their knowledge about the influence of physical illness on mental health[26] not surprisingly only 4 out of 38 respondents were found to be having knowledge about the same. We have educated and counseled all the respondents about the various aspects of the disease like the causes, care to be taken, impact of physical illness on mental health[26] foods to be avoided, importance of the regular medication, need for frequent monitoring, lifestyle modification, rehabilitation, physiotherapy, about the chances of inheritance of the disease etc. According to our study, the prevalence of RA was found to be 2.3%.

CONCLUSION

This research includes only a small portion of Guntur district population, and it brings to notice the burden of the RA among Guntur district. The prevalence of RA according to our study was found to be 2.3%. The reasons for the increase in the burden of the RA as observed in our survey may include the following issues being next to the genetic factors – obesity, lack of awareness, a low financial status of its citizens, lack of proper nutrition, lack of self-assessment, and the various occupational behaviors. The importance of early treatment and the risks of further disease progression must be educated to the population. If RA is left uncontrolled it can lead to serious CVDs, lung diseases, extra-articular manifestations, other musculoskeletal disorders. Hence there is an immediate need to bring awareness among the citizens about the RA disease, impact of physical illness on mental health. Lifestyle modifications, risks and importance of early treatment, need for regular medication and enhance the QOL. Awareness must be created among the population to self-assess their QOL using the standard tools like the SF-36 questionnaire form, to monitor their health status and to incorporate the required, pharmacological and non-pharmacological changes including, the lifestyle modification to have a better QOL.

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REFERENCES

1. Walker, R., Clinical Pharmacy and Therapeutics E-Book. Elsevier Health Sciences. Rheumatoid arthritis and osteoarthritis. D. J. Pang and G. M. Brough; 2012. P- 832.
2. Handa R, Rao UR, Lewis JF, Rambhad G, Shiff S, Ghia CJ. Literature review of rheumatoid arthritis in India. International journal of rheumatic diseases. 2016 May;19(5):440-51.
3. Vos T, Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, Abdulkader RS, Abdulle AM, Abebo TA, Abera SF, Aboyans V. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet. 2017 Sep 16;390(10100):1211-59.
4. Brusca SB, Abramson SB, Scher JU. Microbiome and mucosal inflammation as extra-articular triggers for rheumatoid arthritis and autoimmunity. Current opinion in rheumatology. 2014 Jan;26(1):101-7.
5. Rheumatoid arthritis. American College of Rheumatology. [Updated 2015 ;Cited 2018 Mar 23] Available from: https://www.rheumatology.org.
6. Schur PH, Gabriel SE, Crowson CS. Epidemiology of, risk factors for, and possible causes of rheumatoid arthritis. UpToDate. UpToDate, Waltham. 2014.
7. Frank J. Risk Factors for Rheumatoid Arthritis.Arthritis – Health.[updated 2016 Aug 26] Cited : 2018 Apr 19. Available from: https://www.arthritis-health.com
8. Rheumatoid arthritis. Mayo clinic .[Updated 2017 Aug 09; Cited 2018 Mar 15] Available from: https://www.mayoclinic.org/.
9. Chiu HY, Huang HL, Li CH, Chen HA, Yeh CL, Chiu SH, Lin WC, Cheng YP, Tsai TF, Ho SY. Increased risk of chronic kidney disease in rheumatoid arthritis associated with cardiovascular complications–a national population-based cohort study. PLoS One. 2015 Sep 25;10(9):e0136508.
10. Kochi M, Kohagura K, Shiohira Y, Iseki K, Ohya Y. Chronic kidney disease, inflammation, and cardiovascular disease risk in rheumatoid arthritis. Journal of cardiology. 2018 Mar 1;71(3):277-83.
11. Constitution of W.H.O : principles W.H.O remains firmly committed to the principles set out in the preamble to the constitution. Protected together #vaccineswork.World immunization week 2018 .Http://www.who.int/about /mission/en/. Accessed on April 29,2018.
12. Matcham F, Norton S, Steer S, Hotopf M. Usefulness of the SF-36 Health Survey in screening for depressive and anxiety disorders in rheumatoid arthritis. BMC musculoskeletal disorders. 2016 Dec;17(1):224.
13. Bullinger M, Alonso J, Apolone G, Leplège A, Sullivan M, Wood-Dauphinee S, et al. Translating health status questionnaires and evaluating their quality: The IQOLA project approach. J ClinEpidemiol. 1998 Nov;51(11):913-23. [PubMed].
14. Ware JE Jr[1], SherbourneCD.The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med care1992 Jun;30(6):473-83. [PubMed].
15. 36-Item Short Form Survey (SF-36) Scoring Instructions. RAND HEALTH .http://www.rand.org/health/ surveys_tools/mos/mos_core_36item_scoring.html. Accessed on April 25, 2019.
16. Laucis NC, Hays RD, Bhattacharyya T. Scoring the SF-36 in orthopaedics: a brief guide. The Journal of bone and joint surgery. American volume. 2015 Oct 7;97(19):1628.
17. Brennan-Olsen SL, Cook S, Leech MT, Bowe SJ, Kowal P, Naidoo N, Ackerman IN, Page RS, Hosking SM, Pasco JA, Mohebbi M. Prevalence of arthritis according to age, sex and socioeconomic status in six low and middle income countries: analysis of data from the World Health Organization study on global AGEing and adult health (SAGE) Wave 1. BMC musculoskeletal disorders. 2017 Dec;18(1):271.
18. Matcham F, Scott IC, Rayner L, Hotopf M, Kingsley GH, Norton S, Scott DL, Steer S. The impact of rheumatoid

arthritis on quality-of-life assessed using the SF-36: a systematic review and meta-analysis. InSeminars in arthritis and rheumatism 2014 Oct 1 (Vol. 44, No. 2, pp. 123-130). WB Saunders.

19. Agca R, Heslinga SC, Rollefstad S, Heslinga M, McInnes IB, Peters MJ, Kvien TK, Dougados M, Radner H, Atzeni F, Primdahl J. EULAR recommendations for cardiovascular disease risk management in patients with rheumatoid arthritis and other forms of inflammatory joint disorders: 2015/2016 update. Annals of the rheumatic diseases. 2016 Oct 3:annrheumdis-2016.

20. Favalli EG, Biggioggero M, Crotti C, Becciolini A, Raimondo MG, Meroni PL. Sex and management of rheumatoid arthritis. Clinical reviews in allergy & immunology. 2018 Jan 26:1-3.

21. Mollard E, Pedro S, Chakravarty E, Clowse M, Schumacher R, Michaud K. The impact of menopause on functional status in women with rheumatoid arthritis. Rheumatology. 2018 Jan 29;57(5):798-802.

22. Simon D, Kleyer A, Stemmler F, Simon C, Berlin A, Hueber AJ, Haschka J, Renner N, Figueiredo C, Neuhuber W, Buder T. Age-and sex-dependent changes of intra-articular cortical and trabecular bone structure and the effects of rheumatoid arthritis. Journal of Bone and Mineral Research. 2017 Apr;32(4):722-30.

23. Stefanski AL, Tomiak C, Pleyer U, Dietrich T, Burmester GR, Dörner T. The diagnosis and treatment of Sjögren's syndrome. Deutsches Ärzteblatt International. 2017 May;114(20):354.

24. Cojocaru M, Cojocaru IM, Silosi I, Vrabie CD, Tanasescu R. Extra-articular manifestations in rheumatoid arthritis. Maedica. 2010 Dec;5(4):286.

25. Joshi VL, Chopra A. Is there an urban-rural divide? Population surveys of rheumatic musculoskeletal disorders in the Pune region of India using the COPCORD Bhigwan model. The Journal of rheumatology. 2009 Feb 1:jrheum-080675.

26. Barlow JH, Cullen LA, Rowe IF. Educational preferences, psychological well-being and self-efficacy among people with rheumatoid arthritis. Patient education and counseling. 2002 Jan 1;46(1):11-9.

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