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Quality of life assessment and its correlation with disease activity in rheumatoid arthritis patients

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Abstract---Background: Rheumatoid arthritis (RA) is a chronic autoimmune disease of unknown etiology that leads to synovial membrane inflammation & destruction of the synovial joints. Quality of life (QoL) is a multidimensional concept that is used to describe the individuals' perceptions, satisfaction, and evaluation of different areas of their own lives. Objective: to assess the impact of rheumatoid arthritis on the quality of life of the patients & its correlation with disease activity & functional impairment. Materials and methods: The study was carried out on 60 RA patients. All patients were subjected to complete clinical examination & laboratory assessment. Disease activity had been assessed through Disease Activity Score 28 (DAS 28). Functional assessment by HAQ-DI (Health Assessment Questionnaire - Disability Index) was done. Quality of life assessment by: World Health Organization Quality of Life BREF (WHO QoL BREF) and Rheumatoid Arthritis Quality of Life (RAQoL). Sleep quality was assessed by PSQI. Results: There was significant negative correlation between QoL assessed by (WHO QoL BREF) & DAS. There was significant positive correlation between QoL assessed by RAQoL & DAS ($P < 0.001$), quality of sleep assessed by (PSQI) & DAS. Conclusions: Our study confirms that RA causes impairment of all aspects of QoL & poor sleep quality which is associated with increase in disease activity.

Keywords---Rheumatoid Arthritis, quality of life, WHO QoL BREF, RAQoL, PSQI, US 7 score.

Introduction

Rheumatoid arthritis (RA) is a chronic multisystem disease of unknown cause, characterized by inflammatory synovitis. It is a symmetric polyarthritis involving mostly peripheral joints, with uneven probability for deformation. It affects 1% of the population, and three times more common in females than in males. It usually appears between 35 and 50 years of age, and its onset relates to genetic predisposition and to its interaction with environmental factors (Scott & Wolfe, 2010).

Health-related quality of life (HRQoL) is a multidimensional concept reflecting patients' subjective assessment of the disease effect on their physical, psychological, and social well-being (De Korte, Mombers, Sprangers, & Bos, 2002). There is sufficient evidence that RA has an intense effect on patients' functioning, QoL, and well-being. The physical component of QoL is the most affected due to pain and restrictions in physical functioning, and the most important predictors of QoL are pain severity and depression (Awada et al., 2019). Sleep problems occur in 54 – 70 % of RA patients, such as: difficulty falling asleep, non-restorative sleep, poor sleep quality, awakening during the night, insomnia, and excessive daytime sleepiness (Goes, Reis, Silva, Kahlow, & Skare, 2017).

Musculoskeletal ultrasound (US) is able to detect both soft tissue lesions and bone lesions earlier than conventional radiography. Also, it allows evaluation of inflammatory changes of joints and the detection of tenosynovitis/paratenonitis. Therefore, US has a characteristic role in the diagnostic and follow up assessment of arthritic diseases and is even more sensitive than clinical evaluation (Szkudlarek et al., 2004). The use of power Doppler (PD) US is especially helpful in further differentiation of inflammatory disease activity. Early detection of the inflammatory activity, by US, is of major significance because it influences further diagnostic and therapeutic decisions (Karim et al., 2001). The aim of this work was to assess the impact of rheumatoid arthritis on the quality of life of the patients & its correlation with disease activity & functional impairment.

Materials and Methods

This cross-sectional study was carried out on 60 RA patients diagnosed according to 2010 ACR /EULAR classification criteria for rheumatoid arthritis (Aletaha et al., 2010). All patients were selected from the outpatient clinic of Rheumatology, Rehabilitation and Physical Medicine Department, Faculty of Medicine, Tanta University hospitals. An informed written consent was obtained from all participants. The study was done after approval from the Local Research Ethical Committee Tanta University Hospitals (approval code: 33590/12/19).

Exclusion criteria

Patients with serious comorbid medical conditions (ex: malignancy, heart failure, renal failure, other rheumatic diseases), intellectual and/or cognitive impairments, past history of serious psychiatric disorders, or substance abuse and previous sleep problems before RA disease.

All patients were subjected to complete history, clinical examination and laboratory assessment [Erythrocyte sedimentation rate (ESR), C-Reactive protein (CRP), Complete blood count (CBC), Rheumatoid factor (RF), Serum uric acid, Anti-cyclic citrullinated peptides (Anti-CCP)].

Disease activity had been assessed through DAS 28 by erythrocyte sedimentation rate [8]. A DAS 28 > 5.1 indicated high disease activity, DAS 28 > 3.2 and ≤ 5.1 indicated moderate disease activity, DAS 28 > 2.6 and ≤ 3.2 indicated low disease activity. Remission was considered if DAS 28 was ≤ 2.6.

Functional assessment

HAQ-DI (Health Assessment Questionnaire - Disability Index) (Bruce & Fries, 2003) was done. It determines functional disability, which consists of 8 domains concerning everyday activity: The first one concerns dressing and washing, the second involves getting up in the morning, the third includes eating, the fourth is walking, the fifth is personal hygiene, the sixth is lifting, the seventh is grasping, the eighth includes other activities of everyday life.

Assessment of these sections on a 4-point scale which determines the degree of difficulty in performing these activities. In addition, the patients answered questions about the use of special items or equipment and the use of other people's help. This gives a score in the 0 to 3 range: a score of 0 to <1 represent mild to moderate difficulty, a score of ≥ 1 to < 2 represent moderate to severe disability & a score of ≥2 to ≤ 3 represent severe to very severe disability.

Quality of life assessment

World Health Organization Quality of Life BREF (WHO QoL BREF) ("Development of the World Health Organization WHOQOL-BREF quality of life assessment. The WHOQOL Group," 1998) & Rheumatoid Arthritis Quality of Life (RAQoL) (de Jong, van der Heijde, McKenna, & Whalley, 1997) was done. The WHO QoL-BREF (short form of WHO QoL-100) is a brief 26-item questionnaire. It is a valid and reliable alternative to the original WHO QoL-100 and can be easily administered in the outpatient department. It evaluates QoL in the last two weeks.

The WHO QoL-Bref produces a profile with four domain scores and two individually scored items about an individual's overall perception of quality of life and health. The four domain scores are scaled in a positive direction with higher scores indicating a higher quality of life. After item recoding a raw score is computed by a simple algebraic sum of each item in each of the four domains. The possible raw score ranges for each domain are as follows: physical health (7:35), psychological (6:30), social relationships (3:15) and environment (8:40). The next step is to transform each raw scale score using the formula:

$$\text{Transformed Scale} = \left[\frac{(\text{Actual raw score} - \text{lowest possible raw score})}{\text{Possible raw score range}} \right] \times 100$$

The RAQoL is a disease-specific measure of QoL in RA. The patients are asked to answer 30 dichotomous questions (yes/no) regarding physical, emotional, and social limitations caused by the disease. One point is assigned for each affirmative answer (yes = 1, no = 0) and the scores thus range from 0 (best score) to 30 (worst score).

Assessment of sleep quality

By Pittsburg Sleep Quality Index (PSQI) (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The PSQI measures the patient's reported sleep quality over the preceding month. The PSQI has 19 items measuring the following Seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medication, and daytime dysfunction. A PSQI score > 5, based on the total score (0 to 21), was defined as the cutoff for a diagnosis of insomnia.

Ultrasound assessment

Patients were examined at US unit of Rheumatology, Rehabilitation & Physical Medicine Department in Tanta University Educational Hospital using SAMSUNG MEDISION (UGEO H60), with linear array transducers (frequencies ranging between 7.5-16 MHz).

The novel US 7 score was applied (M. Backhaus et al., 2009). This score includes US evaluation of the following joints of the clinically most affected hand & forefoot: wrist, MCP (II, III), PIP (II, III), & MTP (II & V) which were assessed for synovitis, tenosynovitis/ paratenonitis & erosions.

Scoring of US 7 score (Sarah Ohrndorf, Glimm, Burmester, & Backhaus, 2011): Synovitis by GSUS: (grade 0: no synovial thickening, grade 1: minimal synovial thickening, grade 2: synovial thickening bulging over the line linking tops of the periarticular bones without extention along the bone diaphysis, grade 3: synovial thickening bulging over the line linking tops of the periarticular bones with extention to at least one of the bones diaphyses). Synovitis & tenosynovitis by PDUS: (grade 0: no flow, grade 1: single vessel signals, grade 2: Less than half of the area of the synovium is filled with vessel signals, grade 3: more than half of the area of the synovium is filled with vessel signals. Tenosynovitis by GSUS: (grade 0: absent, grade 1: present. Erosions: (grade 0: absent, grade 1: present). Sum scores for synovitis, tenosynovitis / paratenonitis & erosions were composed. The scoring range for the Gs synovitis score was 0-27, for the PD synovitis score 0-39, for the GS tenosynovitis score 0-7, for the PD tenosynovitis score 0-21, for the erosions score 0-17 including wrist examination.

Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution. Quantitative data were described using range (minimum and maximum), mean & standard deviation. Student t-test (for normally distributed quantitative variables), Mann Whitney test (for abnormally distributed quantitative variables). Pearson coefficient & spearman coefficient used for correlation between two quantitative variables. Significance of the obtained results was judged at the 5% level (Kirkpatrick & Feeney, 2013).

Results

Among the 60 RA patients 52 (86.7%) patients were females and 8 (13.3%) were males with a mean age 44.02 ± 11.13 years, a mean disease duration 8.43 ± 6.09 years, a mean DAS 28 5.07 ± 0.89 . Based on DAS 28, low activity, moderate activity, and high activity presented in 1 (1.7%), 34 (56.7%), and 25 (41.7%) patients, respectively. (Table I)

Functional impairment & quality of life:

A significant negative correlation was found between functional disability based on HAQ-DI & quality of life assessed by WHO QoL BREF (Figure I). Also, there was significant positive correlation between HAQ-DI & quality of life assessment by RAQoL. This indicates that increase in functional impairment leads to worse quality of life.

Disease activity & quality of life

Our results revealed a significant negative correlation between disease activity assessed by DAS 28 & quality of life assessed by WHO QoL BREF (Figure II). Also, there was significant positive correlation between DAS 28 & quality of life assessment by RAQoL (Table II). This study shows that increase in disease activity is associated with worse quality of life.

Disease activity & sleep quality

It was noticed that a significant positive correlation was found between DAS 28 & PSQI (Table II). This reveals that the more uncontrolled disease activity the worse sleep quality among RA patients.

Disease activity & ultrasonographic data:

A significant positive correlation was noticed between PD synovitis & DAS (Table III). This indicates that increase in disease activity is associated with worse ultrasonographic findings in RA patients.

Quality of life & ultrasonographic data:

A significant negative correlation was found between WHO QoL physical domain & tenosynovitis (GS & PD) (Figure III&IV). Also, there was significant positive

correlation between RAQoL & [tenosynovitis (GS & PD) & erosions]. So, the worse ultrasonographic findings the worse quality of life among RA patients.

Discussions

Rheumatoid arthritis (RA) is a chronic autoimmune disease characterized by changes in the synovium followed by joint swelling, pain, cartilage and bone destruction, and subsequent systemic inflammation. The exact etiology is still unknown; however, 50% of the risk is attributable to genetics. Overall, the disease is more prevalent in women and has been found to increase in prevalence with age. Patients with RA have a higher mortality and morbidity burden, reduced quality of life, and higher disability (McInnes & Schett, 2011).

As in other pain conditions, issues of sleep disturbance are of major concern in RA patients, who often report problems with poor sleep quality, issues with falling asleep, as well as feeling unrested and fatigued after sleep. These subjective findings have been supported by a lot of studies where, compared to healthy controls, patients with RA showed lower overall sleep efficiency and more awakenings (Wolfe, Michaud, & Li, 2006).

US examination of all joints and tendons that can be affected in RA would be extremely time consuming, several reduced joint scores for assessing US joint inflammation have been developed. The German US 7 score has been demonstrated to reflect disease activity and to be suitable for monitoring therapy in daily rheumatology practice (T. M. Backhaus et al., 2013). The aim of this study was to assess the impact of rheumatoid arthritis on the quality of life of the patients & its correlation with disease activity & functional impairment.

In our studied RA patients, there was significant negative correlation between QoL assessed by WHOQoL BREF (physical & psychological domains) & (disease activity & functional impairment). This is similar to results by Goma et al (2019) (Goma, Razek, & Abdelbary, 2019) who confirmed that RA causes impairment of all aspects of QoL, and the disease activity is the most predictor factor in those patients, where this study reported that disease activity (measured by DAS 28) negatively correlated with QoL (assessed by WHOQoL BREF).

Also, a study for assessing the QoL in patients with RA used the generic questionnaire WHOQoL BREF showed that the more intense the activity of the disease, the worse the perceived QoL , whereas patients with low disease activity have better QoL perception. It was noticed that all domains of WHOQoL had significant negative correlations with DAS 28 in that study (Taylor, Myers, Simpson, McPherson, & Weatherall, 2004). In our study, there was significant positive correlation between QoL assessed by RAQoL & (disease activity, functional impairment & ESR).

In accordance with our results, Goma et al (2019) (Goma et al., 2019) revealed that DAS 28 has a significant strong positive correlation with QoL of patients with RA assessed by RAQoL; most patients on remission or with low disease activity showed good QoL and low RAQoL score, and others with high disease activity showed high RAQoL score and bad QoL.

Also, this is consistent with a study which reported that disease activity in RA had a negative effect on QoL, which was measured with RAQoL Scale, a RA-specific measure (Sunar, GARİP, Yilmaz, Bodur, & ATAMAN, 2015).

Moreover, this is consistent with another study that was conducted on 79 patients with RA in Colombia, where they evaluated QoL by using RAQoL Scale (Cadena et al., 2003) and demonstrated that RA activity significantly influenced QoL. Similarly, this finding was confirmed in previous studies by Prajs et al (2006) (Prajs et al., 2006). In the study by Intriago et al (2019) (Intriago, Maldonado, Cardenas, & Rios, 2019) the RAQoL scores showed positive correlations with ESR, CRP, painful joint count, swollen joint count, VAS and physician assessment. Also, Marra et al (2005) (Marra et al., 2005) estimated that elevation of HAQ-DI score was associated with an increase of the RAQoL score. This is due to both HAQ-DI & RAQoL assess mainly the activities of daily living & the abilities of the patients which are affected by RA.

Our results reported that there was significant positive correlation between sleep quality assessed by PSQI & (disease activity, functional impairment, ESR & CRP). This is in agreement with Radwan & Borai (2021) (Radwan & Borai, 2021) who revealed that ESR, CRP, VAS, DAS 28, HAQ-DI, morning stiffness and positive Anti-CCP were significantly associated with poor sleep quality which was consistent with Sariyildiz et al (2014) (Sariyildiz et al., 2014) who found a significant correlation between the age, pain, fatigue, DAS 28, ESR, CRP, HAQ-DI, RAQoL, duration of morning stiffness and the sleep disturbance.

Also, Kontodimopoulos et al (2020) (Kontodimopoulos, Stamatopoulou, Kletsas, & Kandili, 2020) found that there is direct relationship between poor sleep quality & RA disease activity. The disease activity is affected by the number of tender and swollen joints that may cause interruptions during sleep throughout the night which may result in longer durations of morning stiffness.

In contrast to our results Hirsch et al (1994) (Hirsch et al., 1994) reported no association between disease activity and poor sleep quality, but this conflicting result may be attributed to the small number of patients participated in their work. However, another study five times larger in terms of the sample size, also found no association between disease activity and sleep quality. This may be due to: the study population pain levels were generally low, the cross-sectional study design didn't allow for causal conclusions on the relationships between variables, their population consisted of men and women of working age, which may also contribute to the reduced sleep problems (Drewes et al., 1998).

Our study revealed that ultrasonographic findings (synovitis & tenosynovitis) were found most in the wrist joint. This is in agreement with Ohrndorf et al and Backhaus et al (2013) (Sarah Ohrndorf et al., 2011) who reported that the most affected joint region in RA patients by ultrasound assessment was the wrist. This may be because this is the mainly affected joint in RA & it is more used in activities of daily living, predisposing it to more mechanical stress.

But in contrast, Kamel et al (2017) (Kamel, Sadek, Mohamed, Samra, & Osman, 2017) found that the MCP II was the most affected joint region. Different

population (number of patients, duration of disease and disease-modifying antirheumatic drugs) may be the reason for this difference. In our studied RA patients, erosions were found most in lateral aspect of 5th MTP & radial aspect of 2nd MCP. Similar results were reported by Ohrndorf and Backhaus (2013) (S. Ohrndorf & Backhaus, 2013) & Kamel et al (2017) (Kamel et al., 2017). Also, this distribution of erosions was shown by a French-US working group before presenting new semiquantitative erosions score with good correlation to radiography. That group also found erosions primarily in MTP V, followed by MCP II (Sommier et al., 2006).

This may be attributed to minor trauma while walking & doing daily activities, with inflammation of the radial collateral ligament of index finger. In our study, there was significant correlation between quality of life & tenosynovitis. This is consistent with Serban et al (2020) (Şerban et al., 2020) who confirmed that the QoL of RA patients is significantly affected, and that US is an important tool in detecting the majority of changes occurring in those patients. Also, Inamo et al (2019) (Inamo, Kaneko, Sakata, & Takeuchi, 2019) retrospectively assessed US-detected subclinical synovitis and concluded that its presence impaired the functionality and QoL in RA patients.

We found a significant positive correlation between synovitis & DAS. This is in agreement with Erraoui et al (2019) (Erraoui et al., 2019) who found significant positive correlation between synovitis & DAS in a study evaluating clinical and ultrasonographic evolution and their correlation in patients with rheumatoid arthritis treated with tocilizumab.

No significant correlation between US 7 score & HAQ-DI was found.

Similar to our results Tanaka et al (2005) (Tanaka et al., 2005) & Drossaers-Bakker et al (2000) (Drossaers-Bakker, Kroon, Zwinderman, Breedveld, & Hazes, 2000) reported that the ultrasound measures included in the US 7 Score were only weakly associated with overall physical functioning as reflected by the HAQ-DI score.

But in contrast to our results, Závada et al (2017) (Závada et al., 2017) found that the PD and GS synovitis sum-scores were significantly positively correlated with HAQ-DI score and the relative impact of US-detected synovitis was twice as high in patients with early RA. This may be partly related to the design of the HAQ-DI itself, although this instrument is capable of detecting small but meaningful changes in function in individual patients (Hawley & Wolfe, 1992), it is dominated by effects on large joints such as the hips, knees and shoulders (which are not represented in the US 7 Score and is relatively insensitive in detecting changes in hand function which is mainly represented in the US 7 Score).

Limitations

in our study were small number of patients & lack of diversity among the patients as regard occupation & residency.

Conclusions

Our study confirms that RA causes impairment of all aspects of quality of life & poor sleep quality which is consistent with increase in disease activity & severity. Good control of disease activity will lead to better quality of life.

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References

- Aletaha, D., Neogi, T., Silman, A. J., Funovits, J., Felson, D. T., Bingham, C. O., 3rd, . . . Hawker, G. (2010). 2010 Rheumatoid arthritis classification criteria: an American College of Rheumatology/European League Against Rheumatism collaborative initiative. *Arthritis Rheum*, 62(9), 2569-2581. doi:10.1002/art.27584
- Awada, S., Ajrouche, R., Shoker, M., Al-Hajje, A., Rachidi, S., Zein, S., & Bawab, W. (2019). Rheumatoid Arthritis in the Lebanese Adults: Impact on Health-Related Quality of Life. *J Epidemiol Glob Health*, 9(4), 281-287. doi:10.2991/jegh.k.190820.001
- Backhaus, M., Ohrndorf, S., Kellner, H., Strunk, J., Backhaus, T. M., Hartung, W., . . . Schmidt, W. A. (2009). Evaluation of a novel 7-joint ultrasound score in daily rheumatologic practice: a pilot project. *Arthritis Rheum*, 61(9), 1194-1201. doi:10.1002/art.24646
- Backhaus, T. M., Ohrndorf, S., Kellner, H., Strunk, J., Hartung, W., Sattler, H., . . . Backhaus, M. (2013). The US7 score is sensitive to change in a large cohort of patients with rheumatoid arthritis over 12 months of therapy. *Ann Rheum Dis*, 72(7), 1163-1169. doi:10.1136/annrheumdis-2012-201397
- Bruce, B., & Fries, J. F. (2003). The Stanford Health Assessment Questionnaire: a review of its history, issues, progress, and documentation. *J Rheumatol*, 30(1), 167-178.
- Buysse, D. J., Reynolds, C. F., 3rd, Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res*, 28(2), 193-213. doi:10.1016/0165-1781(89)90047-4
- Cadena, J., Vinaccia, S., Pérez, A., Rico, M. I., Hinojosa, R., & Anaya, J. M. (2003). The impact of disease activity on the quality of life, mental health status, and family dysfunction in colombian patients with rheumatoid arthritis. *J Clin Rheumatol*, 9(3), 142-150. doi:10.1097/01.RHU.0000073434.59752.f3
- de Jong, Z., van der Heijde, D., McKenna, S. P., & Whalley, D. (1997). The reliability and construct validity of the RAQoL: a rheumatoid arthritis-specific quality of life instrument. *Br J Rheumatol*, 36(8), 878-883. doi:10.1093/rheumatology/36.8.878
- De Korte, J., Mombers, F. M., Sprangers, M. A., & Bos, J. D. (2002). The suitability of quality-of-life questionnaires for psoriasis research: a systematic literature review. *Arch Dermatol*, 138(9), 1221-1227. doi:10.1001/archderm.138.9.1221
- Development of the World Health Organization WHOQOL-BREF quality of life assessment. The WHOQOL Group. (1998). *Psychol Med*, 28(3), 551-558. doi:10.1017/s0033291798006667

- Drewes, A. M., Svendsen, L., Taagholt, S. J., Bjerregård, K., Nielsen, K. D., & Hansen, B. (1998). Sleep in rheumatoid arthritis: a comparison with healthy subjects and studies of sleep/wake interactions. *Br J Rheumatol*, 37(1), 71-81. doi:10.1093/rheumatology/37.1.71
- Drossaers-Bakker, K. W., Kroon, H. M., Zwinderman, A. H., Breedveld, F. C., & Hazes, J. M. (2000). Radiographic damage of large joints in long-term rheumatoid arthritis and its relation to function. *Rheumatology (Oxford)*, 39(9), 998-1003. doi:10.1093/rheumatology/39.9.998
- Erraoui, M., Rkain, H., Bouaddi, I., Aktaou, S., Benbouazza, K., Rostom, S., . . . Hajjaj-Hassouni, N. (2019). The US7 score is an effective tool of monitoring in patients with rheumatoid arthritis over 6 months of Tocilizumab. *J orthop rheumatol*, 4, 120-126. doi:10.15761/ROM.1000168
- Goes, A. C. J., Reis, L. A. B., Silva, M. B. G., Kahlow, B. S., & Skare, T. L. (2017). Rheumatoid arthritis and sleep quality. *Rev Bras Reumatol Engl Ed*, 57(4), 294-298. doi:10.1016/j.rbre.2016.07.011
- Goma, S. H., Razek, M. R. A., & Abdelbary, N. M. (2019). Impact of rheumatoid arthritis on the quality of life and its relation to disease activity. *ERAR*, 46(4), 304-312. doi:10.4103/err.err_39_19
- Hawley, D. J., & Wolfe, F. (1992). Sensitivity to change of the health assessment questionnaire (HAQ) and other clinical and health status measures in rheumatoid arthritis: results of short-term clinical trials and observational studies versus long-term observational studies. *Arthritis Care Res*, 5(3), 130-136. doi:10.1002/art.1790050304
- Hirsch, M., Carlander, B., Vergé, M., Tafti, M., Anaya, J. M., Billiard, M., & Sany, J. (1994). Objective and subjective sleep disturbances in patients with rheumatoid arthritis. A reappraisal. *Arthritis Rheum*, 37(1), 41-49. doi:10.1002/art.1780370107
- Inamo, J., Kaneko, Y., Sakata, K., & Takeuchi, T. (2019). Impact of subclinical synovitis in ankles and feet detected by ultrasonography in patients with rheumatoid arthritis. *Int J Rheum Dis*, 22(1), 62-67. doi:10.1111/1756-185x.13399
- Intriago, M., Maldonado, G., Cardenas, J., & Rios, C. (2019). Quality of life in Ecuadorian patients with established rheumatoid arthritis. *Open access rheumatology : research and reviews*, 11, 199-205. doi:10.2147/OARRR.S216975
- Kamel, S. R., Sadek, H. A., Mohamed, F. A., Samra, M. F. A., & Osman, H. M. (2017). The ultrasound 7 score in the assessment of synovitis in rheumatoid arthritis: correlation with clinical disease activity indices. *ERAR* 44(3), 103-110. doi:10.4103/err.err_4_17
- Karim, Z., Wakefield, R. J., Conaghan, P. G., Lawson, C. A., Goh, E., Quinn, M. A., . . . Emery, P. (2001). The impact of ultrasonography on diagnosis and management of patients with musculoskeletal conditions. *Arthritis Rheum*, 44(12), 2932-2933. doi:10.1002/1529-0131(200112)44:12<2932::aid-art481>3.0.co;2-3
- Kirkpatrick, L., & Feeney, B. (2013). *A simple guide to IBM SPSS statistics for version 20.0 Student*. Cengage Learning, Wadsworth.
- Kontodimopoulos, N., Stamatopoulou, E., Kletsas, G., & Kandili, A. (2020). Disease activity and sleep quality in rheumatoid arthritis: a deeper look into the relationship. *Expert Rev Pharmacoecon Outcomes Res*, 20(6), 595-602. doi:10.1080/14737167.2020.1677156

- Marra, C. A., Woolcott, J. C., Kopec, J. A., Shojania, K., Offer, R., Brazier, J. E., . . . Anis, A. H. (2005). A comparison of generic, indirect utility measures (the HUI2, HUI3, SF-6D, and the EQ-5D) and disease-specific instruments (the RAQoL and the HAQ) in rheumatoid arthritis. *Soc Sci Med*, 60(7), 1571-1582. doi:10.1016/j.socscimed.2004.08.034
- McInnes, I. B., & Schett, G. (2011). The pathogenesis of rheumatoid arthritis. *N Engl J Med*, 365(23), 2205-2219. doi:10.1056/NEJMra1004965
- Ohrndorf, S., & Backhaus, M. (2013). Advances in sonographic scoring of rheumatoid arthritis. *Ann Rheum Dis*, 72 Suppl 2, 69-75. doi:10.1136/annrheumdis-2012-202197
- Ohrndorf, S., Glimm, A.-M., Burmester, G.-R., & Backhaus, M. (2011). Musculoskeletal ultrasound scoring systems: Assessing disease activity and therapeutic response in rheumatoid arthritis. *Int J Clin Rheumatol*, 6, 57-65. doi:10.2217/ijr.10.101
- Prajs, K., Fliciński, J., Brzosko, I., Przepiera-Bedzak, H., Ostanek, L., & Brzosko, M. (2006). [Quality of life and activity of disease in patients with rheumatoid arthritis]. *Ann Acad Med Stetin*, 52 Suppl 2, 39-43.
- Radwan, A., & Borai, A. (2021). Quality of sleep in rheumatoid arthritis patients: Relationship with disease activity, depression and functional status. *Egypt Rheumatol*, 43(2), 183-187. doi:<https://doi.org/10.1016/j.ejr.2020.08.002>
- Sariyildiz, M. A., Batmaz, I., Bozkurt, M., Bez, Y., Cetincakmak, M. G., Yazmalar, L., . . . Celepkolu, T. (2014). Sleep quality in rheumatoid arthritis: relationship between the disease severity, depression, functional status and the quality of life. *J Clin Med Res*, 6(1), 44-52. doi:10.4021/jocmr1648w
- Scott, D. L., & Wolfe, F. (2010). Huizinga TW. *The Lancet Rheumatology*, 376, 1094-1108.
- Şerban, O., Papp, I., Bocşa, C. D., Micu, M. C., Bădărinză, M., Albu, A., & Fodor, D. (2020). Do ankle, hindfoot, and heel ultrasound findings predict the symptomatology and quality of life in rheumatoid arthritis patients? *Journal of ultrasonography*, 20(81), 70-82. doi:10.15557/JoU.2020.0012
- Sommier, J. P., Michel-Batot, C., Sauliere, N., Rat, A. C., Hoenen-Clavert, V., Pourel, J., . . . Chary-Valckenaere, I. (2006). Structural lesions in RA: Proposition for a new semiquantitative score (ScuSSEe: Scoring by ultrasound structural erosion). Paper presented at the Arthritis and Rheumatism.
- Sunar, I., GARİP, Y., Yilmaz, Ö., Bodur, H., & ATAMAN, Ş. (2015). Disease activity (rheumatoid arthritis disease activity index-5) in patients with rheumatoid arthritis and its association with quality of life, pain, fatigue, and functional and psychological status. *Arch Rheumatol*, 30(2), 144-149.
- Szkudlarek, M., Narvestad, E., Klarlund, M., Court-Payen, M., Thomsen, H. S., & Østergaard, M. (2004). Ultrasonography of the metatarsophalangeal joints in rheumatoid arthritis: comparison with magnetic resonance imaging, conventional radiography, and clinical examination. *Arthritis Rheum*, 50(7), 2103-2112. doi:10.1002/art.20333
- Tanaka, E., Saito, A., Kamitsuji, S., Yamada, T., Nakajima, A., Taniguchi, A., . . . Kamatani, N. (2005). Impact of shoulder, elbow, and knee joint involvement on assessment of rheumatoid arthritis using the American College of Rheumatology Core Data Set. *Arthritis Rheum*, 53(6), 864-871. doi:10.1002/art.21589
- Taylor, W. J., Myers, J., Simpson, R. T., McPherson, K. M., & Weatherall, M. (2004). Quality of life of people with rheumatoid arthritis as measured by the

- World Health Organization Quality of Life Instrument, short form (WHOQOL-BREF): score distributions and psychometric properties. *Arthritis Rheum*, 51(3), 350-357. doi:10.1002/art.20398
- Wolfe, F., Michaud, K., & Li, T. (2006). Sleep disturbance in patients with rheumatoid arthritis: evaluation by medical outcomes study and visual analog sleep scales. *J Rheumatol*, 33(10), 1942-1951.
- Závada, J., Hánová, P., Hurňáková, J., Szczuková, L., Uher, M., Forejtová, Š., . . . Pavelka, K. (2017). The relationship between synovitis quantified by an ultrasound 7-joint inflammation score and physical disability in rheumatoid arthritis – a cohort study. *Arthritis Res Ther* 19(1), 5-6. doi:10.1186/s13075-016-1208-6

Tables:**Table (I): Demographic, clinical, laboratory & quality of life assessment data of RA patients (n= 60)**

		Patients (n = 60)
Age (years)		44.02 ± 11.13
Sex	Male	8(13.3%)
	Female	52(86.7%)
Duration of disease (yrs.)		8.43 ± 6.09
Occupation	Not working	49(81.7%)
	Ordinary working	11(18.3%)
Morning stiffness (min.)		Mean ± SD 47.80 ± 37.45
DAS 28	Low activity (> 2.6 ≤ 3.2)	1(1.7%)
	Moderate activity (> 3.2 ≤ 5.1)	34(56.7%)
	High activity (> 5.1)	25(41.7%)
	Mean ± SD	5.07 ± 0.89
HAQ-DI	Mild to moderate difficulty (0 to <1)	6(10.0%)
	Moderate to severe difficulty (≥ 1 to < 2)	43(71.7%)
	Severe to very severe difficulty (≥2 to ≤ 3)	11(18.3%)
	Mean ± SD	1.45 ± 0.41
RF (+ve)		49(81.7%)
Anti-CCP (+ve)		58(96.7%)
ESR 1 (mm/h)		43.75 ± 21.83
CRP (mg/L)		37.9 ± 18.3
Hb (g/dL)		11.15 ± 1.22
WHO QoL (Physical)		38.94 ± 15.08
WHO QoL (Psychological)		58.65 ± 12.03
WHO QoL (Social)		60.38 ± 11.33
WHO QoL (Environmental)		48.95 ± 9.45
RAQoL		14.47 ± 4.59
PSQI		9.92 ± 3.85

Hb: hemoglobin, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, RF: rheumatoid factor, Anti-CCP: Anti-cyclic citrullinated peptide, DAS: Disease Activity Score, HAQ-DI: Health Assessment Questionnaire - Disability Index, WHOQoL: World Health Organization Quality of Life, RAQoL: Rheumatoid arthritis quality of life, PSQI: Pittsburg Sleep Quality Index.

Table (II): Correlation between RAQoL & PSQI with clinical, laboratory & songraphic data of RA patients

	RAQoL		PSQI	
	r	p	rs	p
DAS	0.437	<0.001*	0.486	<0.001*
HAQ-DI	0.608	<0.001*	0.432	0.001*
Synovitis GS	0.234	0.072	0.162	0.215
Synovitis PD	0.108	0.413	0.309	0.016*
Tenosynovitis GS	0.449	<0.001*	0.230	0.077
Tenosynovitis PD	0.392	0.002*	0.310	0.017*
Erosions	0.351	0.006*	0.170	0.197

r: Pearson coefficient, rs: Spearman coefficient, *: Statistically significant at $p \leq 0.05$, GS: grey scale , PD: power dopler.

Table (III): Correlation between sonographic data with clinical and laboratory data of RA patients

	Synovitis GS		Synovitis PD		Tenosynovitis GS		Tenosynovitis PD		Erosion	
	rs	p	rs	p	rs	p	rs	p	rs	p
DAS	0.157	0.231	0.275	0.033*	-0.021	0.871	0.090	0.496	0.049	0.715
HAQ-DI	0.188	0.151	-0.013	0.924	0.126	0.338	-0.018	0.890	0.190	0.150

rs: Spearman coefficient, *: Statistically significant at $p \leq 0.05$.

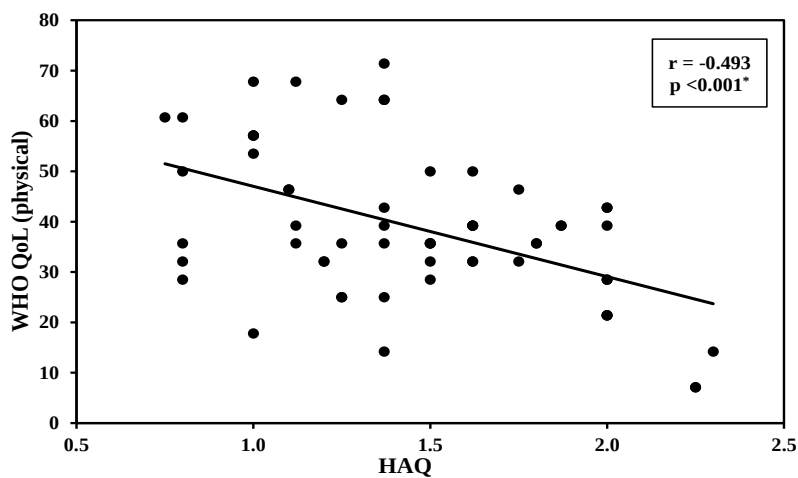


Figure (I): correlation between WHO QoL & (HAQ)

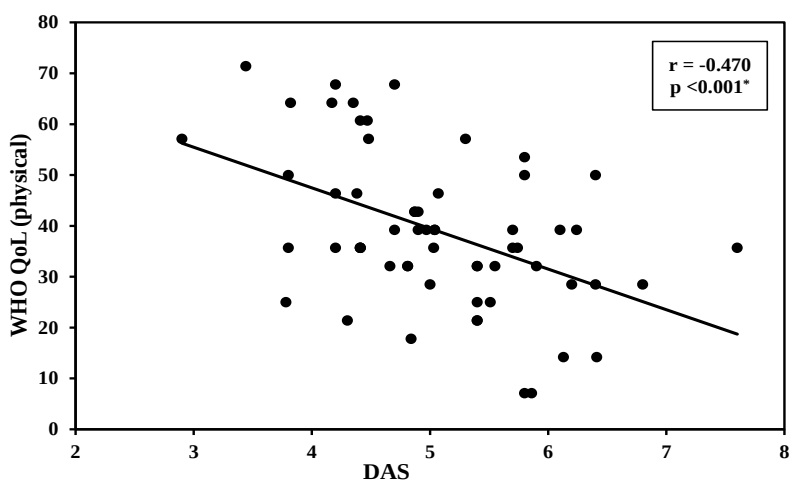


Figure (II): correlation between WHO QoL & (DAS)

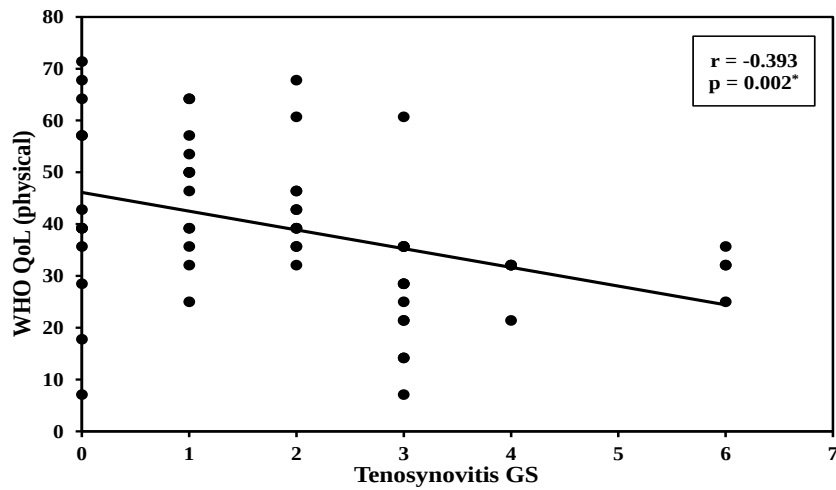


Figure (III): correlation between WHO QoL & (tenosynovitis GS)

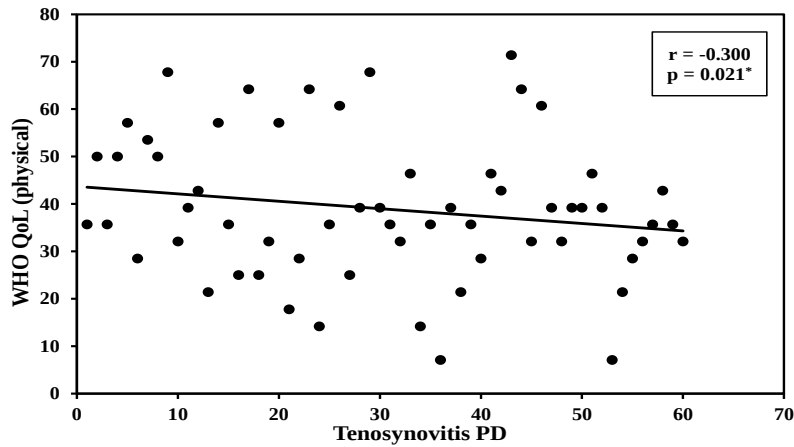


Figure (IV): correlation between WHO QoL & (tenosynovitis PD)