

# Impact of rheumatoid arthritis on the quality of life and its relation to disease activity

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## Background

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, such as physical health and functioning, psychological and emotional well-being, social roles, and relationships. Few studies have addressed the effect of rheumatoid disease on the QOL in the Egyptian community.

## Results

Functional disability based on health assessment questionnaire disability index was significantly increased with the increase in disease activity based on disease activity score-28, where all patients on remission and 56% of those with low disease activity had mild functional disability. Approximately 89% of patients with low disease activity had mild anxiety based on Hamilton anxiety scale, and the majority (75%) of those patients with moderate disease activity and 83.3% of patients on remission had mild anxiety. The majority (85.7%) of those with high disease activity were depressed based on Zung self-rating depression score.

Disease activity score-28 score had a positive significant correlation with health assessment questionnaire disability index ( $P=0.01$ ,  $r=0.40$ ), Hamilton anxiety scale-A ( $P=0.01$ ,  $r=0.46$ ), Zung score ( $P=0.01$ ,  $r=0.46$ ), and rheumatoid arthritis QOL ( $r=0.70$ ,  $P=0.00$ ), and negative correlation with female sexual index ( $r=-0.80$ ,  $P=0.00$ ), all domains of SF-36, and all five domains of WHOQOL.

## Conclusion

This study confirms that rheumatoid arthritis causes impairment of all aspects of QOL (limitation of physical function, physical disability, and pain), mental health disorders (anxiety and depression), and social, environmental, and also sexual dysfunction.

## Keywords:

disease activity score, quality of life, rheumatoid arthritis

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## Introduction

Rheumatoid arthritis (RA) is an autoimmune progressive disease affecting ~1% of the general population [1]. It is mainly a disease of the joints resulting in destruction of the joints and disability, and in severe cases, it may cause life-threatening complications [2]. Musculoskeletal disorders are considered the second largest cause of disability globally, second but close only to behavioral and mental disorders [3]. Many terms are used [e.g. quality of life (QOL), health status, health-related QOL] to discuss the effect of diseases, such as arthritis, on functioning and sense of well-being. At the broadest level, QOL refers not only to health status but also to environmental and economic factors (e.g. income and educational attainment) that can substantially influence well-being. Thus, different conceptual frameworks guide how QOL is defined and measured [4]. QOL is important for measuring the effect of the disease, and for evaluating the effects and cost-effectiveness of the treatment. Some studies have assessed the QOL in patients with RA and its

improvement with early treatment [5]. Owing to medical treatment and health care, QOL became more important, as it extends length of life, sometimes at the expense of QOL, or improve QOL, without extending length of life [6]. RA has major diverse effects on patients' QOL, affecting both mental and physical domains of well-being [7]. QOL is defined as the general well-being of individuals and societies, based on the individual's culture and life values with respect to that individual's objectives, expectation, and standards. It is an important outcome variable in patients with chronic diseases. It also reflects the influences of the personal social and economic resources that an individual has and the way in which these interact with health status. So, QOL can be defined as awareness of people about life, standards, goals, values, and interests [8]. The

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physical disability caused by RA is usually detected clinically; however, the psychological and social morbidities can be easily missed by the clinician [9]. Patients with RA report reduced QOL in several aspects, such as level of independence, physical health, environment, and personal beliefs, compared with the healthy population [10]. Generic and disease-specific QOL scales have been used for evaluating QOL in RA. Disease-specific scales have been designed to pick up health-related aspects particular to the specific disease and that is why they have advantages over the generic ones. They are also more effective than generic instruments to assess treatment response [11,12].

The aim of this study is to assess the QOL in RA and its association with disease activity.

### Patients and methods

A cross-sectional study where 50 patients diagnosed as having RA according to 2010 ACR criteria (RA classification criteria) [13] were enrolled in the study. All patients were from those who attended the Physical Medicine, Rheumatology and Rehabilitation Department and Outpatient Clinic, at Assiut University Hospitals, in the period between September 2016 and March 2018.

#### Inclusion criteria

The following were the inclusion criteria:

- (1) Patients diagnosed as having RA according to 2010 ACR criteria.
- (2) Patients more than 18 years.

#### Exclusion criteria

The following were the exclusion criteria:

- (1) Bedridden patients.
- (2) Presence of significant comorbidity such as malignancies or end-stage organ failure.
- (3) Pregnant women.
- (4) Other rheumatic diseases.

The research was approved by Assiut medical colleague ethics committee for research, keeping patient confidentiality and safety. Verbal and written consents were taken from patients.

For 50 patients with RA, a checklist containing questions on demographic data include age, sex, marital status, level of education, occupation, and cardiovascular comorbidities were completed for all patients.

Full investigations had been done including complete blood count, erythrocyte sedimentation rate, rheumatoid factor, and liver and kidney function tests. Disease activity score (DAS) had been assessed through DAS-28 by erythrocyte sedimentation rate. A DAS-28 score of higher than 5.1 was indicative of high disease activity, whereas a DAS-28 below 3.2 indicated low disease activity. A patient was considered to be in remission if they had a DAS-28 lower than 2.6.

All patients with RA completed all the following questionnaires.

- (1) The health assessment questionnaire disability index (HAQ-DI)

The following categories are assessed by the HAQ-DI: dressing and grooming, arising, eating, walking, hygiene, reach, grip, and common daily activities. The patients are asked about the degree of difficulty they have in performing these activities. The answers were on a scale ranging from 0 to 3 where if the activity can be performed without any difficulty (scale 0) up to cannot be done at all (scale 3). The HAQ-DI is usually analyzed by calculating scores. In each dimension (dressing and grooming, arising, eating, walking, hygiene, reach, grip, and activities), the raw score is calculated as Max (dimension score) and corrected if aids and devices were used or help from another person was needed. This correction will raise a raw score of 0 or 1 to a 2 and will remain as raw score in all other cases.

- (2) The Hamilton anxiety scale (HAM-A)

The scale consists of 14 items assessing both psychic anxiety (mental agitation and psychological distress) and somatic anxiety (physical complaints related to anxiety). The HAM-A has been questioned for its sometimes poor ability to differentiate between anxiolytic and antidepressant effects, and somatic anxiety versus somatic side effects. Regardless of this, the reported levels of reliability for the scale appear to be acceptable.

Scoring was done as follows: each item is scored on a scale of 0 (not present) to 4 (severe), with a total score range of 0–56, where less than 17 indicates mild severity, 18–24 mild to moderate severity, and 25–30 moderate to severe.

- (3) The Zung Self-Rating Depression Scale is a short self-administered survey to assess the status of depression of a patient. There are 20 items on the scale that assess the affective, psychological, and somatic symptoms associated with depression. There are ten positively worded and ten negatively

worded questions. Each question is scored on a scale of 1 through 4 (based on these replies: 'a little of the time', 'some of the time', 'good part of the time', and 'most of the time'). The scores range from 25 to 100: 25–49 normal range, 50–59 mildly depressed, 60–69 moderately depressed, and 70 and above severely depressed.

- (4) The rheumatoid arthritis quality of life questionnaire (RAQOL) consists of 30 items with a yes or no (1 or 0) response. The overall score is the sum of the individual item scores, with a lower score indicating better QOL (range: 0–30).
- (5) The Female Sexual Function Index (FSFI): a multidimensional self-report instrument for the assessment of female sexual function was used to investigate problems with sexual functioning during the past 4 weeks. The FSFI is a 19-item self-report questionnaire that measures six dimensions of female sexual functioning: desire, arousal, lubrication, orgasm, satisfaction, and pain. The FSFI provides an overall score. The questionnaire was psychometrically further evaluated by Wiegel, Meston, and Rosen, and a diagnostic cutoff score was developed for differentiating women with and without sexual dysfunction. This optimal cutoff point was found to be a Total-FSFI score of 26.55 (Wiegel, 2005 #63). We decided to use this cutoff score to estimate the portions of participants with sexual dysfunction. There were no cutoff limits available for the different subscales of the questionnaire. Low scores on FSFI indicate more problems with sexual functioning and high scores indicate fewer problems with sexual functioning.
- (6) SF-36 is a generic multidimensional measure of QOL that contains eight subscales representing physical functioning, social functioning, role limitations owing to physical health problems, role limitations attributable to emotional problems, mental health, vitality, bodily pain, and general health perceptions. Higher scores of each subscale (which range from 0 to 100) indicate a better QOL. The physical and mental components of the eight scales are combined into physical (PCS) and mental (MCS) component summary scale scores.
- (7) The WHOQOL-BREF:  
It represents four domain scores, which are physical, psychological, social relations, and environmental, along with two individually scored items about an individual's overall perception of QOL and health. The four domain scores are scaled (0–100) in a positive direction, with higher scores indicating a higher QOL.

### Statistical analysis

Data were collected and analyzed using statistical package for the social sciences (SPSS, version 20; IBM, Armonk, New York, USA). Continuous data were expressed in form of mean±SD or median (109), whereas nominal data were expressed in the form of frequency (percentage).  $\chi^2$ -Test was used to compare the nominal data of different groups in the study whereas Student *t*-test was used to compare the mean of two different groups and analysis of variance test for more than two groups.

Pearson correlation was used to determine the correlation between DAS-28 and other continuous variables in the study. *P* value was significant if less than 0.05.

### Results

The age of patients with RA ranged between 21 and 67 years, with a mean of 43±12.45 years. Of them, 46 (92%) patients were females and four (8%) patients were males. Regarding the marital status, 31 (62%), 10 (20%), and nine (18%) patients were married, divorced, and single, respectively. The disease duration ranged from 2 to 15 years, with a mean of 7.06±4.41 years. Disease activity ranged from 1.80 to 7.80, with a mean DAS-28 of 4.28±1.62. Based on DAS-28, low activity, moderate activity, and high activity presented in 11 (22%), 17 (34%), and 14 (28%) patients, respectively, whereas remission presented in eight (16%) patients.

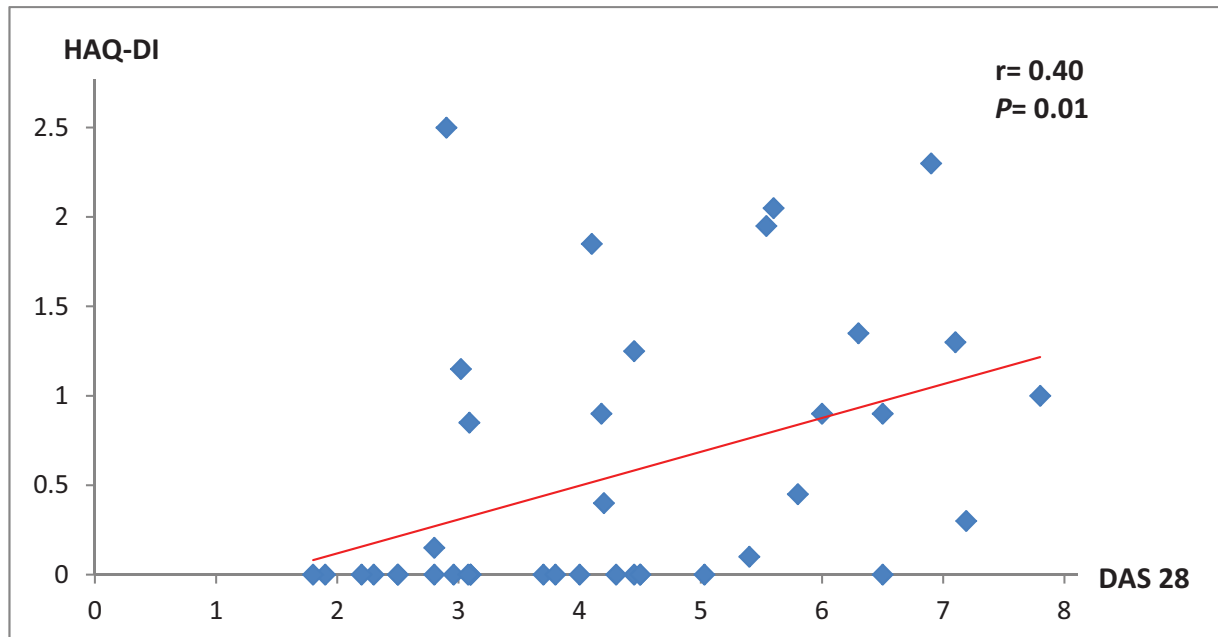
#### Relation between disease activity score-28 and health assessment questionnaire disability index in patients with rheumatoid arthritis

It was noticed that degree of functional disability based on HAQ-DI was significantly increased with the increase in disease activity based on DAS-28, where all patients on remission and 56% of those with low disease activity had mild functional disability. Moreover, it was noticed that 25 and 16.7% of patients with high activity had moderate to severe and severe to very severe disability based on HAQ-DI, respectively. DAS-28 score had positive moderate significant correlation with HAQ-DI ( $P=0.01$ ,  $r=0.40$ ; Fig. 1).

#### Relation between disease activity score-28 and Hamilton anxiety scale-A in patients with rheumatoid arthritis

It was noticed that 89% of patients with low disease activity had mild anxiety based on HAM-A and the majority (75%) of those patients with moderate disease activity and 83.3% of patients on remission had mild

Figure 1



Correlation of disease activity score (DAS)-28 and health assessment questionnaire-disability index (HAQ-DI) in patients with rheumatoid arthritis (RA).

anxiety. DAS-28 score had a positive moderate significant correlation with HAM-A ( $P=0.01$ ,  $r=0.46$ ; Fig. 2).

#### Relation between disease activity score-28 and Zung self-rating depression score

Majority of patients with low disease activity (82%) and those with moderate disease activity (71%) were not depressed whereas majority (85.7%) of those with high disease activity were depressed based on Zung self-rating depression score. DAS-28 score had a positive strong significant correlation with Zung score ( $P=0.01$ ,  $r=0.46$ ; Fig. 3).

#### Relation between disease activity score-28 and rheumatoid arthritis quality of life score

It was noticed that DAS-28 has a significant strong positive correlation with RAQOL ( $r=0.70$ ,  $P=0.00$ ; Fig. 4).

#### Relation between disease activity score-28 and female sexual function index in patients with rheumatoid arthritis

It was noticed that DAS-28 has a significant strong negative correlation with female sexual index ( $r=-0.80$ ,  $P=0.00$ ). Of 46 female patients with RA, 10 (21.7%) had sexual dysfunction according to FSFI (Fig. 5).

#### Correlation of disease activity score 28 with domains of SF-36

It was noticed that all domains of SF-36 had significant negative correlations with DAS-28 in this study. The

most affected domain is pain and role limitation owing to physical health. PCS includes physical function, role limitation due to physical health, bodily pain, and general health perception. MCS includes role limitation owing to emotional problems, energy/fatigue, emotional well-being, and social function. So it was noticed that RA affected PCS more than MCS (Table 1).

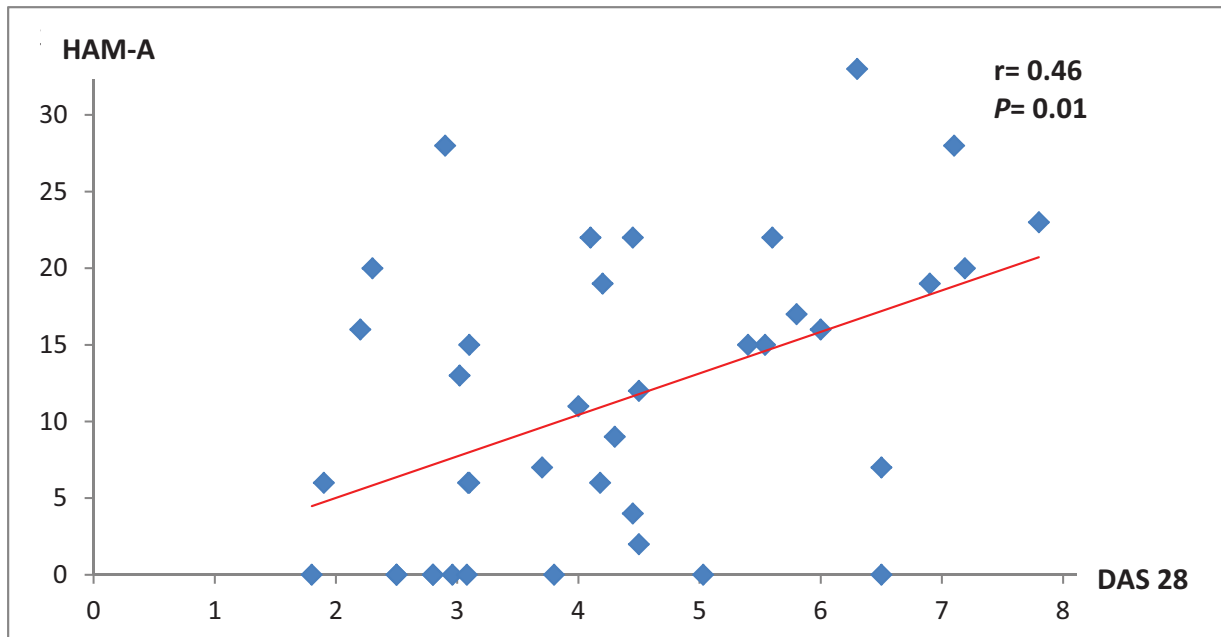
#### Correlation of disease activity score 28 with domains of WHO quality of life in patients with rheumatoid arthritis

It was noticed that all five domains of WHO QOL (general health, physical health, psychological health, social relations, and environmental relations) had significant negative correlations with DAS-28 in this study ( $P<0.001$ ; Table 2).

#### Discussion

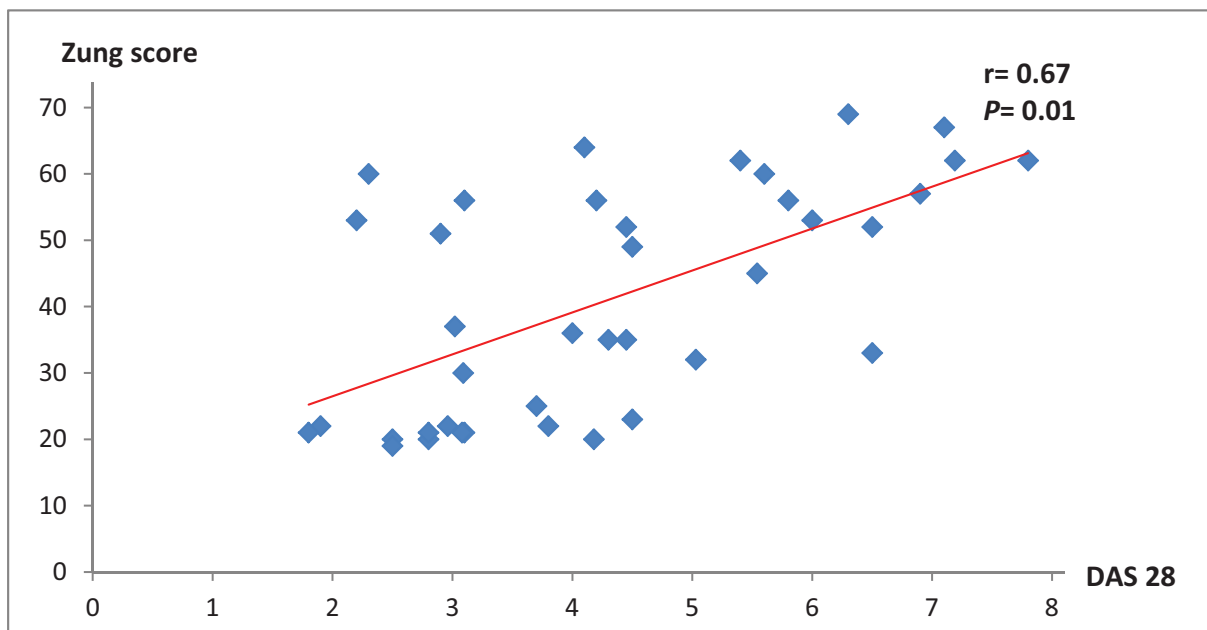
RA is a chronic multisystem autoimmune inflammatory disease of unknown etiology that affects 0.5–1% of the general population. It causes erosion of the joints which is bilateral and symmetrical pattern, causing articular damage, multiple comorbidities, disability, and depressive symptoms [14–17]. RA has a major, diverse effect on patients' QOL, both physical and mental well-being [7]. The physical disability is usually obvious by clinical examination; however, the psychological and social morbidities can be missed by the clinician [9].

Figure 2



Correlation of disease activity score (DAS)-28 and Hamilton anxiety scale (HAM-A) in patients with rheumatoid arthritis (RA).

Figure 3



Correlation of disease activity score (DAS)-28 and Zung self-rating depression score in patients with rheumatoid arthritis (RA).

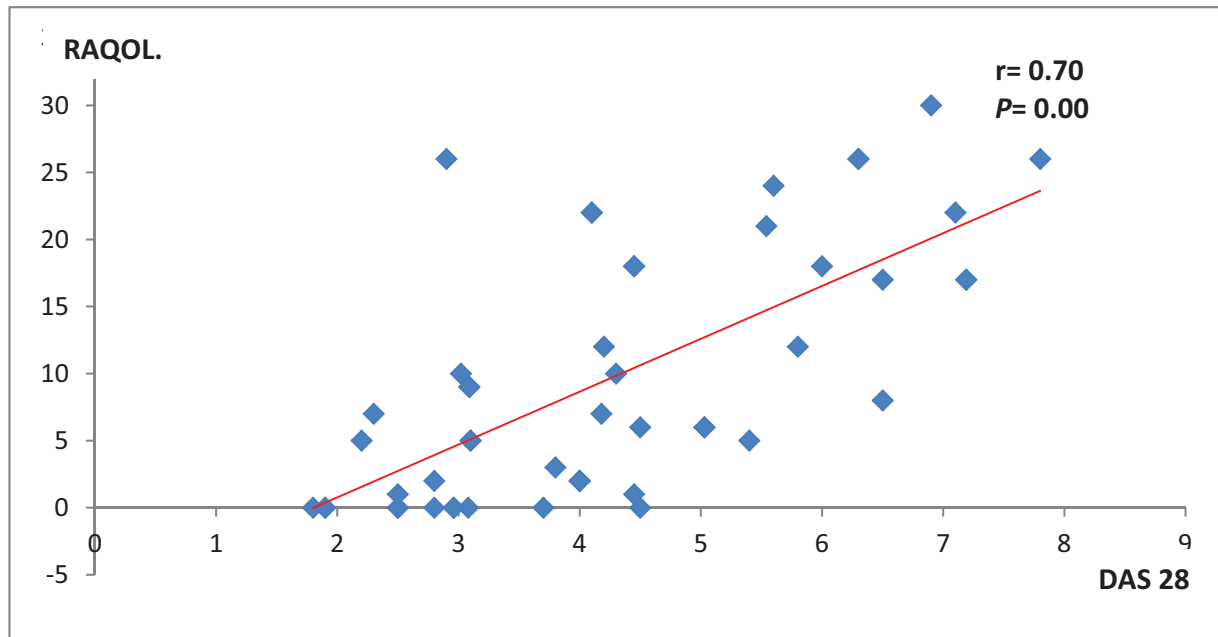
The aim of this study was to assess the QOL in RA and to correlate QOL with disease activity by using different types of generic and specific questionnaires.

This study found that degree of functional disability based on HAQ-DI was significantly increased with the increase in disease activity based on DAS-28, whereas patients on remission and 56% of those with low

disease activity had mild difficulty and 41.7% of patients with high activity had moderate to severe functional disability based on HAQ-DI, respectively.

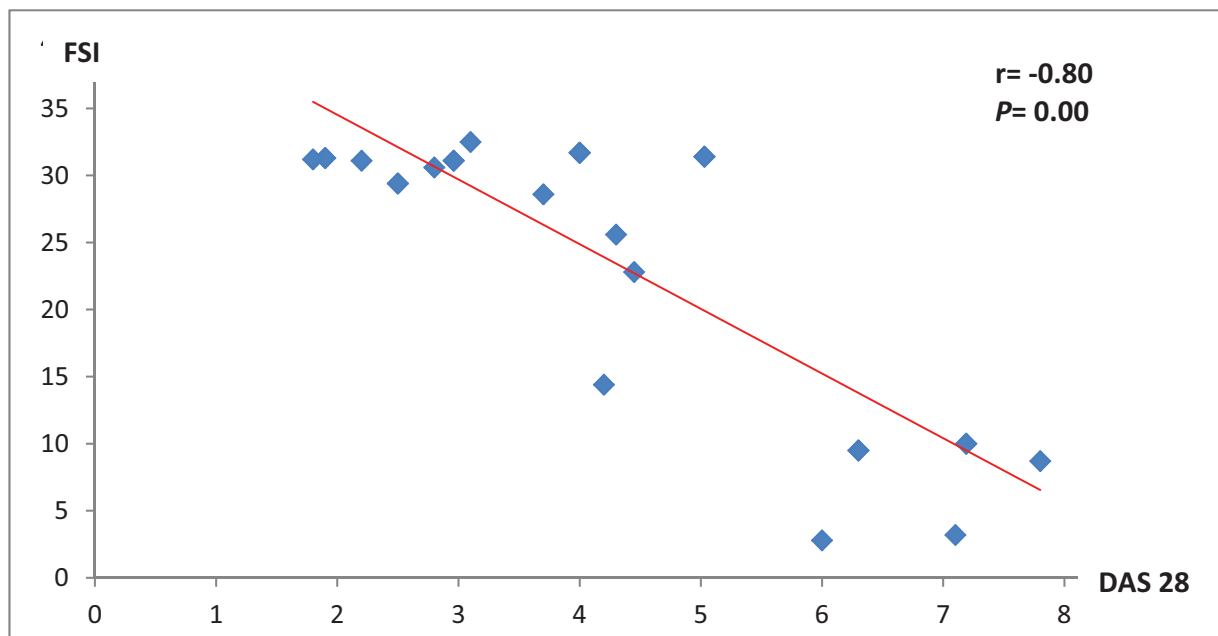
This is consistent with the study by Karpouzas *et al.* [18] that provided evidence that functional disability was common in Chinese patients with RA; this study found that the risk of functional disability increases

Figure 4



Correlation of disease activity score (DAS)-28 and rheumatoid arthritis quality of life (RAQOL) in patients with rheumatoid arthritis (RA).

Figure 5



Correlation Between disease activity score (DAS)-28 and Female Sexual Function Index (FSFI) in patients with rheumatoid arthritis (RA).

with high disease activity and limitation of joint mobility.

Moreover, this was consistent with a study performed in Brazil in 2013 which estimated that moderate to severe RA was associated with major functional disability and morbidity, with work and activity impairment increasing with disease severity [19].

The present study found that majority of patients with low disease activity had mild to moderate anxiety based on HAM-A, whereas 75% of patients with moderate disease activity and 83.3% of patients on remission had mild anxiety based on Hamilton anxiety scale. DAS-28 score had a positive significant correlation with HAM-A ( $P=0.01$ ,  $r=0.46$ ).

**Table 1 Correlation between disease activity score-28 with domains of SF-36 in patients with rheumatoid arthritis**

SF-36 domains	DAS-28	
	<i>r</i>	<i>P</i> value
Physical function	-0.57	<0.001
Role limitation owing to physical health	-0.69	<0.001
Role limitation owing to emotional problem	-0.58	<0.001
Energy/fatigue	-0.63	<0.001
Emotional well-being	-0.54	<0.001
Social function	-0.61	<0.001
Pain	-0.78	<0.001
General health	-0.62	<0.001
Health change	-0.54	<0.001

Data were expressed in form of *r*, indicating strength of correlation, whereas *P* value indicates significance of correlation. DAS, disease activity score.

**Table 2 Correlation of disease activity score-28 with domains of WHOQOL-BREF**

WHO quality of life domains	DAS-28	
	<i>r</i>	<i>P</i> value
General health	-0.58	0.001
Physical health	-0.57	<0.001
Psychological health	-0.59	<0.001
Social relations	-0.32	0.001
Environmental relations	-0.31	<0.001

Data were expressed in form of *r*, indicating strength of correlation, whereas *P* value indicates significance of correlation. DAS, disease activity score; WHOQOL-BREF, WHO quality of life.

This is consistent with a study by Scott [20] which found that many patients with RA experienced anxiety and helplessness and a strong correlation between anxiety with the DAS-28.

Another study reported that the prevalence of anxiety in RA cases was higher than that in the normal population and also found that patients with RA are accompanied by anxiety in early stages of the disease [21]. A study by Clarke and Currie [22] reported that anxiety has a significant rate of comorbidity. Another study reported that anxiety is common in RA cases, but the level of anxiety in RA is similar to that in such noninflammatory rheumatological diseases such as osteoarthritis, mechanical lumbar pain, and fibromyalgia [23].

Some authors found in their studies that treatment of accompanying psychiatric disorders reduces disease activity, which means that anxiety has a significant positive correlation with disease activity [24].

In this study, most patients with low disease activity (82%) and those with moderate disease activity (71%) were not depressed, whereas majority (85.7%) of those with high disease activity were depressed based on

Zung self-rating depression score. DAS-28 score had a positive strong significant correlation with Zung score ( $P=0.01$ ,  $r=0.46$ ). This is consistent with a study by Smedstad *et al.* [25] which found highly significant increase in depression in patients with RA compared with the control. Moreover, this results are consistent with another study which found a strong correlation between depressions and the disease activity (DAS-28) [26]. Another study performed by Dickens *et al.* [27] discovered in a systematic review and meta-analysis of the literature that depression was more frequent in individuals with RA than in healthy individuals. In 2013, another meta-analysis of 72 studies that included 13 189 patients with RA found that the prevalence of major depression was 16.8% [28]. This variation between the last study and our results is that they assessed depression in all patients with RA, but we assessed it in patients with high disease activity.

The RAQOL questionnaire is a specific instrument to measure QOL in patients with RA, where lower scores indicate better QOL (range: 0–30). The present study results of RAQOL questionnaire on patients with RA revealed that DAS-28 has a significant strong positive correlation with QOL of patients with RA ( $r=0.70$ ,  $P=0.00$ ); 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. This is consistent with a study which reported that disease activity in RA had a negative effect on QOL, which was measured with Rheumatoid Arthritis Quality of Life Scale, a RA-specific measure [29]. Moreover, this is consistent with another study that was conducted on 79 patients with RA in Colombia, where they evaluated QOL by using Quality of life-Rheumatoid Arthritis Scale [30] and demonstrated that RA activity significantly influenced QOL. Similarly, this finding was confirmed in previous studies by Prajs *et al.* [31].

Sexual functioning is affected in almost all rheumatic diseases. This is owing to multifactorial reasons including disease-related factors as well as therapy. The sexual problems in RA could be owing to physical and psychological factors such as sexual disability, difficulty in assuming certain positions when hip or knee movements are limited, altered body image, and depression. Dyspareunia also affects sexual functioning owing to vaginal dryness, joint pain, and fatigue [32].

This study found that 10 (21.7%) of 46 female patients with RA experience sexual dysfunction, especially

those with functional disability and with high disease activity, and DAS-28 has a significant strong negative correlation with female sexual functioning index ( $r=-0.80$ ,  $P=0.00$ ). Abdel-Nasser and Ali [33] examined 52 patients with RA and reported that sexual dysfunction was present in women in 60% of the cases.

Prevalence of FSD in patients with RA in a study by El Miedany *et al.* [34] ranged from 45 to 62%. A study by Shahar *et al.* [35] assessed sexual function in women with RA using the FSFI score. They reported a lower prevalence of FSD (29.4%), but Coskun *et al.* [36] reported that 68.75% of Turkish women with RA had a sexual dysfunction according to FSFI score versus 15% of healthy controls.

In the study by Frikha *et al.* [37], seven out of 10 women with RA had a sexual dysfunction assessed by FSFI score, and all subscales of FSFI were affected. Another Turkish study found a mean of total score of FSFI in patients with RA ( $22.6\pm 9.0$ ), which significantly lower than controls ( $34.6\pm 8.3$ ) [38].

In this study, QOL in patients with RA was studied using the SF-36 questionnaire, which is the most widely used generic measure of health status, and our results reported that patients with high disease activity show bad QOL and those with low disease activity and on remission show better QOL. Moreover, we found a significant negative correlation between disease activity and both mental and physical domains of the SF-36, with impairment of all domains of SF-36. The most affected domain is pain and role limitation due to physical health, so PCS is more affected than MCS.

In this study, disease activity significantly correlated with both components of SF-36. Significantly high PCS score was found among patients with RA with low DAS-28 and those on remission compared with those with moderate and high DAS-28 ( $P<0.001$ ). This is consistent with a study which found impairment of all the eight domains of the SF-36 in the patients with RA, where the score of each domain was less than 50% of its maximum score. Moreover, it is consistent with a study on 26 Egyptian patients with early RA from Sohag, where the QOL was impaired also using the SF-36 measure [39]. Birrell *et al.* [40] studied 86 patients with RA attending specialist clinics and found that impairment of health status was moderate to marked by the SF-36, with significant differences from normal population and chronic disease states such as low back pain. They

concluded that it is a practical tool for use in patients with RA.

A study for assessing the QOL in patients with RA used the generic questionnaire WHOQOL-BREF, and the results showed that the more intense the activity of the disease, the worse the perceived QOL of patients with active disease, whereas patients with low disease activity have better QOL perception. The Physical, Psychological and general health domains were the most affected in those with active RA, and it was noticed that all five domains of WHOQOL had significant negative correlations with DAS-28 in this study. This is consistent with a previous study that showed lower QOL in the physical health and psychological domains compared with the mean scores reported by the 23 countries in the WHOQOL group, but QOL in the social relationships and environmental domains was comparable [41].

The results of this study are consistent with a study that reported that patients with RA have significant compromise in their QOL compared with age-matched normal healthy population [42], and also consistent with a study which reported that the QOL of patients with RA has been reported to be worse than patients with other chronic diseases like Sjögren's syndrome, asthma/chronic bronchitis, heart disease, hypertension, diabetes mellitus, migraine, and dermatological disease [43].

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## Conclusion

This study confirms that RA causes impairment of all aspects of QOL (limitation of physical function, physical disability, and pain), mental health disorders (anxiety and depression), and social, environmental, and also sexual dysfunction, 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 and sexual function and positively correlated with depression and anxiety.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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