



Research Article

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The Impact of Rheumatoid Arthritis on Health-Related Quality of Life Among Adult Patients in Basrah City, Iraq

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Abstract

Background: Rheumatoid arthritis is increasingly recognized as a global health burden. The global prevalence has increased markedly. **Objective:** To assess the overall quality of life of rheumatoid arthritis patients compared with a control group and to assess the association of quality-of-life determinants with disease severity and the type of medication used. **Methods:** A comparative cross-sectional study with matching was conducted in the main rheumatology outpatient clinics in Basrah over a six-month period using a convenience sample of 62 adult patients with RA and 62 adult controls. A self-administered questionnaire was used, which included sociodemographic data, clinical characteristics, and the World Health Organization Quality of Life (WHOQOL-BREF) instrument. **Results:** Most quality-of-life domains were significantly lower among rheumatoid patients. physical health (median RA=50, 95%CI 44.0-56.0), psychological health (median for RA=58.33, 95%CI 56.6-60.1), and social health (median RA=66.66, 95%CI 63.5-69.8). No difference in environmental health (mean for RA=55.14, 95%CI 52.9-57.4, $p=0.357$). High disease activity affects both physical (median=42.85, Cohen's $d=1.57$) and psychological health (mean=56.48, Cohen's $d=0.65$) while not affecting social (median=66.66) and environmental health (mean=53.55), whereas this result must be regarded with caution because of the small size of some medication subgroups. Medication type does not affect the quality of life of rheumatoid patients ($p>0.05$). **Conclusions:** Rheumatoid arthritis impairs most quality-of-life domains among patients in Basrah compared with the control group, with the physical domain being the most affected, while no statistically significant difference was found in the environmental domain.

Keywords: DAS28; Disease activity; Rheumatoid arthritis; Social health; WHOQOL-BREF.

تأثير التهاب المفاصل الروثوي على جودة الحياة الصحية بين المرضى البالغين في مدينة البصرة، العراق

الخلاصة

الخلفية: يُعدُّ التهاب المفاصل الروثوي عبئاً صحياً عالمياً بشكل متزايد، إذ ارتفع معدل انتشاره عالمياً بشكل ملحوظ. **الهدف:** تقييم جودة الحياة العامة لدى مرضى التهاب المفاصل الروثوي مقارنةً بمجموعة ضابطة وتقييم ارتباط محددات جودة الحياة بشدة المرض ونوع الدواء المستخدم. **الطرائق:** أُجريت دراسة مقطعية مقارنة في العيادات الاستشارية الرئيسية لأمراض الروماتيزم في البصرة على مدى ستة أشهر، باستخدام عينة مكونة من 62 مريضاً بالغاً مصابين بالمرض و62 شخصاً من البالغين الضابطين. تم استخدام استبيان ذاتي تضمن البيانات الاجتماعية-الديموغرافية والخصائص السريرية وأداة جودة الحياة لمنظمة الصحة العالمية (WHOQOL-BREF). **النتائج:** كانت معظم مجالات جودة الحياة أقل بشكل ملحوظ بين مرضى الروماتويد. إذ كان الانخفاض واضحاً في مجال الصحة الجسدية (متوسط المرض=50) والصحة النفسية (متوسط المرض=58.33) والصحة الاجتماعية (متوسط المرض=66.66). لا يوجد فرق معنوي في مجال الصحة البيئية (متوسط المرض=55.14). أثرت شدة المرض العالية بشكل معنوي على كل من الصحة الجسدية (متوسط المرض=42.85) والصحة النفسية (متوسط المرض=56.48) دون أن تؤثر على الصحة الاجتماعية (متوسط المرض=66.66) والصحة البيئية (متوسط المرض=53.55). بينما يجب النظر إلى هذه النتيجة بحذر بسبب صغر حجم بعض المجموعات الفرعية للادوية، نوع الدواء لا يؤثر على جودة حياة المرضى ($p>0.05$). **الاستنتاجات:** يؤثر التهاب المفاصل الروثوي على معظم مجالات جودة الحياة لدى المرضى في البصرة مقارنةً بالمجموعة الضابطة، حيث كان المجال الجسدي هو الأكثر تأثراً بينما لم يتم العثور على فرق ذو دلالة احصائية في المجال البيئي.

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INTRODUCTION

Rheumatoid arthritis (RA) is the most prevalent autoimmune arthritis worldwide [1]. It is a chronic autoimmune disease that mostly affects joints and develops when the immune system erroneously targets the body's own tissues [2], producing pain, joint swelling, and stiffness. RA typically affects the small joints of the hands, feet, and wrists in a symmetrical pattern. Large joint involvement, systemic symptoms, and extra-articular features may also occur. The global

prevalence of RA is estimated at 0.8%–1.0% [3]. Rheumatoid arthritis is increasingly recognized as a global health burden. Data from the Global Burden of Disease project showed that between 1990 and 2017, the worldwide prevalence of RA rose by 7.4% and the annual incidence by 8.2% [4]. In the Middle East and North Africa (MENA) region, prevalence rates rose by 28.3% in 2019, while incidence rose by 25.2% compared with 1990 [5]. Iraqi studies also indicated a rising trend. The studies conducted in Iraq also showed an increase. A local study in Babil indicated that the

hospital-based frequency (proportion of RA among attendees) was 3.02% in 2011 compared to 1.60% in 2001 [6]. A multinational study conducted in 2018 comparing the impact of various rheumatic diseases on health-related quality of life found that RA was associated with the greatest reduction in health-related quality of life (HRQOL) [7]. By 2019, approximately 18 million people were living with RA globally, and the majority were experiencing moderate to severe disease activity [8]. Rheumatoid arthritis is considered not only a chronic inflammatory disease but also a systemic condition with long-standing comorbidities. It increases the risk of infections, pulmonary and cardiovascular morbidities, osteoporosis, malignancies, and mortality [9]. In addition to significant impairment of daily activities, RA patients complain of psychological problems, mostly depression and anxiety [10]. A study revealed that depression is nearly double in RA patients compared to the general population [11]. Despite physical and psychological impairments, RA has a marked social burden, which affects interpersonal relationships, sexual activity, and work productivity [12]. Health-related quality of life (HRQOL) has emerged as a crucial measure to assess the broader burden of RA. HRQOL reflects patients' perceptions of physical, psychological, social, and environmental aspects of their health, offering complementary perspectives on clinical assessments [13]. In addition, lack of physical activity, unemployment, smoking, higher disease activity, disability, and depression were also significantly associated with poorer quality of life among RA patients [14]. As well, social context impacts coping strategies and psychological reactions to RA and can also impair treatment adherence and hence outcomes [15]. Additionally, RA patients frequently limit their ability to manage everyday tasks, leading in some cases to job modifications or premature retirement [16]. The study's objectives are to assess the overall quality of life of patients with RA compared with a control group and to assess the association of quality-of-life determinants with the severity, type of medication used, and key demographic variables such as age and educational level with health-related quality of life.

METHODS

The study design and setting

This study is a comparative cross-sectional study with matching, conducted on rheumatoid cases attending outpatient clinics of rheumatology in Basrah city center and a control group, including healthy relatives of RA patients and those in the control group (comprising healthy relatives of RA patients and outpatients with minor medical complaints) attending other outpatient clinics of the same hospitals for simple complaints. The cases were confirmed with rheumatoid arthritis based on the American College of Rheumatology/the European League Against Rheumatism (ACR/EULAR) 2010

rheumatoid arthritis classification criteria [17]. The study period was over 6 months, from the 22nd of April 2025 to the 30th of October 2025.

Sampling methods

A convenient sampling technique was used in the study. Three major hospitals were selected for sample collection (Basrah Teaching Hospital, Al Sadr Teaching Hospital, and Al Sayab Teaching Hospital) to enable recruiting of cases; because of the convenience sampling method, the authors recognize that the sample might not be completely representative of all RA patients in Basrah. Each hospital was visited 2-3 times a week during the study period. The RA patients were adults aged 18 years and older who agreed to participate in the study (the study's cases). For each RA case, one control (without RA) was selected.

Exclusion criteria

Cases are patients who were handicapped prior to RA and who were less than 6 months on treatment, and patients who refused to participate are excluded from both cases and the control group.

Control group selection criteria

The control group (n= 62) comprised 32 healthy relatives of RA patients and 30 outpatients attending for minor complaints (51.6% and 48.4% of controls, respectively).

Sample size calculation

The sample size was estimated based on the equation for comparing two independent means, assuming a two-tailed $\alpha = 0.05$ and a power of 0.80 [18]:

$$n = [2 (Z_{\alpha/2} + Z_{\beta})^2 \times \sigma^2] / (\mu_1 - \mu_2)^2$$

An expected mean difference in QOL of 8-10 points and a standard deviation of about 12.5 were assumed, based on previous WHOQOL-BREF studies in rheumatoid arthritis, resulting in approximately 60 participants per group. The drop-out rate of 10% was assumed, and this resulted in an initial target sample of approximately 66 participants each group. The final case sample was 62, and the control sample was 62, representing the real sample size of eligible subjects who completed the study after considering the exclusions and refusals. Each rheumatoid patient was individually matched with one control on age (± 5 years), sex, body mass index (within a close range), educational level (within a close range), and comorbidity presence (to minimize confounding). This person-to-person match was carried out manually in the sampling so that the similarities between the baseline attributes of the groups could be compared. The statistical test then applied the methods of matching groups such as the Mann-Whitney U test and independent t-test as necessary.

The questionnaire and data collection

A special questionnaire form was prepared for the purpose of data collection for this study. It included three parts as follows: the first part included questions that covered the sociodemographic aspects, which included group, age, sex, marital status, educational level, employment status, family monthly income, residency, smoking, comorbid diseases, weight, height, and BMI. The second part included questions that covered the disease-related characteristics, which included age at diagnosis, duration of disease, duration of treatment, morning stiffness categorized into three distinct groups (no morning stiffness, morning stiffness less than 1 hour, and morning stiffness 1 hour or more), number of swollen joints, ESR, DAS28 score, and medication used. Disease activity (DAS28 score) was categorized according to standard criteria into four levels: remission ($\text{DAS28} < 2.6$), low disease activity ($2.6 \leq \text{DAS28} \leq 3.2$), moderate disease activity ($3.2 < \text{DAS28} \leq 5.1$), and high disease activity ($\text{DAS28} > 5.1$) [19,20]. The data of the first and second parts were collected by direct interview with the patients; in addition, some of the data were derived from the laboratory and follow-up cards of the patients. The third part of the questionnaire included the Arabic version of the World Health Organization Quality of Life (WHOQOL-BREF) tool to investigate the quality of life between the rheumatoid patients and the control group. The WHOQOL-BREF, in its Arabic version, has been validated in Saudi Arabia [21] and was used in this study. Iraq shares with Saudi Arabia an Arab-Muslim culture and an Arabic standard language. However, a validation study needs to be conducted in Iraq. To test the internal consistency and reliability of the WHOQOL-BREF instrument, we used Cronbach's alpha coefficient for each of the four domains in our study population: Physical Health ($\alpha = 0.82$), Psychological Health ($\alpha = 0.79$), Social Relationships ($\alpha = 0.75$), and Environmental Health ($\alpha = 0.84$). According to the previously published recommendations concerning QOL assessment, we carried out the WHOQOL-BREF at the beginning of the interview in a quiet and private setting. Verbal informed consent was obtained from each interviewed person before starting the interview. Calculating the Cronbach's alpha coefficient of four domains, Physical health ($\alpha = 0.82$), Psychological Health ($\alpha = 0.79$), Social Relationships ($\alpha = 0.75$), and Environmental Health ($\alpha = 0.84$), was done to determine the internal consistency and reliability of the WHOQOL-BREF instrument in our study population. These values show good to excellent internal reliability of the instrument in the local context.

The WHOQOL-BREF subscales

consist of four subscales; each subscale consists of several items. All the items of the WHOQOL-BREF are rated on a 5-point scale with response anchors

depending on the particular item. The collected raw scores on the items in each of the four domains are added and converted to a 0-100 scale, with higher scores defining the better quality of life [22]. The general quality of life and general health have two general items, which are also rated using a 5-point scale. These four subscales (24 items in total) are physical health (7 items), psychological health (6 items), social relationships (3 items), and environment (8 items). Besides that, two items assess the overall quality of life and general health [23].

Ethical considerations

The study protocol, including the use of verbal informed consent, was reviewed and approved by the Ethics Committee of the Basra Health Directorate prior to its commencement (Protocol EC23, dated April 15, 2025). Verbal informed consent was obtained from all participating patients after a clear explanation of the study objectives, procedures, potential risks, and benefits, ensuring their voluntary participation and right to withdraw at any time.

Statistical analysis

Data was analyzed with the help of SPSS (Statistical Package for Social Sciences) version 29. Participant characteristics were summarized using descriptive statistics (mean, standard deviation, and percentages). To determine the normality of data distribution, the Shapiro-Wilk test was used. Independent t-tests were employed to compare variables with a normal distribution, and the data were given in the form of mean and standard deviation. In the case of non-normal variables, the Mann-Whitney U test was used, and the median with interquartile range was used as the result. Separate multivariate linear regression models were developed under each of the four WHOQOLBREF domains to determine variables that had significant relationships with HRQOL. The models were each followed by the specific independent variables, such as age, educational level, DAS28 score, and the type of medication. Regression assumptions (e.g., linearity, independence of residuals, homoscedasticity, and normality of residuals) were verified. R-squared, adjusted R-squared, and F-statistic were used to determine model fit. A p-value of less than 0.05 was considered statistically significant.

RESULTS

More than half of the rheumatoid patients and the control group were collected from Basrah Teaching Hospital (53.2%). Those collected from Al Sadr Teaching Hospital for both groups were 24.2%, whereas those collected from Al Sayab Teaching Hospital for both groups were 22.6%. The mean age of rheumatoid patients was 48.02 ± 14.98 years, while the mean age of the control group was 47.79 ± 14.52 years (Table 1).

Table 1: Socio-demographic characteristics of the study population

Variables	Cases (n=62)	Controls (n=62)	<i>p</i> -value
<i>Hospital</i>			
Basrah Teaching Hospital	33(53.2)	33(53.2)	0.932
Al Sadr Teaching Hospital	15(24.2)	15(24.2)	
Al Sayab Teaching Hospital	14(22.6)	14(22.6)	
Age (Mean ± SD)	48.2±14.9	47.7±14.5	
<i>Sex</i>			
Female	46(74.2)	46(74.2)	Matched
Male	16(25.8)	16(25.8)	
<i>Marital status</i>			
Single	6(9.7)	3(4.8)	0.321
Married	50(80.6)	51(82.3)	
Divorced	4(6.5)	2(3.2)	
Widow	2(3.2)	6(9.7)	
<i>Educational level</i>			
Illiterate	4(6.5)	2(3.2)	0.332
Primary	25(40.3)	18(29)	
Intermediate	13(21)	21(33.9)	
Secondary	4(6.5)	7(11.3)	
College and more	16(25.8)	14(22.6)	
<i>Employment status</i>			
Governmental employed	15(24.2)	15(24.2)	0.575
Unemployed	41(66.1)	44(71.0)	
Retired	6(9.7)	3(4.8)	
<i>Family monthly income</i>			
< 500,000	37(59.7)	44(71.0)	0.077
500,000 – 1,000,000	18(29.0)	17(27.4)	
>1,000,000	7(11.3)	1(1.6)	
<i>Residency</i>			
Urban	50(80.6)	48(77.4)	0.659
Rural	12(19.4)	14(22.6)	
BMI (mean ± SD)	28.2±5.2	28.4±4.3	0.839
<i>Smoking</i>			
Non-smokers	52(83.9)	56(90.3)	0.284
Smokers	10(16.1)	6(9.7)	
<i>Comorbid diseases</i>			
Yes	32(51.6)	32(51.6)	Matched
No	30(48.4)	30(48.4)	

Values are presented as frequency, percentage, and mean $\pm$ SD. "Cross-matched 1:1"

Most rheumatoid patients and controls were female (74.2%), while males made up 25.8% in both groups. Most of the rheumatoid patients and the control group were married (80.6% and 82.3%, respectively). More than one third of the rheumatoid patients had a primary level (40.3%). Approximately one quarter had a college level or more (25.8%); intermediate level (21.0%); and secondary and illiterate levels were equal (6.5%). The control group consists of individuals at the intermediate level (33.9%), primary level (29.0%), college level and above (22.6%), secondary level (11.3%), and those who are illiterate (3.2%). More than half of the rheumatoid patients were unemployed (66.1%). Government employees were 24.2%, and retired employees were 9.7%. While in the control group, more than two-thirds were unemployed (71.0%), government employees were 24.2%, and retirees were 4.8%. The monthly income of more than half of the rheumatoid patients was less than 500,000 Iraqi dinar (59.7%). The income of 500,000 to 1,000,000 was (29.0%), and the income of more than 1,000,000 was (11.3%). In the control group, the income of more than two thirds of them was less than 500,000 Iraqi dinar (71.0%), while the income of 500,000 to 1,000,000 was 27.4%, and the income of

more than 1,000,000 was 1.6%. Most of the rheumatoid patients lived in urban areas (80.6%), while in the control group, most of them also lived in urban areas (77.4%). The mean BMI of rheumatoid patients was 28.2 ± 5.2 , while the mean BMI of the control group was 28.4 ± 4.3 . Most of the rheumatoid patients were non-smokers (83.9%). Smokers were 16.1%. In the control group, most of them were non-smokers (90.3%), while smokers were 9.7%. The number of rheumatoid patients with no comorbidities was 30 (48.4%) and with at least one comorbid disease was 32 (51.6%). The most common comorbidities included hypertension alone (n= 12), diabetes mellitus alone (n= 4), hypertension and diabetes mellitus (n= 9), bronchial asthma alone (n= 3), hypothyroidism (n= 2), ischemic heart disease (n= 1), and hypertension and bronchial asthma (n= 1). The number of control groups with and without comorbid diseases was the same in cases. In summary, there were no statistically significant differences between rheumatoid patients and the control group regarding socio-demographic variables ($p > 0.05$), confirming successful matching between the groups. When considered in terms of disease activity according to the DAS28 score, the patients were distributed as follows: 5 patients (8.1%) had remission, 12 patients (19.4%) had low disease activity, 21 patients (33.9%) had moderate disease activity, and 24 patients (38.7%) had high disease activity. When looking at the morning stiffness, 10 patients (16.1%) did not experience it, 40 patients (64.5%) had morning stiffness < 1 hour, and 12 patients (19.4%) had morning stiffness ≥ 1 hour (Table 2); the mean age of disease onset was 37.55 ± 13.1 , and the mean duration of the disease was 9.89 ± 9.83 . The duration was categorized into < 10 years (n= 34), 10-19 (n= 20), and ≥ 20 years (n= 8), and the mean duration of treatment was 29.37 ± 21.46 .

Table 2: Distribution of Clinical characteristics of rheumatoid patients

Variables	Values
Age at diagnosis	37.5 $\pm$ 13.1
Duration of the disease	
<10 years	34(54.8)
10-19 years	20(32.3)
≥ 20 years	8(12.9)
Duration of treatment (months)	29.3 $\pm$ 21.4
Morning stiffness	
No morning stiffness	10(16.1)
<1 hour	40(64.5)
≥ 1 hour	12(19.4)
Presence of comorbid diseases	
No	30(48.4)
Yes	32(51.6)
Medication used	
conventional DMARDs	9(14.5)
Biological DMARDs	53(85.5)
Steroids	0(0.0)
DAS28 score disease activity	
Remission (< 2.6)	5(8.1)
Low (2.6-3.2)	12(19.4)
Moderate (3.2-5.1)	21(33.9)
High (> 5.1)	24(38.7)

Data are presented as mean $\pm$ SD or n(%).

The proportions of patients with no morning stiffness, morning stiffness <1 hour, and morning stiffness 1 hour or more were 16.1%, 64.5%, and 19.4%, respectively. Nearly half of patients with rheumatoid arthritis had at least one or more comorbid diseases (51.6%), and those without comorbidity were 48.4%. Most of the rheumatoid patients used biological DMARDs (85.5%). Only 14.5% of patients used conventional DMARDs,

and none used steroids. The number of patients in remission was 5 (8.1%), with low activity 12 (19.4%), moderate activity 21 (33.9%), and high activity 24 (38.7%). Table 3 shows that the scores were not normally distributed by the Shapiro-Wilk test. The Mann-Whitney U test was employed to compare their scores.

Table 3: Comparison of quality of life between rheumatoid patients and controls

QoL domains	Rheumatoid patients	Control group	p-value
Physical health	50(35.71-67.85)	64.28(53.57-75)	<0.001*
Psychological health	58.33(54.16-63.54)	75(65.62-80.2)	<0.001*
Social health	66.66(58.33-75.00)	75(58.33-83.33)	0.001*
Environmental health	55.14± 9.0	57.05±13.62	0.357**
Overall quality of life	50(50-50)	50(50-75)	<0.001*
General health	75(25-75)	75(50-75)	0.160*

IQR: interquartile range; *Mann-Whitney test; **t-test.

The results showed a statistically significant difference (the median for RA cases was 50 and for the control group was 64.28, $p < 0.001$), indicating that rheumatoid arthritis patients had a significantly reduced physical quality of life compared to those in the control group. The scores were not normally distributed by the Shapiro-Wilk test. Therefore, the Mann-Whitney U test was used to compare the scores between them. The results showed a statistically significant difference (the median for RA cases was 58.33 and for the control group was 75, $p < 0.001$), indicating that rheumatoid patients had a significantly reduced psychological quality of life compared to the control group. The scores were not normally distributed by the Shapiro-Wilk test. Therefore, the Mann-Whitney U test was used to compare the scores between them. The results showed a statistically significant difference (the median for RA cases was 66.66 and for the control group was 75, $p = 0.001$), indicating that rheumatoid patients had a significantly reduced social quality of life compared to the control group. The scores were normally distributed by the Shapiro-Wilk test. Therefore, an independent t-test was used to compare the scores between them. The

results showed no statistically significant difference (the mean for RA cases was 55.14, and for the control group was 57.05, $p = 0.357$), indicating rheumatoid patients had no influence on the environmental quality of life compared to the control group. The scores were not normally distributed by the Shapiro-Wilk test. Therefore, the Mann-Whitney U test was used to compare the scores between them. The mean scores were, however, the same (50 for each), but there was a statistically significant difference between the scores in the distribution ($p < 0.001$), which meant that there was a difference in the overall ranking of quality of life between the groups. compared to the control group. The scores were not normally distributed by the Shapiro-Wilk test. Therefore, the Mann-Whitney U test was used to compare the scores between them. The results showed no significant difference in medians (for RA cases it was 75, and for the control group it was 75; $p = 0.160$), indicating that rheumatoid patients had no effect on general health compared to the control group. Correlations between the disease activity (DAS28) and quality-of-life domains are shown in Table 4.

Table 4: Comparison of Quality of Life among rheumatoid Patients according to disease activity (DAS28)

Quality of life domains	Remission (n=5)	Low (n=12)	Moderate (n=21)	High (24)	p-value
Physical health	71.4(64.2-75)	64.3(50-71.4)	53.6(42.8-60.7)	42.8(32.1-55.3)	<0.001*
Psychological health	66.6(62.5-70.8)	62.5(58.3-66.6)	58.3(54.1-62.5)	56.4(50-60.4)	0.015**
Social health	75(66.6-83.3)	66.6(58.3-75)	66.6(58.3-75)	66.6(58.3-75)	0.74*
Environmental health	6.5±6.2	57.3±7.5	55.2±8.4	53.5±9.7	0.09**

IQR: interquartile range; *Mann-Whitney test; **t test.

Patients were divided into four groups: remission, low, moderate, and high disease activity. Patients in remission and low activity groups had a significantly better score than patients in moderate and high activity

groups in the physical health domain with a highly statistically significant difference ($p < 0.001$) across the four groups. Likewise, there was a statistically significant difference in the psychological health

domain ($p= 0.015$) with a progressive reduction in scores as the disease activity increased. Differences between the four disease activity levels were not, however, statistically significant in the social health ($p= 0.74$) or environmental health ($p= 0.09$) domains, although there was a trend of decreasing scores with

increased disease activity in the environmental domain. Table 5 showed the association between the type of medication used and quality of life domains. Each domain was tested independently. The medications used were categorized into conventional DMARDs ($n= 9$) and biological DMARDs ($n= 53$).

Table 5: Comparison of quality of life among rheumatoid patients according to the type of medication used

Quality of life domains	Conventional DMARDs	Biological DMARDs	<i>p</i> -value
Physical health	42.85(60.71-28.57)	Median (IQR) 50(67.85-35.71)	0.284*
Psychological health	62.96±7.34	Mean ± SD 58.33±9.97	0.122**
Social health	66.66(75-54.16)	Median (IQR) 66.66(75-58.33)	0.853*
Environmental health	56.59±6.33	Mean ± SD 54.89± 9.4	0.502**

IQR: interquartile range; *Mann-Whitney test; **t-test.

The scores were not normally distributed by the Shapiro-Wilk test. Therefore, the Mann-Whitney test was used to compare the scores between them. The results showed no statistically significant difference (the median for conventional DMARDs was 42.85 and for biological DMARDs was 50, $p= 0.284$), indicating that the type of medication used was not influenced by the physical quality of life. The scores were normally distributed by the Shapiro-Wilk test. Therefore, an independent t-test was used to compare the scores between them. The results showed no statistically significant difference (the mean for conventional DMARDs was 62.96 and for biological DMARDs was 58.33, $p= 0.122$), indicating that the type of medication used was not influenced by the psychological quality of life. The scores were not normally distributed by the Shapiro-Wilk test. Therefore, the Mann-Whitney test was used to compare the scores between them. The results showed no statistically significant difference (the

median for conventional DMARDs was 66.66 and for biological DMARDs was 66.66, $p= 0.853$), indicating that the type of medication used was not influenced by social quality of life. The scores were normally distributed by the Shapiro-Wilk test. Therefore, an independent t-test was used to compare the scores between them. The results showed no statistically significant difference (the mean for conventional DMARDs was 56.59 and for biological DMARDs was 54.89, $p= 0.502$), indicating the type of medication used was not influenced by the environmental quality of life. In Table 6, the multivariate linear regression showed that high disease activity was an independent predictor of poorer physical and psychological health. Age had a negative effect on physical health. Educational level was the only positive variable associated with psychological health. These findings confirmed that disease activity is the main determinant of reduced quality of life in RA patients.

Table 6: Multivariate linear regression analysis

Significant Predictors ($p < 0.05$)					
QOL domains	Predictor	β	SE	95% CL	<i>p</i> -value
Physical	High DAS28	-8.50	1.94	-12.3 to -4.7	<0.001
Physical	Age (year)	-0.15	0.07	-0.30 to -0.02	0.025
Psychological	High DAS28	-6.10	2.40	-10.8 to -1.4	0.01
Psychological	Education ($\geq$ secondary)	+3.20	1.53	0.2 to 6.2	0.04
Non-Significant Predictors					
QOL domain	Predictor				
Physical	Sex, BMI, Employment, Income, Residency, Smoking, Treatment				>0.05
Psychological	Sex, BMI, Employment, Income, Residency, Smoking, Treatment				>0.05
Social	All predictors				>0.05
Environmental	All predictors				>0.05

The regression models for physical and mental health had high degrees of statistical fit (R^2 of 0.42 and 0.31 respectively; both adjusted $R^2 > 0.3$), with F-values of 11.24 and 7.45 (both $p < 0.001$), respectively.

DISCUSSION

Rheumatoid arthritis (RA) is one of the most common autoimmune diseases worldwide [1]. Its prevalence has been increased both globally and regionally [4,5]. RA is associated with an increased risk of infections, pulmonary and cardiovascular morbidities, osteoporosis, malignancies, and increased mortality [24]. RA patients face nearly double the risk of depression [11]. Among various rheumatic diseases, RA causes the greatest

reduction in health-related quality of life (HRQOL) [7]. The present study employed a case-control design to assess the overall HRQOL among rheumatoid arthritis patients compared with the control group and to assess the association of health-related quality of life of rheumatoid patients with severity (DAS28 score), type of medication used, and the presence of comorbidities. A case-control study was selected for several reasons: it is an appropriate choice for conditions with relatively

low prevalence, such as RA; it is relatively quick and straightforward to conduct; it requires a smaller sample size compared with a cohort study and still provides valuable data regarding the impact of the disease on quality of life; and it is usually inexpensive [25]. Most quality of life domains were significantly lower in rheumatoid patients compared to the control group. The physical domain was the lowest one, while no significant difference was observed in the environmental domain. Such a result was comparable with previous Iraqi studies assessing the impacts of rheumatoid arthritis on health-related quality of life. Hussein's study conducted in Baghdad showed that patients with RA had lower QOL, particularly in pain and general health domains, and better scores in physical and emotional domains [26]. In contrast, the present study indicated that the physical domain had the lowest scores among RA patients. One of the justifications of this result is that the present study utilized the WHOQOL-BREF questionnaire, which assesses physical health more comprehensively, including aspects of energy levels, fatigue, and dependence on medication that tend to decrease the score in active RA. Despite that, both studies agree that RA affects quality of life. Faiq *et al.*, using the WHOQOL-BREF questionnaire, showed all quality of life domains were significantly low [27]. The results of this study agree with the present study that RA significantly reduces most HRQOL domains. The results of these local studies are similar to our findings in Basrah, which provide reliable, reproducible, and consistent results that support the culture, healthcare systems, and disease characteristics in Iraq, reflecting a similar burden on quality of life and indicating a stable pattern of rheumatoid arthritis among Iraqi patients. Regionally, in Saudi Arabia, a Salem study was conducted on 300 patients with RA and showed that all quality of life domains were significantly low, and the social domain had the highest score [28]. Jarab *et al.* conducted a study in Jordan on 261 RA patients using the EQ-5D questionnaire, demonstrating the impact of RA on HRQOL [29]. In Egypt, Goma *et al.* conducted a study on 50 patients with RA using both the WHOQOL-BREF and SF-36 questionnaires and confirmed that RA causes impairment in all domains of quality of life [12]. These findings are also similar to those of the present study and may be explained by shared demographic, family structure, social, and cultural characteristics in Arabian countries, as well as common challenges related to the management of chronic diseases, rehabilitation services, and health education in these populations. Globally, in Poland, Tański *et al.* conducted a study on 142 patients on biological therapy using the WHOQOL-BREF questionnaire to assess work ability and quality of life in patients with rheumatoid arthritis, who showed the lowest scores in physical and psychological domains and the highest social health [24]. In Tanzania, Said's study was

conducted using the EQ-5D questionnaire and showed the HRQOL of RA patients was lower than controls [30]. In China, Bai *et al.*, using the WHOQOL-BREF and SF-36 questionnaires, showed that the QOL of RA patients was generally lower than that of controls [31]. These findings are similar to those of the present study and reflect the global impact of RA on HRQOL, despite different cultural backgrounds and healthcare systems. The multivariate linear regression showed that high disease activity was an independent predictor of poorer physical and psychological health, while older age was associated with reduced physical health. Higher education was a positive predictor of psychological health. These findings are comparable to the results reported by Al-Jabi *et al.* from Palestine, which used the same approach of multivariate linear regression to evaluate the predictors of HRQOL among RA patients and showed that older age, comorbidities, unemployment, and low income were negatively independent predictors of HRQOL in RA patients [32]. These findings are also consistent with the findings of Faiq *et al.* [27] and Goma *et al.* [12]; they found that disease activity harmed both physical and psychological quality of life. Similarly, other studies from Jordan [29], Tanzania [19], and Poland [24] revealed disease activity, comorbidities, and older age as negative predictors and education as a positive predictor. Overall, the agreement from local, regional, and global studies reinforces that disease activity is the main determinant of poor quality of life, whereas education enhances psychological health among RA patients. The present study showed a strong and statistically significant negative relationship between disease activity and HRQOL among RA patients, mostly in physical and psychological health. Patients with higher disease activity had significantly lower QOL, confirming that high disease activity results in significant physical and psychological impairment. This result is consistent with multiple local and regional studies. Faiq *et al.* demonstrated a significant association between higher disease activity and lower QOL, especially in terms of physical and psychological health [27]. Other studies from Egypt [12], Jordan [29], Turkey [20], and Tanzania [19] also found that people with RA who had severe disease had a lower quality of life. In China, Feng *et al.* reported similar findings that revealed a strong negative correlation between disease activity and QOL; physical and mental health were most affected [33]. These findings reflect that active RA not only restricts physical health but also leads to emotional distress and psychological impairment. Overall, these local and regional studies confirm that well-controlled disease is essential to maintaining both physical and psychological health among RA patients. In the present study, there was no significant difference between patients on biological and conventional therapy, despite those on biological therapy providing slightly higher scores in the physical domain than patients on

conventional therapy. The number of patients on conventional DMARDs ($n=9$) may be too small to have sufficient statistical power to detect statistical significance. Hence, interpretation of the results should be taken as a precaution. These results are similar to those of Talib's study, which was done in Iraq and found that patients on biological therapy (rituximab) who responded well had a higher quality of life and satisfaction than those who did not respond [34]. Similarly, Al-Jabi *et al.* in Palestine revealed that patients who used biological therapy (Etanercept) had better QOL than those on conventional therapy, although disease activity was the main determinant of QOL [32]. Gudelj's study, conducted in Croatia, compared the effectiveness of conventional therapy and biological therapy on QOL using the WHOQOL-BREF questionnaire, and it showed no significant difference in QOL scores between the two groups. In contrast, results reported in Karakas and in Turkey showed that RA patients on conventional therapy were more satisfied than those on biological therapy [20]. This discrepancy may reflect indication bias, as biology prescribes more severe disease; in addition, patient satisfaction is not necessarily equal to QOL. Collectively, these results may indicate that the type of medication used alone does not determine QOL independently, although the biological agent can improve QOL through better disease control. So, the success of therapeutic agents in RA may be evaluated according to disease control rather than the type of medication used.

Study Limitations

The fact that only a few clinic days were included in the collection of data might also have represented a possible selection bias, since it might have limited the variety of patients that were recruited and thus may have compromised the representativeness of our sample. Future studies ought to take into account longer data collection periods to overcome this drawback. The study was conducted in Basrah only, which may limit the generalizability of the findings. In addition, some clinical variables (including duration of morning stiffness and number of painful joints) were assessed based on patient self-report, which might result in recall bias. It was attempted to cross-validate data with medical records, if any, but this subjectivity of reporting was a limitation of the procedure and may be a factor to keep in mind when considering clinical results. A possible limitation of the study is that family members of RA patients were included in the control group. Although this method was intended to match certain demographic attributes, it can result in selection bias due to shared genetic or environmental factors, which may influence the differences in quality of life. Further, the control group of healthy relatives of RA patients might also have genetic or environmental risk factors in common with the patients, in part accounting for the lack of generalizability of the comparison.

Conclusion

Rheumatoid arthritis greatly affects the majority of quality-of-life metrics of patients in Basrah compared to the control group, with the physical domain being the most affected. Although the disease activity and quality of life showed a significant association, the environmental domain did not show a statistically significant difference. There was no statistically significant difference in the medication applied to the quality of life in all domains; however, the results should be interpreted cautiously due to the small sample size of some medication subgroups. Disease activity (DAS28) strongly affected the quality of life of rheumatoid arthritis patients in Basrah, particularly in the physical and psychological domains. However, the small statistical power in some subgroups necessitates a cautious approach to drawing conclusions about the effects of the various types of medications.

Recommendations

The present study, conducted in Basrah, revealed an absence of a patient database recording. Therefore, it is recommended to establish a local registry in Basrah rheumatology clinics as an initial step, which includes patients' demographic, clinical, therapeutic, and health-related quality-of-life data for continuous monitoring. It is recommended to educate rheumatoid arthritis patients through educational campaigns and social media for improvement of treatment adherence, promoting healthy lifestyle changes, and encouraging early detection of disease flares to achieve a better quality of life. Further Iraqi studies are recommended across different governments to validate the current findings and provide stronger evidence for national management guidelines.

Conflict of interests

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Data sharing statement

The data that supports the findings of this study are available from the corresponding author upon a reasonable request.

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