Mod Rheumatol (2007) 17:290–295
DOI 10.1007/s10165-007-0604-9

ORIGINAL ARTICLE

Nigil Haroon · Amita Aggarwal · Able Lawrence
Vikas Agarwal · Ramnath Misra

Impact of rheumatoid arthritis on quality of life

Received: October 23, 2006 / Accepted: March 16, 2007

Abstract Quality of life (QOL) of patients affected by various diseases is now recognized as an important outcome variable. Consenting patients with rheumatoid arthritis (American College of Rheumatology criteria) were included in the study. Quality of life was assessed using the World Health Organization Quality of Life assessment, short form (WHOQOL-BREF). Disease activity was assessed by the Disease Activity Score (DAS28) for 3 variables and functional disability by the Health Assessment Questionnaire (HAQ). Extra-articular manifestations (ExRA) were diagnosed clinically. Seventy-five age-matched normal controls and 136 patients (19 males) were included. The mean duration of rheumatoid arthritis (RA) was 9 ± 5.8 years. The mean DAS28 and HAQ were 4.43 ± 1.4 and 0.97 ± 1.6, respectively. At least one ExRA was present in 30 (22.1%) patients. The WHOQOL scores were significantly lower in patients with RA compared to normal controls. Patients and normal controls scored highest in the social relationship domain. There was significant inverse correlation of HAQ with all four domains of WHOQOL. There was significant inverse correlation of DAS28 with the physical health and psychological domains. Patients with ExRA scored significantly lower in the physical health domain of WHOQOL. Multiple regression analysis showed only HAQ to independently affect QOL. Quality of life is compromised in patients with RA. Patients and normal controls scored higher in the social relationship domain. Functional disability is the most important factor affecting QOL in RA.

Key words Disease activity · Functional disability · Rheumatoid arthritis · WHOQOL · WHOQOL-BREF

N. Haroon · A. Aggarwal · A. Lawrence · V. Agarwal · R. Misra (✉)
Department of Clinical Immunology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Raebarelli Road, Lucknow, Uttar Pradesh 226014, India
Tel. +91-522-266-8701 ext. 2286; Fax +91-522-266-8017
e-mail: rnmisra@sgpgi.ac.in

Introduction

Health is a state of complete physical, mental, and social well-being and not just the absence of disease and infirmity.[1] Ever since this definition given by the World Health Organization (WHO) in 1948 there has been a major emphasis on the impact of diseases on the quality of life (QOL) of patients. Like the various disease activity measures, an equal number of measures have been developed to measure the QOL of patients suffering from various diseases.

Rheumatoid arthritis (RA) is a chronic inflammatory disabling disease with significant impact on the QOL of patients. Generic and disease specific QOL instruments have been validated for assessment in RA. Disease-specific measures have the advantage that they have been designed to pick up health-related aspects particular to the specific disease. They are also more effective than generic instruments to assess treatment response.[2,3] Generic instruments on the other hand can be employed in the general population and can be used for comparing with QOL of patients.

According to the WHO, QOL is defined as "the individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns."[4] Hence, the regional applicability of the QOL instrument is cardinal and it should reflect the practices of people from the particular region. Instruments used previously like the short form 36 (SF-36)[5] and Arthritis Impact Measurement Scale 2 (AIMS2)[6] were developed in the Western world and so their applicability in the Indian subcontinent is doubtful.

The QOL instrument from the WHO, WHOQOL-100, is a true international instrument as it was developed simultaneously in 15 culturally diverse centers around the world, including two centers in India.[4] The WHOQOL-100 consists of 100 items divided into 4 major domains and 24 facets. The major domains are physical capacity (including independence), psychological (including spirituality), social relationships, and environment. The WHOQOL-BREF (short form of WHOQOL-100), which has been validated

in Hindi, is a brief 26-item questionnaire assessing all 24 facets from the original 4 QOL domains.[7] It is a valid and reliable alternative to the original WHOQOL-100, and can be easily administered in the outpatient department.[8] We designed a study to assess the impact of RA on QOL of patients using this generic instrument. We also studied the influence of different disease variables on QOL.

Patients and methods

Patients with RA who attended the Clinical Immunology outpatient department of our tertiary care hospital during the months of September and October 2005 were included in the study if they satisfied the American College of Rheumatology 1987 criteria and consented to participate. The disease activity was measured using Disease Activity Score in 28 joints (DAS28) for 3 variables, which includes the 28-joint tender joint count (TJC), swollen joint count (SJC), and Westergren erythrocyte sedimentation rate. The functional disability was assessed using the Health Assessment Questionnaire (HAQ). Extra-articular (ExRA) manifestations were identified clinically and confirmed using investigations when indicated. Neuropathy was confirmed using nerve conduction velocity (NCV), amyloidosis by abdominal fat pad aspiration, atlantoaxial dislocation from cervical spine X-rays, interstitial lung disease by pulmonary function tests, and high-resolution computed tomography (CT) scan.

The QOL was assessed by using a self-administered WHOQOL-BREF questionnaire to all patients and 75 age-matched normal individuals (25 patient relatives, 40 hospital employees, and 10 general public). A social worker helped illiterate patients. Raw scores were calculated and converted to a 0–100 scale. Verbal consent was attained from all participants before administering the questionnaire.

Statistically, Student's *t*-test was used for comparing means of parametric data while the Chi-square test was used for categorical variables. Pearson's correlation coefficient (r) was calculated for each domain score with disease variables. A P value of less than 0.01 was considered significant. Multiple regression analysis was done for identifying the individual predictors of QOL. Partial correlation was used to identify the influence of DAS28 after controlling for HAQ. Analysis of variance (ANOVA) with Scheffe's post hoc test was done for comparing more than two variables. All analyses were carried out using the SPSS 13 for Windows software.

Results

During the study period, 152 patients who were willing to participate were included in the study. In the final analysis 136 patients (19 males) were included as data on disease activity was missing in 7 patients and in 9 patients either the WHOQOL-BREF form was incomplete or not returned.

Table 1. Demographic factors and disease variables of patients (n = 136)

Variable	Value
Age in years (mean ± SD)	44.4 ± 10.5
F:M	6:1
Duration of RA in years (mean ± SD)	9 ± 5.8
Tender joint count (mean ± SD)	5.6 ± 7
Swollen joint count (mean ± SD)	2.7 ± 4
DAS28 (mean ± SD)	4.43 ± 1.4
HAQ (mean ± SD)	0.97 ± 1.6
Patients with extra-articular manifestations	30 (22.1%)

RA, rheumatoid arthritis; DAS28, Disease Activity Score (28 joints); HAQ, Health Assessment Questionnaire

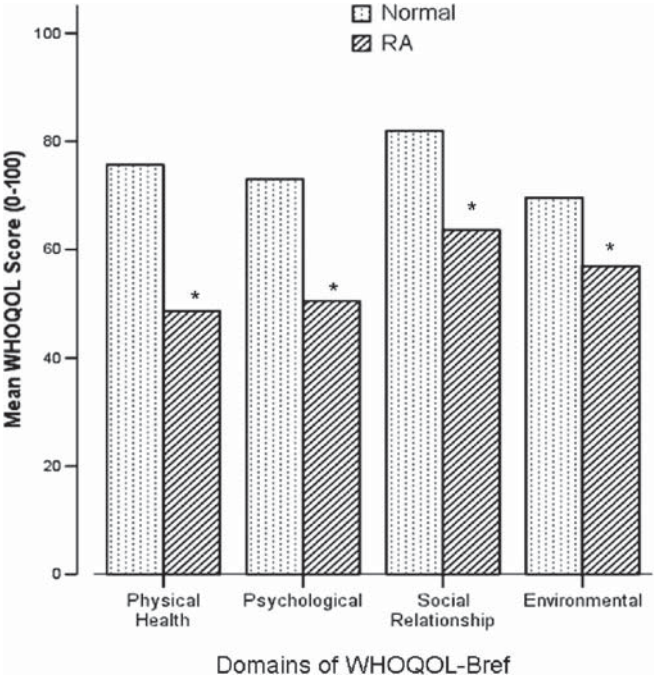

Fig. 1. Bar diagram showing the mean World Health Organization Quality of Life Short Form (*WHOQOL-BREF*) scores of patients with rheumatoid arthritis and normal healthy controls. Higher scores indicate better quality of life. *Significant difference from normal healthy controls at $P < 0.001$. *RA*, rheumatoid arthritis

The mean age of the normal controls was 43.1 ± 9.0 years. The mean age and disease duration of 136 patients were 44.4 ± 10.5 and 9 ± 5.8 years, respectively (Table 1). The mean TJC and SJC were 5.6 ± 7 and 2.7 ± 4, respectively. The mean DAS28 and HAQ were 4.43 ± 1.4 and 0.97 ± 1.6, respectively. Anemia was present in 36 (26.5%) patients and at least one ExRA was present in 30 (22.1%) patients. The ExRA seen were secondary Sjögren's syndrome (n = 17), subcutaneous nodules (n = 10), interstitial lung disease (n = 7), neuropathy (n = 4), autoimmune Addison's disease (n = 2), scleritis, amyloidosis, carpal tunnel syndrome in 1 patient each, and serositis, vasculitis and Felty's syndrome in none.

All patients were on disease-modifying antirheumatic drugs (DMARDs) with 49 patients (36%) on combination of at least two DMARDs. Seventy-two patients (53%) were

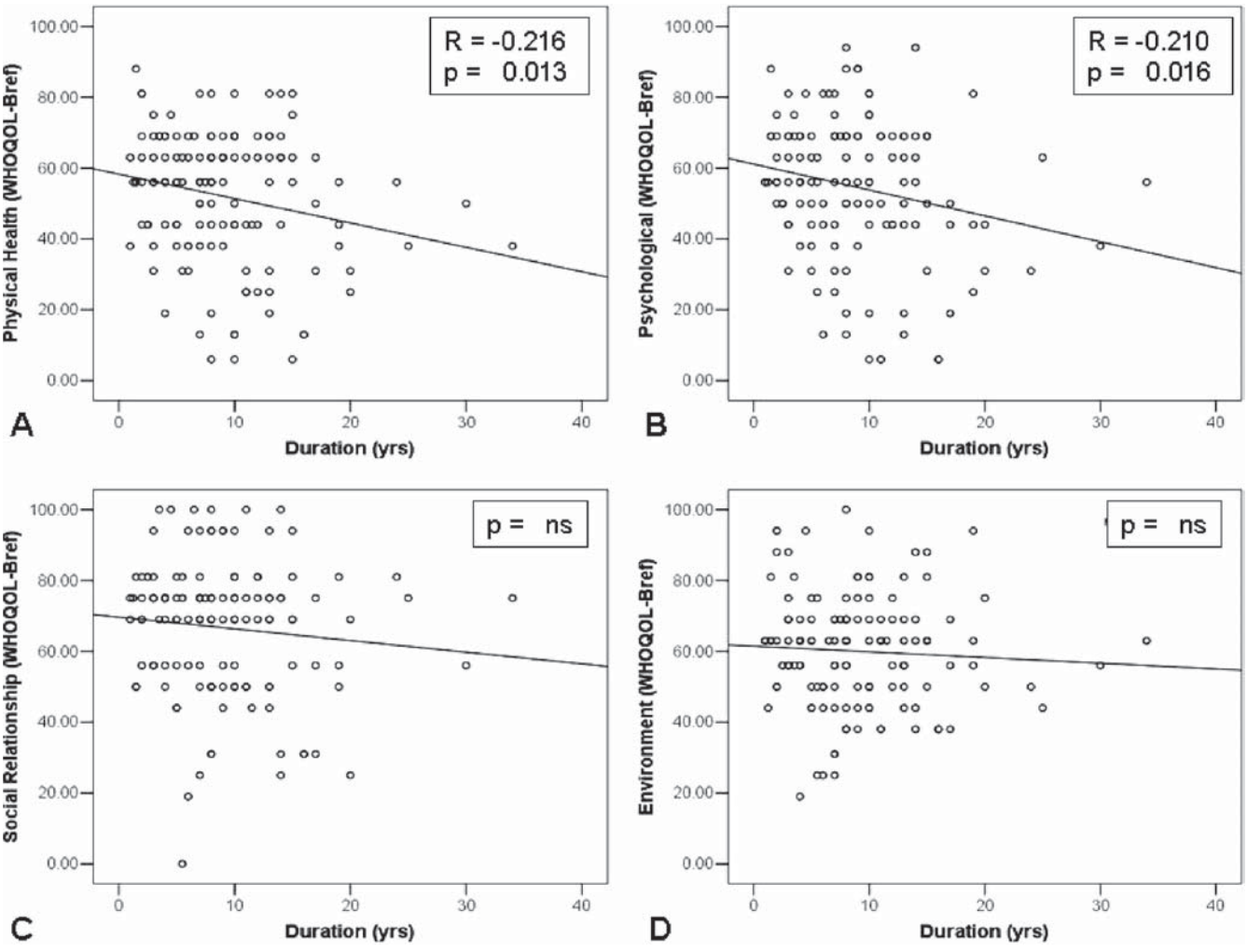

Fig. 2A–D. Scatter plots showing the correlation between duration of disease and the four domains of the WHO quality of life instrument (*WHOQOL-BREF*). There is mild but significant correlation of duration of disease with the physical health (**A**) and psychological domains (**B**) of QOL. There was no correlation with the social relationship (**C**) and environmental (**D**) domains

on a mean dose of 2.5 ± 3.5 mg per day of steroids at the time of assessment.

The mean WHOQOL scores were significantly lower in patients with RA (Fig. 1) compared to normal healthy controls in physical health (51.7 ± 18.6 vs 75.6 ± 8.5, $P < 0.001$), psychological (54.3 ± 20.3 vs 73.0 ± 10.4, $P < 0.001$), social relationship (66.4 ± 19.7 vs 88 ± 12.3, $P < 0.001$), and environment domains (60.0 ± 15.9 vs 69.5 ± 12.3, $P < 0.001$). Patients as well as normal controls scored highest in the social relationship domain (ANOVA, $P < 0.001$). There was significant inverse correlation of duration of disease with the QOL scores in physical health ($r = –0.218$, $P = 0.01$; Fig. 2A) and psychological domains ($r = –0.221$, $P = 0.01$; Fig. 2B).

There was significant inverse correlation of HAQ with the physical health ($r = –0.58$, $P < 0.001$; Fig. 3A), psychological ($r = –0.42$, $P < 0.001$; Fig. 3B), social relationship ($r = –0.25$, $P = 0.004$; Fig. 3C) and environmental domains ($r = –0.21$, $P = 0.01$; Fig. 3D) of QOL. There was significant inverse correlation of DAS28 with QOL in physical health ($r = –0.378$, $P < 0.001$; Fig. 4A) and psychological ($r = –0.206$, $P = 0.01$; Fig. 4B) domains. There was no correlation of the social relationship or environment domain of QOL with DAS28. On multiple regression analysis using the variables duration of disease, DAS28 and HAQ, there was significant effect of HAQ on the physical health ($B = –11.76$, Beta = –0.487, $P < 0.001$), psychological ($B = –10.05$, Beta = –0.384, $P = 0.001$), and environmental domains ($B = –6.11$, Beta = –0.294, $P < 0.01$) of WHOQOL-BREF. There was no effect of DAS28 on QOL after controlling for HAQ using partial correlation.

The QOL in patients with anemia was not different from those without anemia. Patients with at least one ExRA scored significantly lower in the physical health (42.13 ± 19.3 vs 54.40 ± 17.6, $P = 0.001$) domain of WHOQOL.

Discussion

There is paucity of data on QOL in RA from the Indian subcontinent. A previous study from our center evaluated

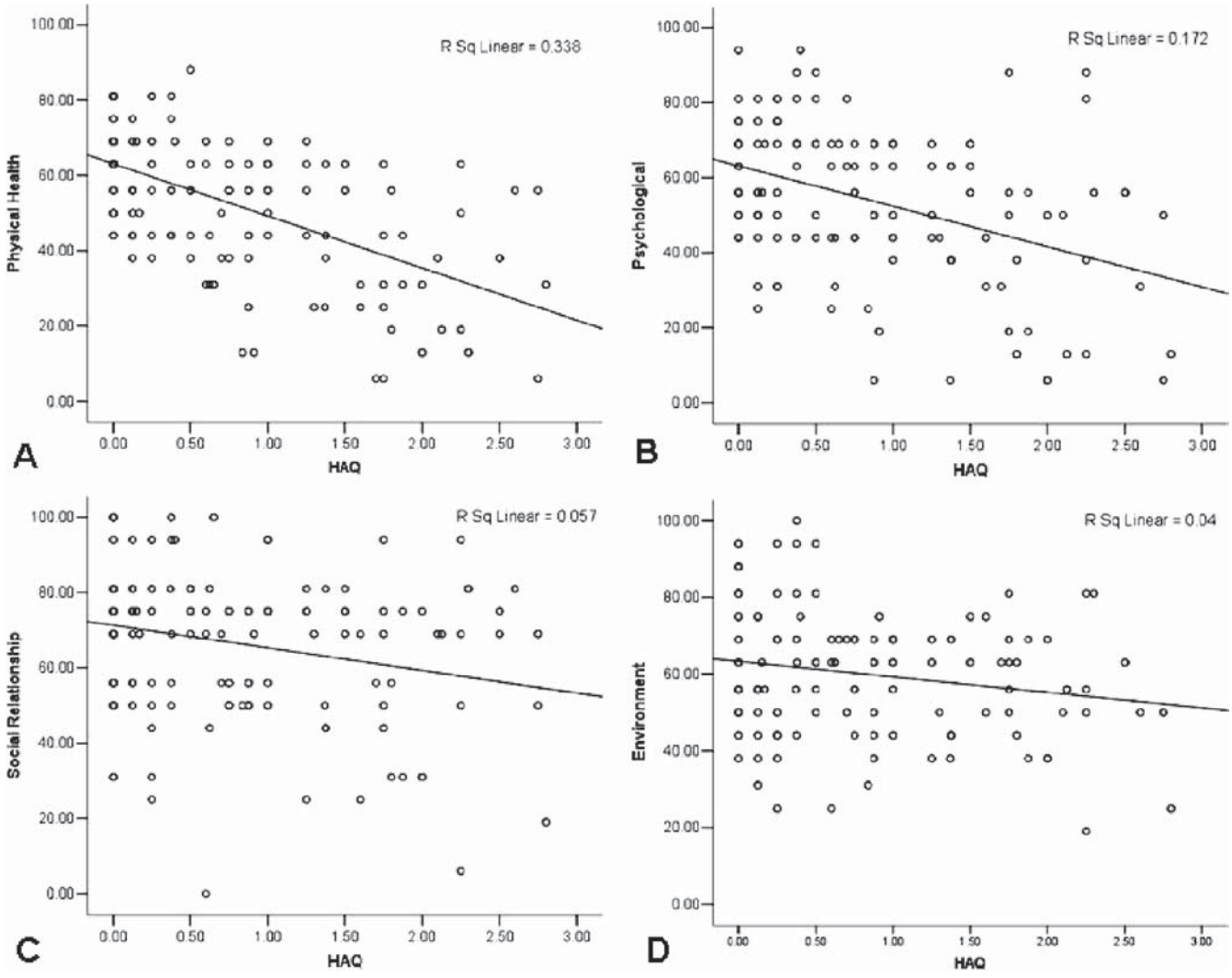

Fig. 3A–D. Scatter plots showing the correlation between functional disability as measured by Health Assessment Questionnaire (*HAQ*) and the four domains of the WHO quality of life instrument

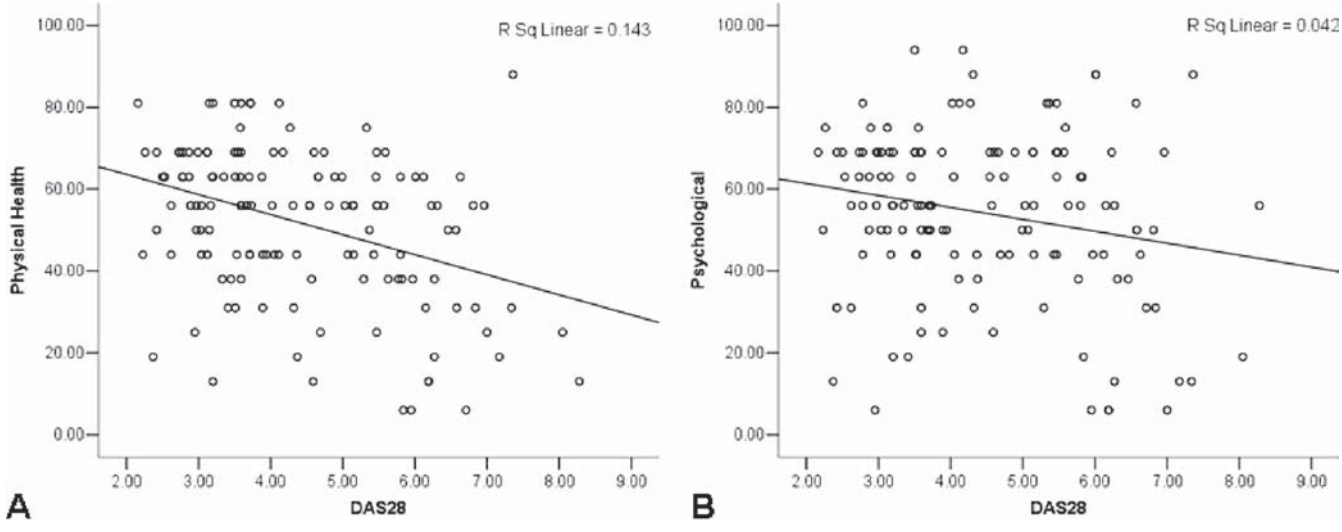

Fig. 4A,B. Scatter plots showing the correlation between disease activity, as measured by Disease Activity Score 3 variables, and the physical health (**A**) and psychological (**B**) domains of the WHO quality of life instrument. *DAS*, Disease Activity Score

the QOL in 101 patients with RA using SF-36; however, no controls were included.[9] The SF-36, used in the above study, was developed in the West and may not reflect the unique societal considerations, regarding QOL, of patients form the subcontinent. It has not been validated for use in Hindi, the local language of patients in North India. The calculation of the final score in SF-36 is complicated. Different societies have differing socioeconomic conditions, values, and interpretation of QOL.[10] As the QOL instrument used in the present study was developed by the WHO in multiple centers with emphasis on local cultural practices, QOL deviations can be aptly captured. The WHOQOL-BREF has been validated against the original WHOQOL-100 and found to have good test–retest reliability.[8] A validated Hindi version was helpful in self-administration of the instrument.

Using a validated instrument, we have, in a large cohort of patients, shown that patients with RA have significant compromise in their QOL compared to age-matched normal healthy population. Our results corroborate with other studies which employed the WHOQOL-BREF as well as other validated instruments to compare QOL in patients with RA and healthy controls.[11–14] 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.[12,13]

Of all domains, physical health was affected most. Despite physical disability, there was relative preservation of the social relationship and the environmental domains of QOL. This has been borne out by other studies from India.[9,15] However, this observation is not specific to this region as higher scores in the social functioning and mental health subscales of SF-36 has been shown in patients with RA from other countries like Holland, Britain, Finland, and China.[12,16–18] Level of social support is known to impact on psychological well-being and those with good social support tend to have less depression.[19] Using a novel social support questionnaire for measuring transactions and satisfactions, support satisfaction was found to influence QOL in patients with RA from Norway, France, Holland, and Sweden.[20] Social support systems are active and efficient in the developed countries. It could be that the joint family system in India provides adequate support resulting in higher scores in the social relationship and environmental domains, as in the developed world.

In our study, normal controls also scored significantly higher in the social relationship domain of QOL. Hence we contemplated whether this phenomenon was related to the design of the questionnaire. The social relationship domain in WHOQOL-BREF contains only three questions and has been considered less responsive to change than other domains.[8] A similar reason was considered during the validation study of the brief form of an RA-specific QOL instrument, the Cedar–Sinai health related quality of life in RA (CSHQ-RA), wherein emotional well-being (represented by three questions) had less correlation to mental component summary of SF-36 scores (which includes social relationship).[21] However, using the Nottingham Health Profile (NHP), which has five items in the social isolation and nine items in the emotional reactions domains, patients with RA did not differ from controls significantly in the dimensions of emotional reactions or social isolation.[22] Hence, even an increased representation also gave similar results in the social and emotional domains of QOL. Whatever the underlying reasons, it appears that patients with RA across different cultures as well as normal controls score higher in questions related to social relationship and environment.

Correlation studies showed a significant effect of duration of disease, functional disability, and disease activity on QOL, with functional disability having the greatest strength of association. Our findings are in agreement with other studies from India and elsewhere.[9,11,16] Similar to another study from India, Patients with ExRA were found to have greater reduction in QOL than those without ExRA.[15] However, on multiple regression analysis only HAQ independently affected QOL. After controlling for the effect of HAQ, disease activity did not have an independent effect on QOL. Thus, although disease activity affects QOL, the predominant effect is through its influence on the functional disability of the patient.

Our study had a few shortcomings. Depression and anxiety, factors which can affect QOL irrespective of DAS and HAQ, were not estimated. Data were not collected on the educational and socioeconomic status of the patients. The control group was small and there was no disease control group.

Conclusion

Quality of life is significantly lower in patients with RA as compared with the normal population. Higher scores were observed in both patients and normal controls in the social relationship domain. Functional disability, as reflected by HAQ, is the most important factor affecting QOL in RA.

References

1. World Health Organization. Basic documents. 39th ed. Geneva: WHO; 1992.
2. Patrick DL, Deyo RA. Generic and disease-specific measures in assessing health status and quality of life. Med Care 1989;27: S217–32.
3. Damiano AM, Steinberg EP, Cassard SD, Bass EB, Diener-West M, Legro MW, et al. Comparison of generic versus disease-specific measures of functional impairment in patients with cataract. Med Care 1995;33:AS120–30.
4. The World Health Organization Quality of Life assessment (WHOQOL): position paper from the World Health Organization. Soc Sci Med 1995;41:1403–9.
5. Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care 1992;30:473–83.
6. Meenan RF, Mason JH, Anderson JJ, Guccione AA, Kazis LE. AIMS2. The content and properties of a revised and expanded Arthritis Impact Measurement Scales Health Status Questionnaire. Arthritis Rheum 1992;35:1–10.

7. Saxena S, Chandiramani K, Bhargava R. WHOQOLHindi. A questionnaire for assessing quality of life in health care settings in India. World Health Organization Quality of Life. Natl Med J India 1998;11:160–5.
8. O'Carroll RE, Smith K, Couston M, Cossar JA, Hayes PC. A comparison of the WHOQOL-100 and the WHOQOL-BREF in detecting change in quality of life following liver transplantation. Qual Life Res 2000;9:121–4.
9. Aggarwal A, Chandran S, Misra R. Physical, psychosocial and economic impact of rheumatoid arthritis: a pilot study of patients seen at a tertiary care referral centre. Natl Med J India. 2006;19: 187–91.
10. Tammaru M, Strömpl J, Maimets K, Hanson E. The value of the qualitative method for adaptation of a disease-specific quality of life assessment instrument: the case of the Rheumatoid Arthritis Quality of Life Scale (RAQoL) in Estonia. Health Qual Life Outcomes 2004;2:69.
11. Taylor WJ, Myers J, Simpson RT, McPherson KM, Weatherall M. 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 2004;51:350–7.
12. Kempen GI, Ormel J, Brilman EI, Relyveld J. Adaptive responses among Dutch elderly: The impact of eight chronic medical conditions on health-related quality of life. Am J Public Health 1997;87: 38–44.
13. Strombeck B, Ekdahl C, Manthorpe R, Wikstrom I, Jacobsson L. Health-related quality of life in primary Sjögren's syndrome, rheumatoid arthritis and fibromyalgia compared to normal population data using SF-36. Scand J Rheumatol 2000;29:20–8.
14. Kosinski M, Kujawski SC, Martin R, Wanke LA, Buatt MC, Ware JE Jr, et al. Health-related quality of life in early rheumatoid arthritis: impact of disease and treatment response. Am J Manage Care 2002;8:231–40.
15. Bedi GS, Gupta N, Handa R, Pal H, Pandey RM. Quality of life in Indian patients with rheumatoid arthritis. Qual Life Res 2005; 14:1953–8.
16. Ruta DA, Hurst NP, Kind P, Hunter M, Stubbings A. Measuring health status in British patients with rheumatoid arthritis: reliability, validity and responsiveness of the short form 36-item health survey (SF-36). Br J Rheumatol 1998;37:425–36.
17. Hirvonen J, Blom M, Tuominen U, Seitsalo S, Lehto M, Paavolainen P, et al. Health-related quality of life in patients waiting for major joint replacement. A comparison between patients and population controls. Health Qual Life Outcomes 2006;4:3.
18. Koh ET, Leong KP, Tsou IYY Lim VH, Pong LY, Chong SY, et al. The reliability, validity and sensitivity to change of the Chinese version of SF-36 in oriental patients with rheumatoid arthritis. Rheumatology (Oxford) 2006;45:1023–8.
19. Doeglas D, Suurmeijer T, Krol B, Sanderman R, van Rijswijk M, van Leeuwen M. Social support, social disability and psychological well-being in rheumatoid arthritis. Arthritis Care Res 1994;7: 10–5.
20. Doeglas D, Suurmeijer T, Briancon S, Moum T, Krol B, Bjelle A, et al. An international study on measuring social support: interactions and satisfaction. Soc Sci Med 1996;43:1389–97.
21. Chiun-Fang C, Sherbourne CD, Ofman J, Lee M, Lubeck DP, Paulus HE, et al. Development and validation of Cedars-Sinai Health-Related Quality of Life in Rheumatoid Arthritis (CSHQ-RA) short form instrument. Arthritis Rheum 2004;51: 358–64.
22. Uutela T, Hakala M, Kautiainen H. Validity of the Nottingham Health Profile in a Finnish out-patient population with rheumatoid arthritis. Rheumatology (Oxford) 2003;42:841–5.