Original Article

Quantification of health-related quality of life among patients with rheumatoid arthritis: An institution-based study in Kolkata, West Bengal

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Abstract

Context: Rheumatoid arthritis (RA) is a known chronic debilitating disease accounting for a large percentage of disability globally. Pain and stiffness, decreased work function, depression and emotional state alteration, fatigue, disability, and social handicaps are some patient reported outcomes, which if considered with priority the health-related quality of life (HRQOL) of patients with RA could improve. **Aims:** This study was conducted with the aim to assess the HRQOL of the patients with RA and the determinants related to it. **Settings and Design:** This was a cross-sectional study conducted at Rheumatology Department of a tertiary care hospital, Kolkata. **Subjects and Methods:** A total of 252 patients with RA were selected in this study through systematic random sampling. **Statistical Analysis Used:** Data were analyzed using appropriate statistical measures with Statistical Package for the Social Sciences(SPSS) version 16.0 (Armonk, NY: IBM Corporation) software program, version 16.0. Univariate and multivariable logistic regression were carried out. **Results:** In the study, the mean age of the patients was 43.1 years (mean age ±SD: 43.05±10.63 years). The proportion of female subjects was 84.5%. Unsatisfactory QOL was found in 59.9% study participants. In multivariable logistic regression unsatisfactory quality of life was significantly associated to moderate to high functional disability [AOR: 6.04, CI: 2.86, 12.78], disease activity moderate to high [AOR: 5.41, CI: 1.87, 15.69], presence of comorbidity [AOR: 2.90, CI: 1.39, 6.04], extra-articular manifestations [AOR: 3.14, CI: 1.41, 6.96] and delay in starting Disease-Modifying Anti-Rheumatoid Drugs (DMARDs) [AOR: 1.24, CI: 1.08, 1.42]. **Conclusion:** Findings of this study clearly indicate the presence of high proportion of unsatisfactory QOL among the patients with RA. Early identification and prompt referral are the key strategies to prevent any permanent damage. Regular follow-up of the patients should be carried out to prevent or delay the disability progression and provide high-quality physical and mental health.

Keywords: DAS28 score, functional disability, health-related quality of life, modified health assessment questionnaire (MHAQ), quality of life, rheumatoid arthritis, WHOQOL-BREF

Introduction

Nothing is more miserable than to live a crippled and disabled life. Rheumatoid arthritis (RA) is a known chronic debilitating disease accounting for a large percentage of disability globally.[1] It also creates a poor quality of life (QOL) in every aspect of a person. It is a prolonged multisystem autoimmune disease

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of unknown etiology, which causes erosion of bony cartilages followed by demolition of joints leads to deformity of the joints if left untreated.[2] The first target of the disease is synovium or the membrane, which is the source of synovial fluid in the joints.[3,4]

The prevalence of RA ranges from 0.3% to 1% globally with an annual incidence rate of 3 per 10,000 adults.[5,6] In India, estimated prevalence rate of RA is 0.5%–0.75%.[7] Globally, among the 291 disease RA is the 42nd highest contributor to global disability measured in years living with disability (YLDs).[8]

QOL is a wide concept described as a complex phenomenon of person's physical, psychological, social, personal beliefs, and relationship by which their environment remains stable. It covers overall every aspect of life, whereas health-related QOL (HRQOL) is more specific to dimensions related to disease aspect, which includes physical, social, functional, and psychological health. Pain and stiffness, decreased work function, depression and emotional state alteration, fatigue, disability, and social handicaps are some patient-reported outcomes, which if considered with priority for improvement the QOL of rheumatoid patients would also improve.

RA is a crippling disease with articular, extra-articular as well as systemic complications. Anemia, cardiovascular diseases, lymphoma, cancers, renal disease, endocrinal diseases, infections, lung diseases, and neuropsychiatric disorders are some comorbidities of RA.[1,9-12] It causes catastrophic economic losses as well as a notable public health problem.[13] This can be prevented by early diagnosis and regular treatment of the patients having RA. Chronic pain creates social and mental insecurity by increasing absenteeism in workplace and bed occupying days. Patients with rheumatic symptoms are very often misdiagnosed and mismanaged. They frequently come at a late stage in tertiary care center with already forming disability despite the fact that early diagnosis can help patients to lead better QOL. As it needs long-term management, treatment compliance is also very poor among these patients. Comorbidity factors have an additive result on poor QOL of patients with RA.

Every person has contributory effect to the economy of the country. Thus, a more satisfactory QOL of a person has positive effect on the economy of the country. It is also very much applicable for the patients with RA.

There is a paucity of studies on QOL among patients with RA in the context of India and West Bengal. This study was conducted with the objective to assess the QOL of the patients with RA and to elicit the determinants of unsatisfactory QOL. Although there are national guidelines for other noncommunicable diseases such as hypertension and diabetes, RA remains a neglected and debilitating disease resulting in poor QOL among the patients with RA. Thus, it is strongly felt that this study may help health policy makers to adopt some effective guidelines for improving the QOL of patients with RA.

Subjects and Methods

Study type and design

The study was an institution-based, observational study with cross-sectional design. Data collection was performed in the Rheumatology outdoor at SSKM Hospital, Kolkata for 1 year (May 1, 2018 to April 30, 2019).

Adults (≥18 years) suffering from RA for minimum 1 year (diagnosed by American Rheumatism Association 1987 revised criteria for RA classification), attending the outpatient department (OPD) of Department of Rheumatology of I.P.G.M.E. and R and SSKM Hospital, Kolkata were included in the study. Those who were critically ill, mentally challenged, and not willing to participate were excluded from the study.

Sample size

Considering the lowest mean of physical domain of HRQOL as 12 of a previous study conducted by Bedi *et al.*[14] in New Delhi, standard deviation (SD) as 2.8, level of confidence as 95%, and allowable error as 5% (relative error), the sample size "*n*" was calculated using the formula: $n = (Z_{\alpha/2})^2 \times (\sigma)^2/L,^2$

Where Z = 1.96,

σ = standard deviation = 2.8,

L = allowable error = 5% of 12 (mean),

and sample size "*n*" = $(1.96)^2 \times (2.8)^2/(12 \times 0.05)^2 = 83.639 \approx 84$.

Systematic random sampling had been used for selection of study subjects; a design effect of 3 was considered and thus the estimated sample size (N) was as follows: $N = 84 \times 3 = 252$.

Sampling design

It was considered that of 52 weeks in a year, after adjusting for holidays, approximately 50 weeks would be effectively available for the data collection period. By review of previous year's average daily attendance it was assumed that average 70–75 patients with RA usually visit the OPD. In an OPD day of 240 min and considering an average interviewing time of 30 min, it was estimated that six patients could be interviewed in 1 day. Systematic random sampling design was considered for selection of the participants on each day. First number was selected by simple random sampling, then sampling interval (12) was added. So with a random start, a linear systematic sampling was adopted with sampling interval of 12. This was repeated for each day of interview. If any patient refused to participate the next patient was included without altering the interview sequence. Predesigned pretested structured schedule, which included World Health Organization Quality of Life BREF (WHOQOL-BREF) questionnaire, modified health assessment questionnaire (MHAQ), and DAS28, was used for interviewing the study subjects.

Study technique

After obtaining permission from the Institutional Ethics Committee (IEC) of All India Institute of Hygiene and Public Health, Kolkata and I.P.G.M.E. and R., SSKM Hospital, the study was started. Informed written consent was taken from all study subjects using a predesigned, pretested structured schedule with the following domains:

1. Sociodemographic characteristics.
2. Disease (RA) profile.
3. Functional disability—elicited by MHAQ.
4. Disease activity—elicited by DAS28.
5. HRQOL—elicited by WHOQOL-BREF.

Operational definition

Disease activity: Disease activity score 28 (DAS28)[15] uses a 28 tender joint count (TJC), a 28 swollen joint count (SJC), ESR, and visual analog scale (0–100). The 28 joints are metacarpophalangeal (MCP) =10, proximal interphalangeal (PIP) = 10, wrist = 2, elbow = 2, shoulder = 2, and knee = 2. In this case, categories were remission = <2.6, low disease activity = ≥2.6–≤3.2, moderate disease activity = >3.2–≤5.1, and high disease activity = >5.1. In logic regression, the first two categories were merged and last two categories were merged.

Functional disability: MHAQ[16] assesses the limitation of activities of daily living measured by a validated questionnaire with eight questions. Questions are on dressing and grooming, get in and out of bed (arising), lift a full cup or glass (grip), walking, get in and out of vehicle (reach), common daily activities like wash and dry entire body, and bend down and turning taps on and off.

Scale ranges from 0 to 1 as no difficulty (0), with some difficulty (1), much difficulty (2), and unable to do any daily living activities (3). Higher score denotes more disability. Normal = <0.3, mild = 0.3–1.3, moderate = >1.3–1.8, and severe = >1.8.

In logistic regression, the subjects with normal and mild value were considered in one group and the other two were grouped in one category.

Extra-articular manifestations: The other systemic signs and symptoms other than articular one. Constitutional symptoms are such as fever, fatigue, subcutaneous nodule, rheumatoid nodule, dry eyes, interstitial lung disease, purpura, and carpal tunnel syndrome,

Comorbidity: Associated diseases with RA.

Delay in starting disease-modifying anti-rheumatoid drugs (DMARDs): When the medicine started after initiation of symptoms (in months).

Treatment adherence: If the patient took prescribed medicines for last 3 months continuously.

QOL: QOL was measured with the help of WHOQOL-BREF.[17] It is a 26-item questionnaire that produces an HRQOL profile. Four domain scores can be derived from it: physical, psychological, social, and environmental. The four domain scores are fashioned in a positive manner that is higher scores denote better QOL. Domain score is calculated by mean score of items within every domain. The total score was calculated by summating all the domain scores. First two questions were not included in any domain. The total domain score was divided into quintiles for logistic regression. Lowest three quintiles were considered as unsatisfactory QOL and the higher two quintiles were considered as satisfactory QOL among the subjects.

Statistical analysis

Data were analyzed using appropriate statistical measures with the help of Statistical Package for the Social Sciences (SPSS) software program, version 16.0. Effect of different factors affecting the dependent variable (quality of life) was analyzed by univariate and multivariable logistic regression. A value of $P < 0.05$ was considered as significant.

Results

In this study, the mean (±SD) age of the subjects was 43.05 (±10.63) years; most 96 (38.1%) of whom belonged to 40–49 years age group. The proportion of female subjects was 84.5%. The ratio of female : male was around 5.4:1. The study population predominantly consisted of Hindus (75.4%). Rest of the respondents were Muslim (25.6%). Mean (SD) per capita income was 2801 (3680) INR with median PCI of 1670 INR. According to Modified B. G. Prasad 2019, 118 (46.8%) of the participants belonged to SES Class IV in both the genders. Among the study participants, 85.7% were currently married, 4.0% never married, and 10.35 were widow and separated. All unmarried, widow, and separated participants were female. Positive family history of RA was present in 25.4% of the study participants [Table 1].

Table 2 shows that 59.9% suffered from unsatisfactory QOL in physical domain, 77.0% in psychological domain, 79.4% in social domain, and 55.2% in environmental domain. In total score, the proportion of unsatisfactory QOL was 59.9%.

Mean (±SD) score of physical domain was 32.29 (±20.88), median 31.00. Mean (SD) score of psychological domain was 35.63 (22.62), median 31.00. Mean (SD) score of social domain was 39.01 (26.74), median 44.00. Mean (SD) of environmental domain was 41.47 (21.06), median 38.00.

Univariate logistic regression showed that with unsatisfactory QOL was significantly related to increasing age (odds ratio [OR], confidence interval [CI] = 1.03 [1.00–1.05]), education below middle (OR [CI] = 2.37 [1.41–3.97]), functional disability moderate to high (OR [CI] = 8.46 [4.70–15.21]), disease activity moderate to high (OR [CI] = 13.97 [5.62–34.76]), presence

Table 1: Sociodemographic characteristics of the study participants (*n*=252)

Variables	Number (%)
Age	
20-29	30 (11.9)
30-39	53 (21.0)
40-49	96 (38.1)
50-59	57 (22.6)
≥60	16 (6.3)
	Mean age (±SD)=43.04 (±10.63) years
	Median (IQR)=44 (35,50) years range=49 (69-20) years
Gender	
Male	39 (15.5)
Female	213 (84.5)
Religion	
Hindu	189 (75.4)
Muslim	63 (25.6)
Education	
Illiterate	46 (18.3)
Below primary	28 (11.1)
Up to primary	70 (27.8)
Up to middle	44 (17.5)
Up to secondary	27 (10.7)
Higher secondary	21 (8.3)
Graduate and above	16 (6.3)
Socioeconomic status (Modified B G Prasad Scale, January 2019)	
Class I (7008 and above)	17 (6.7)
Class II (3504-7007)	36 (14.3)
Class III (2102-3503)	33 (13.1)
Class IV (1051-2101)	118 (46.8)
Class V (1050 and below)	48 (19.0)
Occupation	
Home maker	164 (65.1)
Service	7 (2.8)
Business/self-employed	21 (8.3)
Skilled worker	2 (0.8)
Unskilled worker	24 (9.5)
At home/retired	18 (7.1)
Never married	10 (4.0)
Currently married	216 (85.7)
Widow/widower	10 (4.0)
Separated	16 (6.3)
Family history of RA	
Yes	64 (25.4)
No	188 (74.6)

of comorbidities (OR [CI] = 2.19 [1.31–3.67]), extra-articular manifestations (OR [CI] = 4.23 [2.30–7.77]), poorly adherent to treatment (OR [CI] = 2.67 [1.55–4.59]), and delay in starting DMRADs (OR [CI] = 1.19 [1.06–1.33]) [Table 3].

Multivariable logistic regression was performed using the significant variables in univariate logistic regression. All the variables retained their significance level except increasing age, education below middle school, and treatment adherence.

The Cox and Snell value was 0.37 and Nagelkerke R^2 for the model was 0.51. Hosmer and Lemeshow test was not significant for this model (P = 0.105) so the model was fitting well.

Discussion

Status of QOL

In our study, the mean (±SD) score of physical domain was 32.29 (±20.88), median 31.00. Mean (SD) score of psychological domain was 35.63 (22.62), median 31.00. Mean (SD) score of social domain was 39.01 (26.74), median 44.00. Mean (SD) of environmental domain was 41.47 (21.06), median 38, and mean of total score was 148.4 (±86.20). 59.9% study subjects had unsatisfactory QOL in total score domain.

A study by Haroon *et al.*[18] in Lucknow Uttar Pradesh showed the mean WHOQOL scores in physical, psychological, social, and environmental domain as 51.7 ± 18.6, 54.3 ± 20.3, 66.4 ± 19.7, and 60.0 ± 15.9, respectively, in the patients.

A study conducted by Bedi *et al.*[14] in AIIMS New Delhi showed that the mean (SD) HRQOL scores in each domain of WHOQOL-BREF were 12.0 ± 2.8, 13.2 ± 2.7, 14.4 ± 2.9, and 13.3 ± 2.6 in physical, psychological, social, and environmental domain, respectively.

Determinants of QOL

In this study, lower education, functional disability, moderate-to-high activity, presence of co-morbidity extra-articular manifestations, and late initiation of treatment were the factors associated with unsatisfactory QOL in different domains.

A study conducted by Goma *et al.*[19] depicted that every aspects of QOL was impaired by RA specially physical function, physical disability, mental health, social health, environmental health, and even sexual health.

Table 2: Distribution of respondents according to status of QOL (WHOQOL-BREF, domain-wise) (*n*=252)

Domain	Unsatisfactory QOL number (%)	Satisfactory QOL number (%)	Total number (%)	Mean score (±SD)
Physical	151 (59.9%)	101 (40.1%)	252 (100)	32.29 (±20.88)
Psychological	194 (77.0)	58 (23.0)	252 (100)	35.63 (±22.62)
Social	200 (79.4)	52 (20.6)	252 (100)	39.01 (±26.74)
Environmental	139 (55.2)	113 (44.8)	252 (100)	41.47 (±21.06)
Total score	151 (59.9)	101 (40.1)	252 (100)	148.4 (±86.20)

Table 3: Factors affecting unsatisfactory quality of life (total score) of the study participants: univariate and multivariable logistic regression (*n*=252)

Variables	Quality of life		Odds ratio (95% CI)	Adjusted odds ratio (AOR) (95% CI)
	Unsatisfactory Number (%)	Satisfactory Number (%)	*P*	*P*
Age in years	-	-	1.03 (1.00-1.05), 0.024	1.01 (0.98-1.04), 0.615
Gender				
Female	132 (62.0)	81 (38.0)	1.72 (0.86-3.41), 0.123	-
Male	19 (48.7)	20 (51.3)	1	
Religion				
Muslim	38 (61.3)	24 (38.7)	1.08 (0.60-1.94), 0.800	-
Hindu	113 (59.5)	77 (40.56)	1	
Caste				
SC/OBC	65 (67.0)	32 (33.0)	1.63 (0.96-2.77), 0.070	-
Others	86 (55.5)	69 (45.5)	1	
Education				
Below middle	99 (68.8)	45 (31.2)	2.37 (1.41-3.97), 0.001	1.67 (0.79-3.53), 0.177
Middle and above	52 (48.1)	56 (51.9)	1	1
Type of family				
Joint	92 (64.3)	51 (35.7)	1.53 (0.91-2.54), 0.102	-
Nuclear	59 (54.1)	50 (45.9)	1	
Per capita income				
<3000 (<75th quartile)	49 (68.1)	22 (31.9)	1.62 (.91-2.76), 0.097	-
≥3000 (≥75th quartile)	102 (56.7)	78 (43.3)	1	
Functional disability (by MHAQ score)				
Moderate to high	106 (82.8)	22 (17.2)	8.46 (4.70-15.21), <0.001	**6.04 (2.86-12.78), 0.001***
Normal to low	45 (36.3)	79 (63.7)	1	1
Disease activity (by DAS28 score)				
Moderate to high	145 (69.4)	64 (30.6)	13.97 (5.62-34.76), <0.001	**5.41 (1.87-15.69), 0.002***
Remission to low	6 (14.0)	37 (86.0)	1	1
Comorbidity				
Present	95 (68.3)	44 (31.7)	2.20 (1.32-3.67), 0.003	**2.90 (1.39-6.04), 0.004***
Absent	56 (49.6)	57 (50.4)	1	1
Extra-articular manifestation				
Yes	130 (68.4)	60 (31.6)	4.23 (2.30-7.77), <0.001	**3.14 (1.41-6.96), 0.005***
No	21 (33.9)	41 (66.1)	1	1
Delay in months for starting DMRDs	-	-	1.19 (1.06-1.33), 0.003	**1.24 (1.08-1.42), 0.002***
Treatment adherence				
Poorly adherent	115 (67.6)	55 (32.4)	2.67 (1.55-4.59), <.001	1.97 (0.92-4.22), 0.080
Adherent	36 (43.9)	46 (56.1)	1	1

*$P < 0.05$ was taken as statistically significant; Hosmer-Lemeshow goodness of fit: 0.104; Nagelkerke R2: 0.510; Cox and Snell R2: 0.377

Another study of Katchamart *et al.*[20] showed that disease severity, functional disability depression, and anxiety have negative association with QOL of patients with RA.

In Haroon *et al.*,[18] all the domain scores were less than normal healthy individuals. Significant inverse correlation was found between HAQ with physical domain ($r = -0.58$, $P < 0.001$), psychological domain ($r = -0.42$, $P < 0.001$), social domain ($r = -0.25$, $P = 0.004$) and environmental domains ($r = -0.25$, $P = 0.004$), and environmental domain score ($r = -0.21$, $P = 0.01$) of QOL among the patients. DAS 28 scores were inversely correlated with physical domain and psychological domain.

A study conducted by Bedi *et al.*[14] showed that age, gender, literacy, income, constitutional symptoms, and deformity were not associated with HRQOL. Physical domain was found to be most affected in Indian context. Extra-articular manifestation and increased DAS28 score had negative impact on QOL of patients with RA.

A study conducted by Sri Preethy *et al.*[1] in Karnataka showed that the newly diagnosed patients with RA with "mild to moderate" disease activity had "good to fine" mental health, whereas the old rheumatoid patients having "moderate to severe" disease activity had "fine to bad" mental health. The patients who had high Morisky's Medication Adherence score had a better HRQOL.

A study conducted by Barman *et al.*[21] in Kolkata established that high fatigue level, disability, and pain decreased QOL. Majority of the patients had moderate to higher disease activity. 91.51% patients were in moderate to higher group.

A study conducted by Mathew *et al.*[22] in Kerala showed that all 58 patients had moderate DAS 28 score ranging between 3.2 and 5.1 (patients in the remission phase or highly active stage were excluded); 79.3% patients were exposed to complementary and alternative medicine (CAM) therapy before presenting to the hospital.

A study conducted by Gong *et al.*[23] in China depicted that lower self-efficacy, level of fatigue, increased level of functional disability, poor social support, unemployment, highly active disease stage, presence of co-morbidities, low socioeconomic condition, female gender, rural residence, and increased age were somehow found significant and negatively related to HRQOL.

A study conducted by Taylor *et al.*[24] in New Zeeland found significant association with educational level, blood pressure state, marital status, monthly income, duration of treatment, source of the treatment, and type of the treatment, residence ownership in various domains of QOL. Comorbidity affected physical component of disease the most. Significant correlation was found with all the four WHOQOL-BREF domains and HAQ disability index. Increased physical disability was correlated with poor QOL among rheumatoid patients.

Lack of awareness and ignorance toward seeking medical help resulted in delay in starting the effective treatment resulted in occurrence of more disability and hence poorer QOL, thereby influencing it. Functional disability and disease activity were some explanatory determinants of QOL of patients with RA. Presence of extra articular manifestations as well as comorbidities are not only debilitating for the patients but also significantly enhances the cost of treatment, thus affecting the physical, economic, and mental wellbeing of the patients.

Limitations

This was an institution-based study; hence, findings could not be externally generalized. As it was a cross-sectional in nature, temporal association or cause effect relationship could not be established. Categorization of scores as satisfactory and unsatisfactory was arbitrary.

Conclusion and Recommendations

The findings of this study clearly indicate the presence of a high proportion of unsatisfactory QOL among the patients with RA. The physical, personal, social, and emotional wellbeing are very much hampered due to the disease progression. Regular follow-up of the patients should be performed to prevent or delay the disability progression. Early identification at primary stage and prompt referral are the key strategies to prevent permanent damage due to the disease. Health workers can be made aware of the symptoms so that they can identify the cases at primary level. They can use the MHAQ and DAS28 to identify the disability status and disease activity at primary level and refer the patients to appropriate health care facility accordingly. The front line health workers can quantify the QOL of the patients with RA using this WHOQOL-BREF questionnaire and provide the patients a basic primary health care to improve the QOL. Social security should be made available to those who are abandoned by their families due to the disease. Special vocational training measures should be adopted for the patients with RA who became disabled due to the disease. Keeping in mind the miserable consequences of the disease, management of RA should be included under the program of noncommunicable diseases. Provision of financial support and subsidies for treatment expenditure due to the disease may be explored. Public private partnership model can be used to curtail the expenditure for investigations purpose and provisions of DMARDs.

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Conflicts of interest

There was no conflicts of interest in the study.

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