Study of health related quality of life in rheumatoid arthritis patients

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ABSTRACT

Introduction: Rheumatoid Arthritis (RA) is a chronic disorder associated with substantial morbidity and mortality. Patients with active RA suffer from significant decline in functional capacity and many become work disabled within five years, from onset of symptoms despite treatment. Measureable outcome of these can be done with the help of Health Related Quality of Life (HRQoL) questionnaires. There is a need to study the HRQoL in RA patients, as very less data is available from Indian sub continent. **Objective:** To study of health related quality of life in rheumatoid arthritis patients. **Materials and Methods:** This cross-sectional observational study was conducted over a period of six months in Rheumatology unit of Medicine Department at JSS Hospital, Mysore, approved by the Institutional Human Ethics Committee. Health Assessment Questionnaire (HAQ) and Disease Activity Score (DAS) 28 were administered to assess the HRQoL in RA patients. Morisky's Medication Adherence Scale (MMA) was used to assess the medication adherence. The correlation between the results of the questionnaires was analyzed using Pearson Correlation Coefficient method. **Result:**Total 105 patients who met the study criteria were enrolled. A statistically significant (P<0.05) correlation between the HAQ, MMA and DAS questionnaires was observed in the study. The early RA patients' had a 'mild to moderate' disease activity with 'good to fine' mental health. The old RA patients had 'moderate to severe' disease activity with 'fine to bad' mental health. **Conclusion** :The patients with high MMA score had a better HRQoL and showed moderate decrease in the DAS and HAQ score.

KEY WORDS: Rheumatoid Arthritis, Health Related Quality of Life (HRQoL), Disease Activity Score (DAS), Health Assessment Questionnaire (HAQ), Morisky's Medication Adherence (MMA).

INTRODUCTION

Rheumatoid Arthritis (RA) is one of the most common rheumatic diseases, accounting for a large percentage of disability in the world. RA is a chronic multi-systemic autoimmune disorder of unknown aetiology which may be remitting, but if uncontrolled may lead to destruction of joints due to erosion of cartilage and bone, leading to deformity.[1] The synovium, or membrane present in the synovial joints that lines the joint capsules and creates synovial fluid for the joints in the hands and feet, is the first structure affected in RA. The subsequent inflammatory changes lead to cartilage and bone destruction.[2,3] The exact cause of RA is unknown. The leading hypothesis is that RA is the result of an environmental exposure or "trigger" in a genetically susceptible individual.[4]

Among the genetic factors linked to RA, susceptibility are different in human leukocyte antigen (HLA)-DRB1 alleles, especially in patients positive for Rheumatoid Factor (RF) and Anti-Citrullinated Protein Antibody (ACPA).[2]HLA1-DRB1 genotypes appear to affect both disease susceptibility and disease severity. Gene-environment interactions have been observed; there is an increased incidence of RA in HLA-DRB1 individuals who smoke cigarettes. Chromosome 6, which contains the genes for HLA-DRB1, influences a number of immune processes, including production of tumor necrosis factor (TNF).[5]Thus, the interaction of genetic and environmental factors results in a cascade of immune reactions, which leads to development of synovitis and structural bone damage. And also due to sub-fertility and the immediate postpartum period after a first pregnancy (especially when breastfeeding), appear to increase the risk of RA.[6]

The pathogenesis involves several process of the humoral and cellular mechanisms such as immune complex formation & complement system activation leading to the production of pro-inflammatory and inflammatory cells, which causes the bone damage seen in RA.[7]

The Global Burden of Disease 2000 study, published in the World Health Report 2002 states that RA is the 31st leading cause of Years Lived with Disability (YLD) at global level, accounting for 0.8% of

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total global YLDs.[8] The prevalence of Rheumatoid Arthritis varies between 0.3% to 1% worldwide and approximately 0.75% in India and is more common in women.[9] RA is associated with substantial morbidity and increased mortality. Patients with active RA suffer from significant decline in functional capacity and as many as 40% become work disabled within five years, from onset of symptoms.[9]

The direct and indirect costs such as disability payments, loss of employment and early retirement are enormous due to RA. The social and economic consequences for the individuals are drastic, even in the first year of the disease. According to the World Health Organisation (WHO), this percentage rises significantly as the disease condition progresses, '10 years after onset of the disease, nearly 60% of RA patients are no longer able to work'.[9]

According to WHO, Quality of Life (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." Hence, the regional applicability of the QoL instrument is cardinal and it should reflect the practices of people from the particular region.[10]

Health Related Quality of Life (HRQoL) assessment includes at least four dimensions: physical, functional, psychological and social health. The physical health dimension refers to disease-related symptom. The functional health comprises of self-care, mobility and the capacity to perform various work. The psychological dimension includes cognitive and emotional functions and subjective perceptions of health and life satisfaction. The social dimension includes social and familial contact.[10]

The physical, emotional, and social impact of RA contributes to poor health-related quality of life. Disease severity is correlated with the degree of pain and physical functioning, although patients score their pain worse than physicians estimate. The disease burden of RA is not limited to the affected joints and its physical impact. RA is associated with a number of systemic complications like anemia, cardiovascular problems, lymphoma, cancers, kidney damage, etc. It appears that persistence of inflammatory mediators contributes to the extra-articular involvement. Patients with extra-articular manifestations of RA appear to have higher mortality, especially among men relative to women. It appears that a majority of the deaths in patients with RA are related to cardiovascular disease and it does not appear to be explained solely by traditional cardiovascular risk factors, such as dyslipidemia, smoking, diabetes, and hypertension and is associated with premature death.[6] Analysis of HRQoL surveillance data can identify subgroups with relatively poor perceived health and help to guide interventions to improve their situation and avert more serious consequences.[8]

MATERIALS AND METHODS:

The study conducted involved subjects from the Department of Medicine, inpatients and outpatients of Rheumatology Unit, at JSS Hospital (JSSH), Mysore. This was a cross-sectional, observational study and was conducted over a period of six months from November 2013 to April 2014. Approval for the study was obtained from the Institutional Human Ethical Committee of JSS College of Pharmacy, Mysore. The study criteria included patients of all ages of either sex admitted to medicine and rheumatology wards with the diagnosis of rheumatoid arthritis with or without co-morbidities; and patients who visited the rheumatology OPD and were diagnosed as having RA. The study excluded patients who were non cooperative and were not willing to give the informed consent.

Study Procedure:

Patients meeting the study criteria were included in the study after explaining about the study in their local language and obtained their informed consent. Patient's demographic details, social habits, socio economic condition, past medication history, known allergies to food and drugs were collected from patient's case sheets (includes inpatient case record and OPD record) interview with patients and/or their care takers and health care professionals. Collected information was documented in a suitably designed data collection form which was computerized using Microsoft Access 2007 for easy accessibility, retrieval and analysis of collected data. Medication adherence behaviour was assessed by using Morisky's Medication Adherence Questionnaire. The Health Related Quality of Life (HRQoL) of the patients was assessed by using Disease Activity Score 28 (DAS 28) and Health Assessment Questionnaire (HAQ).

The questionnaires DAS 28, MMA and HAQ used in the study were in Kannada (local language) version. The original DAS 28, MMA and HAQ questionnaires were translated from English to Kannada, approved and validated by the Central Institute of Indian Languages (CIIL), Mysore. DAS 28 Questionnaire measures the disease activity which includes tender joints (out of 28), swollen joints (out of 28), physicians and patient's global assessment and erythrocyte sedimentation rate (ESR). HAQ measures the ability to carry out daily life activities, tasks, overall health and changes made in the daily routine. Each item in the questionnaire shall be scored with the key information such as— always can do it - have no difficulty with the task = 0; usually can do it - although has some difficulty = 2; sometimes can do it -but usually has much difficulty = 4; unable to do it = 6. Those patients with low DAS and HAQ score were considered to have high HRQoL. The patients enrolled were administered with HAQ and asked to answer the questions in the questionnaire with study pharmacist's assistance.

Medication Adherence:

Patients' medication adherence was assessed with the help of Morisky's Medication Adherence Scale. This scale consists of eight questions. Patients answered eight questions and each 'Yes' answer scored one point and each 'No' answer scored zero point. The patients who scored a total of greater than 2 were categorized as having low adherence and those scored 'one' to 'two' points were categorized as having medium adherence and those scored 'zero' points was categorized as having high adherence. The patients enrolled were administered with MMA scale and asked to answer the questions in the questionnaire with pharmacist's assistance.

Statistical Analysis:

Results were analyzed using Pearson's Correlation Coefficient formula in Microsoft Office Excel 2010. Initially the patient demographics' percentage and mean ± standard deviation were calculated. The Pearson coefficient correlation value and significance was calculated for the 3 different questionnaires DAS 28, MMA and HAQ individually and the co-relation between them.

RESULTS AND DISCUSSION

From a total of 720 patients who visited the rheumatology OPD, 105 patients met the study criteria and were enrolled in to the study. From the total number of patients, 20 were male and 85 were female. RA is one of the many chronic inflammatory diseases that predominate in females. The prevalence is about 2.5 times higher in females than males.[11,12] A recent study conducted by Mittal et al., in India has reported that more than 80% of the RA patients were females, which is in agreement with our study.[13]

The age group 41-60 years had the highest percentage of patients (60.95%), which is more than in any other age group in our study population. The mean ± standard deviation (sd) age in our study is 46.42±11.48 years. In the epidemiology study by Sangha.O, a ratio of 6:1 for age groups 65:25 years was found, stating that aging is a major risk for RA, which is similar to our study.[1]

Those whose disease starts early (before the age of 45) are more likely to become severely disabled than those whose disease start at older ages >70 years.[1, 8] However, in our study none of the patients became severely disabled which may be due to early initiation of DMARDs.

Risk Factors such as alcohol consumption and tobacco smoking were seen in this study population in about 0.95% and 2.9% of patients respectively, who were all of male gender. A study conducted by Kuder SA, et.al, also says that alcohol consumption and cigarettes smoking are risk factors for the development of RA.[14] The demographics details of the study population are described in **Table 1.**

Table No 1: Categorization of Patients Based on Demographic Details

Demographics		Number of patients' n (%)
Gender	Male	20 (19.05)
	Female	85 (80.95)
Age	<20	1 (0.95)
	20-40	28 (26.66)
	41-60	64 (60.95)
	>60	12 (11.43)
Risk factors	Smoking	3 (2.86)
	Alcohol	1 (0.95)
Co-morbid conditions	HTN & T2DM	11 (66.67)
	Hypothyroidism	6 (35.33)
Diagnosis	Juvenile RA	1 (0.95)
	Old RA	8 (7.62)
	Early RA	47 (44.77)
	Late RA	45 (42.86)
	Steroid dependent RA	4 (3.81)
Rheumatoid Factor (RF)	RF Factor Positive	93 (88.57)
	RF Factor Negative	12 (11.43)
Anti Citrulinated Protein Antibody (ACPA)	ACPA Positive	42 (40)
	ACPA Negative	63 (60)

Majority of the patients had co-morbid conditions such as hypertension (HTN) and type II diabetes mellitus (T-II DM) about a total of 66.7% and around 35.3% patients had hypothyroidism. HTN & T-II DM were seen in both the genders, while hypothyroidism was seen only in female subjects. In a study by Tae-Jin Lee et al, there were more patients with the co-morbid conditions HTN 62.5% and T2DM 17.3% from their total number of 196 patients, which is similar to our study.[15] In a study conducted by Staykova ND on RA and thyroid abnormalities, it was known that thyroid dysfunctions in RA patients are most often of autoimmune nature and in case of hypo-/hyperthyroidism without any autoimmunity the disease in itself can cause bone resorption or act as a trigger for chronic inflammatory conditions such as RA. [16]

Based on American College of Rheumatology (ACR) 2010 criteria, around 44.8% patients were diagnosed as early RA newly detected at the early stage of the disease with only symptoms, 0.95% juvenile RA, 7.6% late diagnosed RA i.e. patients with RA disease activity at moderate to severe presenting with articular bone damage and 42.9% of patients who were known cases of or old RA. There were four patients diagnosed with steroid dependent RA, in whom use of steroids for treatment is mandatory as there may be decreased or no changes seen even with DMARDs only therapy. Co-morbid condition in RA patients and diagnosis details are also featured in **Table 1.** The Rheumatoid factor (RF) and Anti-Citrullinated Protein Antibody (ACPA) are two diagnostic tests which help to confirm the diagnosis of RA other than x-rays. About 88.57% patients were RF positive (sero-positive) while 11.43% were negative for RF (sero-negative). Also, 40% were ACPA positive while the remaining 60% were negative. Similarly, in a study by Shini V K et al, the male to female ratio

obtained was 1:5. Out of the 266 patients studied, 90.98 % patients were found to be positive for RF (Sero Positive RA) and 9.02 % patients were found to be negative for RF (Sero Negative RA). Only 118 patients were tested for ACPA and out of that, 87.29 % patients were ACPA Positive and 12.71% patients were ACPA Negative. [17]

Assessment of HRQoL:

The HRQoL in RA patients was assessed by using HAQ, DAS and MMA questionnaires. The HAQ questionnaire has four domains such as physical, hygiene, health and symptoms.

The Physical Domain determines the ability to do normal work such as dressing, grooming, arising, walking, eating and whether the patient is in need of any support or aid in doing their daily activities. In early RA (ERA), the number of patients with zero score who can perform their daily activities without any aid or support were found to be five, whereas those with the score 2-4 were found to be 35, who had moderate disability but still could perform their activity and eight patients were found to have score six who could not perform their daily activities. Patients with old RA (ORA), who had a score of zero, could perform their daily activities without any aid or support were found to be six, those with the score 2-4 were found to be 11, who had moderate disability but still could perform their activity and seven patients were found to have score six who were unable to do their daily activities. The mean ± sd in physical domain for ERA patients were 3.70 ±1.67 and the ORA patients were 3.44 ±1.64 respectively. The mean ± sd of overall physical domain was found to be 3.56±1.64, had good ability to do their daily activities.

The Hygiene domain determines the ability to do activities to maintain their hygiene such as bathing, reach, grip, run errands such as to go out to shops and if any aid is required in doing these activities. The patients from our study population with early and old RA who had a score of zero were seven and 15 respectively could maintain their good hygiene. Those patients with the score of 2-4 were found to be 36 and 33, with ERA & ORA respectively could maintain their hygiene moderately. And patients were found to be six and eight with the score of six, in ERA & ORA respectively who were unable to maintain their hygiene. The mean ± sd of ERA and ORA patients in hygiene domain were 2.85±1.81 and 2.42±1.99 respectively. The mean ± sd of the overall hygiene domain was found to be 1.14±1.91, had good hygiene.

The Health domain determines their symptoms such as morning stiffness and pain, for which if they are taking any pain relievers. In case of general health, the number of patients with score zero were three in ERA patients and eight in ORA patients, had a good health without

morning stiffness. While with the score of 2-4, five ERA patients were there and 13 ORA patients, had moderate (30 minutes) morning stiffness. And eight patients with ERA had severe pain and nine patients of ORA, had severe morning stiffness. The mean ± sd of ERA and ORA patients in health domain were 3.87±1.47 and 3.30±1.83 respectively. The mean ± sd of overall health domain was found to be 3.56 ±1.69, had good health.

The Symptoms domain determines if the patient has had any new symptoms which could be either due to the medications, or any other co-morbidity or extra-articular manifestation. Five ERA and seven ORA patients were found to have score zero who did not have any new symptoms. With score 2-4, 26 ERA patients did not have any symptoms due to medications except due to disease and out of 37 ORA patients, some had symptoms of hypothyroidism, and few had changes in lab data which was due to medications. Score six was found in 18 ERA patients with severe symptoms of RA and in 12 ORA patients with extra-articular manifestations such as vascular abnormalities and lung diseases. The mean ± sd of ERA and ORA patients in health domain were 3.96±2.02 and 3.16±1.93 respectively. The mean ± sd of overall symptoms domain was found to be 3.52 ±1.99, with mild to moderate symptoms.

All the above domains such as physical, hygiene, health and symptoms, provide an insight to the patient's mental status about their disease condition. The overall HRQoL based on HAQ in ERA and ORA patients were found to be 4.13±1.53 and 3.61±1.83. The overall HRQoL was found to be good with a mean ± sd, 0.99±1.70. Similarly, in a study by Shini.V.K et al, the overall HAQ was found to be significant with mean ± sd of 0.69 ± 0.49.[17]

DAS is a questionnaire to assess the disease activity based on the number of tender and swollen joints with either ESR or CRP and pain based on global visual analogue. The number of joint involved and included for DAS are 28 i.e. 14 joints bilateral they are shoulder, elbow, wrist, meta-carpo-phalangeal (MCP) -1,2,3,4,5 and proximal inter-phalangeal (PIP)-1,2,3,4,5 and knees.

In early RA patients, 76.59% patients had >10 tender joints (TJ), 17.02% patients had 1 to 10 TJ and 6.38% patients had zero TJ. In the same group, 29.5% patients had >10 swollen joints (SJ) and 70.45% patients had 1 to 10 SJ. While, in old RA patients, 77.19% patients had more than >10 TJ, 21.05% had 1 to 10 TJ and 1.75% patient had zero TJ. In the same group, 15.78% had > 10 SJ, 68.42% had 1 to 10 SJ and 15.78% had zero SJ. The mean ± sd of tender joints is 17.67±8.16, swollen joints 6.82±6.72 and ESR 42.73 ± 19.88. This shows that most patients had more number of tender joints than swollen joints. The

mean ± sd of TJs, SJs, and ESR of ERA patients were found to be 19.38±7.42, 6.96±6.80 and 40.08±17.08 respectively. The mean ± sd of TJs, SJs, and ESR of ORA patients were found to be 16.23±8.53, 6.70±6.81 and 44.96±21.86 respectively. In comparison, the disease activity seen in ERA and ORA patients is the same as seen in the mean± sd of the TJs, SJs and ESR. The overall DAS 28 mean ± sd was found to be 6.17±1.09, with a high disease activity.

While in a study by Shini.V.K et al, the overall DAS 28 mean ± sd was found to be 3.37 ± 1.24, with a moderate to low disease activity.[17] In another study by Jenny Amaya-Amaya et al, the mean ± sd of tender and swollen joints was found to be 2 ± 4, with the overall DAS 28 mean of 2.75 ± 1.30, which is low disease activity.[18] The details on scores in number of patients have been tabulated in **Table 2**.

Table No 2: Comparison of Health Assessment Questionnaire (HAQ) and Disease Activity Score (DAS) Scores of Rheumatoid Arthritis Patients

HRQoL Scale		Number of Patients n (%)	
HAQ	**Scores**	**Early RA (ERA)**	**Old RA (ORA)**
Physical domain	0	5 (10.41)	6(25)
	2 to 4	35 (72.91)	11(45.83)
	6	8 (16.66)	7(29.16)
Score (mean±sd)		3.70±1.67	3.44±1.64
Hygiene Domain	0	7(15.55)	15(26.78)
	2 to 4	36(80)	33(58.92)
	6	6 (13.33)	8(14.28)
Score (mean±sd)		2.58±1.81	2.42±1.99
Health Domain	0	3(18.75)	8(26.66)
	2 to 4	5(31.25)	13(43.33)
	6	8(50)	9(30)
Score (mean±sd)		3.80±1.47	3.30±1.83
Symptoms Domain	0	5(10.20)	7(1.5)
	2 to 4	26(53.06)	37(66.07)
	6	18(36.73)	12(21.42)
Score (mean±sd)		3.96±2.02	3.16±1.92
DAS			
Tender Joints (TJ)	0	36(76.59)	44 (77.19)
	1 to 10	8 (17.02)	12(21.05)
	>10	3(6.38)	1(1.75)
Score (mean±sd)		19.38±7.42	16.23±8.53
Swollen Joints (SJ)	0	0	9(15.78)
	1 to 10	31(70.45)	39(68.42)
	>10	13(29.5)	9(15.28)
Score (mean±sd)		6.96±6.80	6.70±6.81

Medication Adherence was assessed based on the Morisky Medication Adherence (MMA) questionnaire – 8 items. There were 5.7% patients with high adherence score of zero, 20.95% patients with score one and 29.5% patients with score two, both of medium adherence. There were 9.5% patients with score three, 11.4% patients with score four, 7.6% patients with score five, 3.8% patients with score six, 4.8% patients with score seven, and a set of 6.7% patients with score eight, who were all having low medication adherence. It was found

that as the MMA score increased, the overall quality of life of the patient decreased and that majority of patients had scored two of medium adherence.

A study conducted by Johnson C to evaluate the importance of medication adherence and its outcomes, observed that after counselling, the study population showed 100% adherence to medication.[19] To evaluate the effectiveness of patient counselling on use of medications appropriately in RA, a study conducted by Karen M. Stockl et al, observed that there was increased compliance to medication with the benefits shown as improvement in their overall HRQoL. [20]

The reasons for medication non adherence are— poor quality of provider-patient relationship; poor communication; lack of access to healthcare; lack of continuity of care; complexity of regimen; side effects; poor socioeconomic status; low literacy; higher medication costs; poor social support, which were seen in our study population. Studies by Johnson C and Karen M. Stockl et al, on medication adherence also mentioned the same reasons for lack of adherence. [19, 20] The MMA different scoring and their percentage in accordance with QoL, are summarised in **Table 3**.

Table No 3: Comparison of Medication Adherence Scale (MMA) and Overall Quality of Life (Qol)

Total score of MMA		Total number of patients' n (%)	Overall QoL
High Adherence	0	5(8.77%)	Good
Medium Adherence	1	6(10.52)	Fine
	2	16(28.07)	Fine
	3	5(8.77)	Medium
Low Adherence	4	6(10.52)	Medium
	5	7(12.28)	Bad
	6	3(5.26)	Bad
	7	3(5.26)	Bad
	8	4(7.01)	Bad

Comparison of DAS, HAQ and MMA

The early RA patients had a mild to moderate disease activity with DAS 28 mean score as 5.1±1.2, and their HAQ scores were between 0-4 showing a 'good to fine' mental and physical health.

The old RA patients had a DAS28 mean score of 6.44±0.82 with moderate to severe (no response) disease activity with a MMA score varying between 3-8, moderate to low adherence and their HAQ score was 4 and 6, thus showing a 'fine to bad' mental and physical health. Nell et al compared the DAS28 scores of patients with early RA (<3 months) with those with late/ old RA (6 months–3 years). Patients in both groups had baseline DAS28 scores in the high disease activity range. Although both groups showed statistically significant improve-

ments over time, the late-early group reached a plateau in the moderate activity range with moderate HRQoL and the very early group improved into the low activity range with a good HRQoL.[21]

The HRQoL in RA patients were measured using DAS, MMA and HAQ, which were analysed using Pearson correlation method to ascertain the level of relationship between each of them. It was found to be moderate to low level of significant correlation between DAS and HAQ (r=0.088; p<0.05); DAS and MMA (r= (-0.091); p<0.05). Whereas highly significant correlation was observed between MMA and HAQ (r=0.600; p<0.05). The results revealed that there is a significance (p<0.05) association between DAS, MMA and HAQ.

Similarly, in a study conducted by Oyoo G O et al. to evaluate the HRQoL in RA patients, summary scores of both physical and mental health component scales showed significant negative correlations with disease activity scores [Pearson correlation coefficients of – 0.603 and – 0.632 respectively, p< 0.001 for both] among the study patients. [22] This is an expected association since disease activity is the critical determinant of functional capacity and HRQoL, throughout the course of rheumatoid arthritis.

In a study conducted by Jenny Amaya-Amaya et al., moderate correlation was observed between DAS-28 and multidimensional HAQ (r-0.44, p<0.0001and p<0.004). Also it presented with moderate to high correlations between disease activity scores taken as simple and complex disability index with all variable measurements done by the patients.[18]

The usefulness of HRQoL questionnaires, also called as Patient Reported Outcomes (PROs) while treating a chronic condition like RA has been demonstrated in our study which is in line with the objective. Similarly, to determine the usefulness of PROs in RA focus group, a study by Jenny Amaya-Amaya et al, found that the PROs applied in focus groups interview were a useful tool for managing patients with RA regardless of gender, educational level, and duration of disease.[18]

CONCLUSION

Among the study population, the female patients were three folds predominantly more than the male population and majority of the patients were newly diagnosed. The HRQoL score of the early RA (ERA) patients assessed based on DAS and HAQ were 5.1±1.2 and 0-4 respectively, which is mild to moderate disease activity with 'good to fine' mental health. Whereas, the HRQoL scores of old RA (ORA) patients based on DAS and HAQ were 6.44 ±0.82 and 3- 8, which is moderate to severe disease activity with 'fine to bad' mental health. Also, the patients with high Morisky Medication Adherence (MMA)

score had a better HRQoL and showed moderate decrease in the DAS and HAQ score. The study results showed that there is a moderate correlation between HAQ, DAS and MMA. The study concluded that the HRQoL questionnaires provide a better insight to the patient's disease condition, using HRQoL questionnaire as a standard protocol could help in the treatment of RA patients on a regular basis.

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