

Quality of Life in Rheumatoid Arthritis: Influence of Personality Traits and Disease Related Variables. An Egyptian Study

Abeer Allam ^a, Heba A Esaily ^b, Eman G. Saleh ^a

Departments of ^a Neuropsychiatry, and ^b Physical Medicine, Rheumatology and Rehabilitation, Faculty of Medicine, Menoufia University, Menofia Governorate, Egypt

Corresponding author: Heba A. Esaily, MD, e-mail: hebaesaily@yahoo.com

Mobile: +20 109 272 2125, ORCID ID: <https://orcid.org/0000-0002-8660-6817>

ABSTRACT

Background: Quality of life (QoL) in rheumatoid arthritis patients may be greatly affected by their personality, which shape their perception of illness, their attitude, and behavior. Up to our knowledge, none has discussed personality traits in Egyptian RA patients.

Objectives: To study personality traits in Egyptian RA patients and its impact on health-related quality of life together with its relation to severity of illness.

Methods: A cross-sectional study was conducted on 150 Rheumatoid arthritis female patients and 50 healthy voluntaries. All participants completed the following: socio-demographics, SF-36, Eysenck personality questionnaire, hospital anxiety and depression scale, DAS-28, Pain VAS, and laboratory investigations.

Results: Neuroticism traits were substantially more in RA patients and significantly correlated to most of measured variables. QoL deteriorated in RA patients. Pain severity (coefficient B= -0.31, p 0.002) and depression severity (coefficient B= -0.25, p 0.01) were an independent negative predictor of life quality related to physical health, followed by higher disease activity (coefficient B= -0.20, p 0.02), disease span (coefficient B= -0.19, p 0.02). Depression was an independent negative predictor of quality of life related to mental health (coefficient B=-0.42, p< 0.001) followed by anxiety (coefficient B=-0.38, p< 0.001), then disease span (coefficient B=-0.17, p 0.03) and Pain severity (coefficient B=-0.34, p0.04)

Conclusion: Personality traits specially neuroticism was significantly correlated with most of measured variables and affect QoL in Egyptian RA patients, indirectly.

Keywords: Anxiety, Depression, Personality traits, Quality of life, Rheumatoid arthritis.

INTRODUCTION

The autoimmune disorder rheumatoid arthritis (RA), is one of the most prevalent conditions. Prevalence of RA ranges from 0.6 to 1.3 % based on data of World Health Organization (WHO) records. It causes severe limitations in patients' life despite many advances in its treatment. Higher rates of disability were found to be related to older age, female sex and higher disease activity variables ⁽¹⁾. Impairments in HR-QoL in RA have been reported ⁽²⁾. QoL greatly influenced by personality traits as evaluation of HR-QoL items depends on subjective assessment of its items ⁽³⁾. Neuroticism subtype of personality traits in RA patients was found to contribute to their psychological distress even to their disease adjustment ⁽⁴⁾.

Depression rates in RA ranges from 13% to 20% and even above. Studies that used self-report measurement gives higher rates of depression despite symptomatology levels is subclinical ⁽⁵⁾. In a longitudinal study, depression risk in RA was found to be 40% over 9 years. Depression occurrence in RA patients found to be related to pain, fatigue, more disease activity, greater use of health services, more work disability even to higher suicidal risk and mortality ⁽⁶⁾. Higher levels of anxiety (21% to 70%) were also reported in previous studies ⁽⁷⁾. Up to our Knowledge, none has discussed personality traits in Egyptian RA patients. Thus, the aim of this work was to study personality traits in Egyptian RA patients and its

impact on health-related quality of life together with its relation to severity of illness.

MATERIALS AND METHODS

The study enrolled 150 patients in a cross-sectional design (both sexes, ages from 20 to 50 years). They were diagnosed with RA using the 2010 ACR/EULAR indicators of classification ⁽⁸⁾. Patients were drawn from the Physical Medicine, Rheumatology, and Rehabilitation department's Outpatient Clinic at Menoufia University Hospital between July 2019 and February 2020. As a control group, 50 healthy volunteers with similar ages were enrolled.

Exclusion criteria: Patients who were uncooperative for psychiatric evaluation, or with positive history of psychiatric disorders or receiving psychotropic medication. Also, patients with any other physical illness, or with extra-articular manifestations were excluded.

Socio-demographic information were gathered.

The Disease Activity Score (DAS-28) was employed to evaluate the illness severity. It included the first hour Erythrocyte Sedimentation Rate (ESR), joint swelling and tender counts, and personal evaluation of patients on a visual analogue scale. The total DAS-28 score was computed using the standard method. RF titre was obtained using the latex agglutination method (RF

Direct Latex; EDALAB, France). Laboratory assessment for CRP titre (SPINREACT, S.A/S.A.U Ctra. Santa Coloma.7 E-17176, Spain) was done.

Clinical psychiatric evaluation was assessed using structured clinical interview axis I (SCID-I) interview to assess major axis I psychiatric disorders ⁽⁹⁾. Personality traits were evaluated using the Eysenck Personality Inventory. **Abdel-Khalek** ⁽¹⁰⁾ translated and verified the Arabic version.

Arabic version of Hospital Anxiety and Depression Scale (HADS) ⁽¹¹⁾ was used to test for anxiety and sadness: Each subscale consisted of seven items that are rated on a four-point scale and scored from 0 to 3, resulting in total scores ranging from 0 to 21 for each subscale. Scores ranging from 0 to 7 indicate 'no case,' 8 to 10 indicate a 'possible case,' and 11 to 21 indicate a 'probable case of anxiety/depression' ⁽¹²⁾.

Rheumatoid patients' life quality was evaluated using the SF-36 questionnaire ⁽¹³⁾:

Physical functioning (PF), bodily pain (BP), social functioning (SF), general health (GH), role-physical (RP), role-emotional (RE), vitality (VT), and mental health (MH) are among the 36 questions broken down into these eight areas. The physical component scale and the mental component scale are the two categories into which the eight scales were split. Answers in each dimension are scored from 0 to 100. The highest potential degree of wellbeing is indicated by the highest possible score. A scale from 0 (worst potential health state) to 100 (The healthiest condition conceivable) can be created by coding, adding, and transforming the item ratings for each factor.

Ethical approval:

Menoufia University Ethics Committee on Human Research gave its approval to the study. Each participant signed a written, informed consent form. The Declaration of Helsinki, the World Medical Association's code of ethics for studies involving humans, guided the conduction of this work.

Statistical analysis

The Statistical Package for Social Science (SPSS) version 13 (IBM Corp., Armonk, New York, USA) software was used for data analysis using IBM personal computer. All variables in the study were subjected to descriptive statistics. When comparing two groups of normally distributed variables, the student t-test was utilized, and the Mann-Whitney U test was used to compare the means of demographic and clinical data between patients and control groups. Chi-square test and Fisher exact test were used for categorical data when the expected values in one or more cell of 2X2 tables were <5 and >5 respectively. Spearman correlation between various clinical factors was examined. Multivariate linear regression analysis was used to assess independent predictors of physical and mental component of quality of life. The p-value cutoff for significance was 0.05.

RESULTS

This cross-sectional study was conducted on 150 RA patients and 50 healthy subjects as a control group. The age of RA patients and the healthy control ranged from 19 to 50 years, with a mean of **41.7 ± 7.86** and **41.2 ± 8.39** years respectively.

Regarding socio-demographic information, there was no statistically significant difference between the patient and control groups. Both groups were matched to negate the effect of socio-demographic variable on the quality of life (table 1).

Concerning psychiatric evaluation, 14% of RA patients had major depressive disorder (MDD) and 23% had generalized anxiety disorders (GAD) (according to SCID-I) while 100% of control subjects were free of any psychiatric disorders. Patients' group scores on the hospital anxiety and depression scales were substantially higher than those of the control participants (p 0.03 and < 0.001 respectively). Regarding personality traits, neuroticism traits were significantly higher in rheumatoid arthritis patients (p 0.01).

Table (1): Socio-demographic variables of rheumatoid patients and healthy control

	Rheumatoid patients N = 150		Healthy control N = 50		Test	P value
Age (Years) X ±SD Range	41.7±7.86 19 – 50		41.2±8.39 19 – 50		t-test 0.38	0.70
	No	%	No	%	X²	
Sex						
Male	33	22	9	18	0.36	0.55
Female	117	78	41	82		
Education						
Illiterate	33	22	11	22	0.0	1.0
Middle	96	64	32	64		
High	21	14	7	14		
Marital						
Single	9	6.0	3	6.0	1.55	0.67
Married	126	84.0	43	86.0		
Widow	9	6.0	1	2.0		
Divorced	6	4.0	3	6.0		
Occupation						
Professional	15	10.0	4	8.0	FE 0.17	0.79
Manual	135	90.0	46	92.0		

The present study showed significantly lower scores in all domains of SF-36 QoL scale in rheumatoid patients than the control subjects (p<0.001). Among RA patients, the physical component domains showed lower (worse) mean scores than the mental component domains. The worst physical domain was role physical and the worst mental domain was role emotional (table 2).

Table 2: SF36 QOL among cases and control

QOL (SF36)		Rheumatoid arthritis patients N = 150 (X ±SD)	Healthy control N = 50 (X ±SD)	FE test	P value
Physical component summary (PSC)	Physical functions	48.71±23.02	65.58±28.37	3.73	<0.001
	Role physical	28.41±31.88	79.71±16.44	U 8.72	<0.001
	Body Pain	42.02±25.65	76.70±18.82	7.61	<0.001
	General health	40.66±18.33	61.62±19.40	5.71	<0.001
	Total	39.95±24.72	70.90±20.75	4.07	<0.001
Mental component summary (MCS)	Mental health	40.58±17.38	63.29±25.02	U 8.05	<0.001
	Role emotional	32.75±24.79	75.67±23.92	5.35	<0.001
	Social function	47.75±23.33	62.73±23.38	3.62	<0.001
	Vitality/energy	46.84±13.56	73.86±23.63	6.67	<0.001
	Total	41.98±19.76	68.88±23.98	5.72	<0.001

FE = Fisher's Exact test, U= Mann Whitney U test

Severity of anxiety was positively correlated with TJC, DAS-28 scores, and VAS scores, which were of statistical significance (< 0.01, <0.05 and <0.05 respectively) and adversely associated with how long the illness lasts (p<0.05). Severity of depression was positively correlated with duration of illness, positive RF, TJC, DAS (28) scores and VAS scores (p 0.01, < 0.001, 0.01, <0.001 and <0.001 respectively). Neuroticism trait was positively connected with the length of the disease, VAS scores, and DAS scores (28) (p <0.001, 0.001 and 0.002 respectively). Extraversion trait was negatively correlated with, SJC and DAS-28 scores (p 0.01 & < 0.001 respectively). Psychoticism had non-significant correlation with disease related variables (p>0.05). Physical component total score was negatively correlated with duration of illness, CRP level, VAS, and DAS scores (p <0.001, 0.001, 0.01 and 0.01 respectively). The mental component total score was negatively correlated with duration of illness, CRP, ESR, DAS, and VAS (P<0.001, <0.001, <0.001, <0.05 and 0.01 respectively) (table 3).

Table (3): Spearman correlation between disease-related variables and psychometric measures

Disease variables	Duratio n of illness	CRP	ESR	Positive RF	SJC	TJC	DAS	VAS
	r	r	r	r	r	r	r	r
Hospital anxiety and depression scale								
Anxiety scores	-0.19*	0.03#	0.04#	0.10#	0.03#	0.25*	0.18*	0.16*
Depression scores	0.21*	0.17#	0.10#	-0.51*	0.02#	0.23*	0.49*	0.42*
Eysneck personality inventory								
Neuroticism	0.29*	0.01#	0.03#	0.03#	-0.11 #	0.11#	0.22*	0.30*
Extraversion	0.03#	0.09#	-0.04#	0.16#	-0.27*	-0.05#	-0.34*	-0.57#
Psychoticism	0.14#	-0.19#	-0.66#	0.17#	0.13#	0.12#	0.13#	-0.21#
Quality of life (SF36)								
Physical function	-0.23*	-0.33*	-0.19*	-0.09#	-0.05#	-0.21*	-0.28*	-0.22#
Role physical	-0.32*	-0.25*	-0.24*	-0.12#	-0.03#	-0.10#	-0.30*	-0.32*
Pain	0.14#	-0.28*	-0.20*	0.02#	-0.09#	-0.14#	-0.14#	-0.38*
General health	-0.24*	-0.36*	-0.32*	0.51*	0.08#	0.01#	-0.11#	-0.09#
PCS total score	-0.36*	-0.39*	-0.21*	0.05P#	0.04#	-0.15#	-0.37*	-0.40*
Mental health	-0.16*	-0.21*	-0.07#	0.22#	-0.10#	-0.19*	-0.29*	-0.26#
Role emotional	-0.31*	-0.34*	-0.29*	-0.01#	0.04#	-0.14#	-0.22#	-0.11#
Social activity	-0.19*	-0.32*	-0.14#	-0.08#	0.03#	0.06#	-0.19#	-0.25#
Vitality /energy	-0.23*	-0.24*	-	0.32*	0.32*	-0.07#	-0.25#	-0.09#
MCS total score	-0.31*	-0.44*	-27*	0.18#	0.05#	-0.14#	-0.31*	-0.36*

R= spearman correlation # p > 0.05 *: significant PCS= physical component summary MCS mental component summary.

Neuroticism traits had significant negative correlation with all subscales of physical component of quality of life. Extraversion traits had significant negative correlation with physical function domain (p 0.02). Psychoticism traits had significant negative correlation with body pain and general health domain (p 0.01 & < 0.001 respectively). Neuroticism traits had a significant negative correlation with mental component (MCS) (p 0.01), emotional wellbeing (p < 0.001), role restriction due to emotional issue (p 0.01) (table 4).

Table (4): Correlation between quality of life parameters and Eysenck personality traits

QOL (SF36)		Neuroticism		Extraversion		Psychoticism	
		R	P	R	P	R	P
Physical component summary (PCS)	Physical functions	-0.27	<0.001	-0.17	0.01	0.13	0.113
	Role physical	-0.25	<0.001	-0.06	0.466	0.11	0.180
	Body pain	-0.21	0.001	-0.06	0.466	-0.71	0.01
	General health	-0.32	<0.001	-0.02	0.808	-0.24	0.001
	PCS (total)	-0.26	<0.001	-0.08	0.330	0.13	0.113
Mental component summary (MCS)	Emotional well being	-0.21	0.001	-0.03	0.715	0.10	0.223
	Role emotional	-0.18	0.01	-0.02	0.808	0.06	0.466
	Social function	-0.12	0.143	-0.11	0.180	0.07	0.395
	Vitality/ Energy	-0.08	0.330	-0.02	0.808	-0.03	0.715
	MCS (total)	-0.19	0.01	-0.05	0.543	0.12	0.143

Neuroticism and psychoticism traits were positively correlated with the severity of both anxiety (p < 0.001, 0.01 and depression (p < 0.001, 0.01). On the other hand, extraversion traits were negatively correlated with depression severity (p 0.01). There was significant negative correlation between physical and mental component of quality-of-life domain and severity of anxiety and depression.

Multivariate regression analyses were conducted to examine the relationships between quality of life (PCS & MCS) and various potential predictors. Predictors of (PCS), after controlling other variables, pain severity (coefficient B= -0.31, p 0.002) and depression (coefficient B= -0.25, p 0.01) were an independent negative predictor of poor physical health component of quality of life, followed higher disease activity (coefficient B= -0.20, p 0.02), and duration of illness (coefficient B= -0.19, p 0.02) (table 5).

Table (5): Multivariate regression analysis for independent predictors of physical component of quality of life.

Variables	SE	Standardized coefficient β	P value	CI	
				Lower	Upper
Duration	1.02	-0.19	0.02	-4.40	-0.37
CRP	0.35	-0.05	0.60	-0.87	0.51
ESR	1.27	-0.005	0.96	-2.45	-2.58
DAS(28)	0.26	-0.21	0.02	-1.33	-0.30
VAS	2.01	-0.31	0.003	7.45	-0.21
HAD (anxiety scores)	1.32	-0.015	0.20	-2.61	3.12
HAD (depression scores)	1.33	-0.25	0.01	-6.09	-0.83
Neuroticism traits	1.0	-0.15	0.10	-3.64	0.33

Predictors of MCS, after controlling other variables, depression was a unique negative predictor of the low life quality component related to mental health, (coefficient B=-0.42, p< 0.001) followed by anxiety (coefficient B=-0.38, p< 0.001), illness span (coefficient B=-0.17, p 0.03), and pain severity (coefficient B=-0.34, p0.04) (table 6).

Table (6): Multivariate regression analysis for independent predictors of mental component of quality of life

Variables	SE	Standardized coefficient β	P value	CI	
				Lower	Upper
Age	0.61	-0.17	0.046	-2.45	-0.03
Duration	0.94	-0.17	0.03	-3.92	-0.21
CRP	0.90	-0.15	0.09	-3.36	0.23
ESR	0.25	-0.12	0.18	-0.83	0.16
DAS(28)	0.16	-0.51	0.3	-8.5	0.21
VAS	1.33	-0.34	0.04	-5.44	0.45
HAD (anxiety scores)	1.23	-0.38	<0.001	-6.93	-2.07
HAD (depression scores)	0.32	-0.42	<0.001	-3.36	0.23
Neuroticism traits	2.79	-0.08	0.34	-8.22	-2.83

DISCUSSION

Compared to healthy controls, RA patients experienced significantly lower quality of life. This appears in all domains of quality of life donating the negative impact of rheumatoid arthritis disease on the quality of life. This was consistent with other studies conducted in Egypt and abroad ^(14, 15,16). On the other hand, **Martinec et al.** ⁽²⁾ found no statistically significant difference between RA patients & general population despite showing limitations in pain, physical and social functioning items. Impairment of all HR-QoL domains was demonstrated in this study in RA patients. PCS total score was minimally lower than the MCS total score. Role physical was the most affected domain. This approximation in the mental and physical component scores is explained by devastating effect of arthritis on HR QoL and the impact of psychiatric morbidity of MCS. Pain severity, disease activity & disease duration were the main items associated with QoL. **Martinec et al.** ⁽²⁾ also found significant correlation between pain & disability.

GAD was found in 23% of RA patients and MDD in 14% of the patients. **Nebhinani et al.** ⁽¹⁷⁾ in their study that was conducted on 40 RA cases, 60% of patients were found to have psychiatric problems, with depression being the most prevalent (52.5%). Anxiety was found in some studies to be more prevalent than

depression. Our results were lower than other studies, which showed significantly higher levels (21% to 70%) of anxiety in RA ⁽⁷⁾. Also, depression varied from 14% to 64% ⁽¹⁸⁾. This is because we used SCIDI interview, which is based on DSMIV diagnostic criteria, however most of the researches depend on the screening's scales only as depression anxiety stress scale and HAD scale. **Machin et al.** ⁽¹⁹⁾ conducted an investigation of the relationship between anxiety, disease activity, and quality of life in RA. They found significant effects of anxiety on disease activity & QoL especially in early RA & recommended that improving comorbid anxiety recognition & management will help in improving outcomes in RA patients ⁽¹⁹⁾. Pain severity was positively correlated with anxiety severity. This can be explained by recurrent RA attacks create conditioned emotional response in which pain is the trigger of anxiety physiological response. Positive correlation between disease duration and depression was shown in this work. This can be explained by mechanism of learned helplessness that makes patients suffer more from depression ⁽²⁰⁾. Also, high stress levels in our community related to older age as death of spouse, marriage of children, and financial stressors together with disease process itself and its medications may increase risk for depression.

Disease activity correlated positively with depression in this work, which comes in accordance to

several previous studies^(5, 20). This finding can be attributable to increased levels of pro-inflammatory cytokines in RA that might signal sickness behaviour by brain as weakness, lethargy and inability to concentrate⁽²¹⁾. In the present study, three personality traits were assessed where neuroticism traits were significantly higher in rheumatoid patients than healthy control, but we cannot conclude that RA increases expression of neuroticism traits or the neuroticism traits make patient more vulnerable to illness. In explaining how personality factors affect the emergence of the disease, 3 main mechanisms were introduced: indirect effects through behaviors and bad habits, searching for unhealthy environmental and social situations and direct effects from physiological mechanisms. It may even affect disease course and management⁽²²⁾. An interesting question is whether the personality traits changes as a result of having and adapting to chronic condition or it remain stable over time especially in age group involved in this study. Unfortunately, our study is not a longitudinal one, which can answer this question, but we found strong correlation between neuroticism traits and duration of illness. It is worth mentioned that personality changes due to physiological consequences of a medical conditions is one of diagnostic categories of personality disorders (code F07.0 in ICD10CM; code 3.17 in DSMV).

Neuroticism trait in our patients was found to be related to higher pain and disease activity scores. Chronic inflammatory conditions usually is associated with neuroticism traits rather than conscientiousness as these patients usually exaggerate pain⁽²³⁾. Extraversion traits were associated with lower disease activity DAS-28 scores. This association can be mediated through less vulnerability to stress in extraverted persons and protective effect of extraversion traits against development of depression. In the present study neuroticism and psychoticism traits were positively correlated with severity of anxiety and depression. Neurotic people tend to have chronic anxiety and avoid negative situations. Avoidance behavior is essential for persistence of fears and anxiety⁽²⁴⁾. Extraversion personality trait had a negative correlation with severity of depression. In present study, our hypothesis was that personality traits especially neuroticism will affect the QoL of rheumatoid patients and this was supported by our finding. People who score highly on neuroticism tend to be more sensitive to environmental stress and respond poorly to it, and had more anxiety and depressed feelings⁽¹²⁾, which in turn result in poor quality of life. Also, personality characteristics was found to affect disease impact on patients & patients' adjustment to it⁽²⁴⁾. In a study done by **Leon et al.**⁽²⁵⁾, personality traits were found to affect even acceptance or rejection of aggressive therapy. In their study, neuroticism trait was the only associated with refusal of more aggressive treatment. In 2020, **Ko et al.**⁽³⁾ examined whether different personality traits affect medication adherence in RA patients & applied a

validated self-report questionnaire. In their study, better psychosocial health was found to be associated with extraversion & agreeableness personality traits while poorer one was associated with neuroticism. The present study revealed significant negative correlation between duration of illness and both PCS and MCS scores, where longer duration was associated with greater impairment. This was consistent with **Chiu et al.**⁽²⁶⁾.

In the current investigation, poor physical and mental components were linked to increased disease activity and pain intensity. This may be explained by the close correlation between disease activity score and the degree of joint degeneration and inflammation. These results are in line with some research, where it was found that disease activity was associated to both the physical and psychological aspects of HR QoL. In other investigations, disease activity rather than mental health was revealed to be a factor of physical disability⁽²⁾.

Multivariate regression analysis was used to assess independent predictors of physical and mental components of QoL where pain severity, depression, and longer duration of illness were negative predictors of both physical and mental components of QoL. However, high disease activity predict physical HR-QoL and anxiety severity predict mental HR-QoL. Pain severity was a strong negative predictor of physical and mental HR-QoL. This finding is in line with previous studies⁽²⁷⁾. This rise the question if the available treatment for pain is sufficient from the patient perspective. Depression was a poor predictor of QoL in terms of both physical and mental health. This is consistent with both our hypothesis and earlier reports⁽²⁸⁾. This finding highlighted the significance of diagnosing and treating depression in RA patients. An independent predictor for both physical and mental health-related QoL was a longer illness duration. This was in agreement with **Bae et al.**⁽²⁹⁾, who discovered that higher levels of pain, sadness, and disease duration predict health-related quality of life.

The physical-health related QoL was significantly predicted by high disease activity. This was consistent with previous studies⁽²⁷⁾. Anxiety severity was a negative predictor for mental health-related QoL. More depressive and anxiety symptoms were independently associated with lower disease-specific QoL⁽³⁰⁾. Lastly personality traits especially neuroticism traits, age, ESR, CRP levels were not an independent predictor of HR-QoL.

Limitations:

Being cross sectional correlation study, we cannot explore the cause-and-effect relationship between different psychosocial and disease related variables and their impact on HR-QoL. Our study did not include patients with severe devastating rheumatoid arthritis with extra articular manifestation. Those patients may need intense care from both

rheumatologist and psychiatrist. Also, we did not assess psychosocial stressors.

CONCLUSION

The most prominent personality traits in RA patients were neuroticism traits. Although high neuroticism traits were strongly related to poor physical and mental component of QoL, when multivariate regression analysis was conducted, neuroticism traits were not an independent predictor of HR-QoL in RA. This means that it affects RA patient's quality of life indirectly through: increased vulnerability to stressors, increased severity of depression and anxiety, and lastly it affects the individual perception of illness, self-management, adherence to treatment and course of disease itself. All these data suggest multidisciplinary approach for RA management with involvement of psychiatrist and social worker besides the rheumatologist. It also emphasizes the usefulness of offering mindful interventions (e.g., cognitive behavioral therapy) when tailoring treatment plan & to focus on improving functional ability, social interactions, positive emotional responses and relieving pain. Also screening tools for psychosocial variables should be used routinely in rheumatology outpatient clinic for better management and better quality of life.

Abbreviations:

RA: Rheumatoid arthritis	VT: vitality	RF: Rheumatoid Factor	VAS: Visual Analogue Scale
WHO: World Health Organization	PF: physical functioning	MH: mental health	PHC: Physical Health Component
HR-QoL: health-related Quality of Life	BP: bodily pain	SPSS: Statistical Package of Social Science	PHC: Physical Health Component
SF-36: 36-Item Short Form Health Survey	SF: social functioning	PCS: Physical Component summary	MDD: major depressive disorder
DAS 28: Disease Activity Score	GH: general health	MCS: Mental Component summary	GAD: Generalized anxiety disorders
ESR: Erythrocyte Sedimentation Rate	RP: role-physical	EPI: Eysneck personality inventory	QoL: Quality of Life
SCID-I: Structured clinical interview axis I	RE: role-emotional	TJC: Tender Joint Count	SJC: Swollen Joint Count
HADS: Hospital Anxiety and Depression Scale			

DECLARATIONS

- **Availability of data and materials:** On request, the data will be made available.
- **Competing interests:** The authors stated that they have no interests in conflict.
- **Funding:** For their research, writing, and/or publication of this work, the authors got no financial funding.

We certify that all authors have given their consent for the work to be submitted

REFERENCES

1. **Maria I, Genessis M, Roberto G et al. (2020):** Functional Disability and Its Determinants in Ecuadorian Patients with Rheumatoid Arthritis. *Rheumatol.*, 12: 97-104.
2. **Martinec R, Pinjatela R, Balen D (2019):** Quality of Life in Patients with Rheumatoid Arthritis- A Preliminary Study. *Acta Clin Croat.*, 58: 157-166.
3. **Ko K, Moon S, Koh J et al. (2020):** Contribution of Personality Traits, Psychological Factors, and Health-Related Quality of Life to Medication Adherence in Patients with Rheumatoid Arthritis. *Yonsei Med J.*, 61(5): 406-415.
4. **Suurmeijer F, Van Sonderen, Krol B et al. (2005):** The relationship between personality, Supportive transactions and support, Satisfaction, and mental health of patients with early rheumatoid. Results from the Dutch part of the Euridiss Study. *Social indicators research*, 73 (2): 179-197.
5. **Covic T, Tyson G, Spencer D et al. (2006):** Depression in rheumatoid arthritis patients: demographic, clinical, and psychological predictors. *Journal of Psychosomatic Research*, 60: 469-476.
6. **Ang D, Choi H, Kroenke K et al. (2005):** Co morbid depression is an independent risk factor for mortality in patients with rheumatoid arthritis. *J Rheumatol.*, 32: 1013-1019.
7. **VanDyke M, Parker J, Smarr K et al. (2004):** Anxiety in rheumatoid arthritis. *Arthritis Care Res.*, 51: 408-412.
8. **Jonathan K, Katherine U (2012):** ACR/EULAR 2010 rheumatoid arthritis classification criteria. *Rheumatology (Oxford)*, 51 (6): vi5-9.
9. **First M, Spitzer R, Gibbon M et al. (2002):** Structured clinical interview for DSM-IV axis I disorders, Research version, Non-Patient Edition. (SCID-1/NP) New York: Biometrics research, New York State Psychiatric Institute, New York.
10. **Abdel-Khalek A (1921):** The Arabic manual of the Eysenck Personality Questionnaire (Children a in Arabic. Eysenck and Eysenck ,1975.nd Adults), Translation and Adaption. Alexandria: Dar Al-Maarifa Al-Jamiiyah. <https://pubmed.ncbi.nlm.nih.gov/23045849>
11. **Zigmond A, Snaith R (1983):** The hospital anxiety and depression scale. *Acta Psychiatr Scand.*, 67: 361-370.
12. **Malasi T, Mirza I, El-Islam M (1991):** Validation of the Hospital Anxiety and Depression Scale in Arab patients. *Acta Psychiatr Scand.*, 84: 323-326.
13. **Walters S (2004):** Sample size and power estimation for studies with health-related quality of life outcomes: a comparison of four methods using the SF-36. *Health Qual Life Outcomes*, 2: 26.

14. **Gamal R, Mahran S, Abo El Fetoh N et al. (2016):** Quality of life assessment in Egyptian rheumatoid arthritis patients: Relation to clinical features and disease activity. *The Egyptian Rheumatologist*, 8 (2): 65-70.
15. **Suh C, Lee K, Kim J et al. (2022):** Factors affecting quality of life in patients with rheumatoid arthritis in South Korea: a cross-sectional study. *Clin Rheumatol.*, 41 (2): 367-375.
16. **Rahman M, Khasru M, Rahman M et al. (2022):** Quality of Life Assessment by SF-36 among the Patients with Rheumatoid Arthritis. *Mymensingh Med.*, 31 (3): 586-591.
17. **Nebhinani N, Mattoo S, Wanchu A (2022):** Quality of Life, Social Support, Coping Strategies, and Psychiatric Morbidity in Patients with Rheumatoid Arthritis. *J Neurosci Rural Pract Jan.*, 13 (1): 119-122.
18. **Dougados M, Soubrier M, Antunez A et al. (2014):** Prevalence of co morbidities in rheumatoid arthritis and evaluation of their monitoring results of international cross sectional study (CONRA). *Ann Rheum Dis.*, 73:62-68.
19. **Machin A, Babatunde O, Haththotuwa R et al. (2020):** The association between anxiety and disease activity and quality of life in rheumatoid arthritis: a systematic review and meta-analysis. *Clin Rheumatol.*, 39 (5): 1471-1482.
20. **Margaretten M, Yelin E, Imboden J et al. (2009):** Predictors of depression in a multiethnic cohort of patients with rheumatoid arthritis. *Arthritis Care and Research*, 61: 1586-1591.
21. **Dantzer R (2001):** Cytokine-induced sickness behavior: mechanisms and implications. *Annals of the New York Academy of Sciences*, 933: 222-234.
22. **Erlen J, Stilley C, Bender A et al. (2011):** Personality traits and chronic illness: A comparison of individual with psychiatric, coronary heart disease and HIV/AIDS diagnoses. *Appl Nurs Res.*, 24 (2): 74-81.
23. **Sutin A, Terraciano A, Deiana B et al. (2010):** High neuroticism and low conscientiousness are associated with Interleukin 6. *psychological medicine*, 40: 1485-1493.
24. **Santos E, Duarte C, Ferreira R et al. (2019):** Multifactorial explanatory model of depression in patients with rheumatoid arthritis: a structural equation approach. *Clin Exp Rheumatol.*, 37: 641-8.
25. **Leon L, Redondo M, Garcia-Vadillo A et al. (2016):** Influence of patient personality in the treatment of rheumatoid arthritis. *Rheumatol Int.*, 36 (11): 1549-1555.
26. **Chiu Y, Lai M, Lin H, et al. (2014):** Disease activity affect all domains of quality of life in patients with rheumatoid arthritis and is modified by disease duration. *Clinical and experimental rheumatology*, 32 (6): 0898-0903.
27. **Alishiri G, Bayat N, Fathiashtiani A et al. (2008):** Logistic regression models for predicting physical and mental health-related quality of life in rheumatoid arthritis patients. *Modern Rheumatology*, 18 (6): 601-608.
28. **Bazzichi L, Maser J, Piccinni A et al. (2005):** Quality of life in rheumatoid arthritis: Impact of disability and lifetime depressive spectrum symptomatology. *Clinical and Experimental Rheumatology*, 23 (6): 783-788.
29. **Bae S, Cho, Soo-Kyng et al. (2009):** Predictors of quality of life in rheumatoid arthritis patients. *Arthritis and rheumatism*, 60: 16-21.
30. **Roger H, Brotherton H, Plaza S, et al. (2015):** Depressive and anxiety symptoms and social support are independently associated with disease specific quality of life in Colombian patients with rheumatoid arthritis. *Rev Bras Rheumatol.*, 55 (5): 406-413.