REVISTA BRASILEIRA DE REUMATOLOGIA

Original article

Sensitivity and specificity of assessment instruments of quality of life in rheumatoid arthritis

Silvana Almeida Ribas[a], Selena Dubois Mendes[a], Laís Bittencourt Pires[a], Rafaela Brito Viegas[a], Israel Souza[b], Maurício Barreto[a], Martha Castro[a], Abrahão Fontes Baptista[c], Katia Nunes Sá[a],*

[a] Escola Bahiana de Medicina e Saúde Pública, Salvador, BA, Brazil
[b] Instituto Federal de Educação, Ciência e Tecnologia do Rio de Janeiro (IFRJ), Rio de Janeiro, RJ, Brazil
[c] Universidade Federal da Bahia (UFBA), Salvador, BA, Brazil

ARTICLE INFO

ABSTRACT

Objective: To check sensitivity and specificity of assessment instruments of QoL in patients with rheumatoid arthritis (RA).

Methodology: Accuracy study in a sample consisting of patients with confirmed diagnosis of RA. QoL questionnaires QV SF-36 (Gold Standard), HAQ and NHP were applied. The Pearson correlation coefficient, ROC curve, AUC and Youden Index (J) were used to analyze the data.

Results: This study enrolled 97 individuals with RA. The functional capacity estimated by SF-36 was correlated with the total score of HAQ ($r = -0.666$; $p < 0.001$; $J = 0.579$), while the emotional aspects of SF-36 were correlated with the emotional reactions domain of NHP ($r = -0.316$; $p = 0.005$; $J = 0.341$). The vitality domain of SF-36 was correlated with the level of energy of NHP ($r = -0.362$; $p = 0.001$; $J = 0.302$). For the evaluation of functional capacity (AUC = 0.839; $p < 0.001$) and physical aspect (AUC = 0.755; $p < 0.001$) the most accurate instrument was the HAQ. For evaluation of the impact of vitality, sleep (AUC = 0.679; $p = 0.007$), emotional reactions (AUC = 0.674; $p = 0.009$) and level of energy in QoL, the NHP (AUC = 0.633; $p = 0.045$) was the most specific and sensitive. In the evaluation of the emotional aspect domain, the most accurate instrument was the NHP in the "emotional reaction" score (AUC = 0.699; $p = 0.003$). The evaluation of pain was limited in the three instruments and SF-36 was the only one in assess of the domains of social aspects and general health status.

Conclusion: For evaluation of the physical aspects in patients with RA, the HAQ is the most accurate. For evaluation of emotional aspects the NHP is the most indicated, although the SF-36 was the only one in the evaluation of general domains.

* Corresponding author.
E-mail: katia.sa@gmail.com (K.N. Sá).

Sensibilidade e especificidade dos instrumentos de avaliação da qualidade de vida na artrite reumatoide

R E S U M O

Palavras-chave:
Artrite reumatoide
Acurácia
Questionários
Qualidade de vida
Avaliação

Objetivo: Verificar a sensibilidade e a especificidade dos instrumentos de avaliação da qualidade de vida em pacientes com artrite reumatoide (AR).

Metodologia: Estudo de acurácia em uma amostra de pacientes com diagnóstico confirmado de AR. Aplicaram-se os questionários de QV SF-36 (padrão ouro), HAQ e NHP. Usaram-se o coeficiente de correlação de Pearson, a curva ROC, a ASC e o índice de Youden (J) para analisar os dados.

Resultados: Este estudo envolveu 97 indivíduos com AR. A capacidade funcional estimada pelo SF-36 esteve correlacionada com a pontuação total do HAQ ($r = -0,666$; $p < 0,001$; $J = 0,579$), enquanto o aspecto emocional do SF-36 esteve correlacionado com o domínio reação emocional do NHP ($r = -0,316$; $p = 0,005$; $J = 0,341$). O domínio vitalidade do SF-36 esteve correlacionado com o nível de energia do NHP ($r = -0,362$; $p = 0,001$; $J = 0,302$). Para a avaliação da capacidade funcional (ASC = 0,839; $p < 0,001$) e aspecto físico (ASC = 0,755; $p < 0,001$), o instrumento mais preciso foi o HAQ. Para a avaliação do impacto da vitalidade, do sono (ASC = 0,679; $p = 0,007$), da reação emocional (ASC = 0,674; $p = 0,009$) e do nível de energia na QV, o NHP (ASC = 0,633; $p = 0,045$) foi o instrumento mais específico e sensível. Na avaliação do domínio aspecto emocional, o instrumento mais preciso foi o NHP no domínio reação emocional (ASC = 0,699; $p = 0,003$). A avaliação da dor foi limitada nos três instrumentos e o SF-36 foi o único a avaliar os domínios aspecto social e estado geral de Saúde.

Conclusão: Para a avaliação do aspecto físico em pacientes com AR, o HAQ é o instrumento mais preciso. Para a avaliação do aspecto emocional, o NHP é o mais indicado, embora o SF-36 seja o único a avaliar domínios gerais.

Introduction

Rheumatoid arthritis is an autoimmune disease, of unknown etiology, characterized by symmetrical peripheral polyarthritis. This leads to joint deformity and destruction resulting from bone and cartilage erosion,[1,2] and almost always leads to functional compromise of the structures involved.[3,4] Epidemiological studies have estimated the prevalence of RA at 1% of the adult population, ranging from 0.4 to 1.9% at world level, and from 0.5 to 1.0% in Brazil.[5,6] RA affects three times as many women as men, with the highest incidence between the ages of 30 and 50 years.[7,8]

The majority of patients will have their independence affected to variable degrees, and take ill at a productive age, thus generating limitations on social, leisure and professional activities.[1,9–11] The main symptoms of patients with RA are intense pain and functional limitation, with significant impact on quality of life (QoL).[12–14] The main objectives in the treatment of patients with RA are to prevent or control articular lesions, prevent the loss of function and diminish pain, in an endeavor to improve their quality of life.[2]

Because this is a chronic disease, the outcome expected must not be evaluated by traditional epidemiological measures alone, and therefore, the impact of the disease on QoL has been adopted to improve outcome measurements.[15,16] The use of specific tools for this purpose is most valuable[17] and various instruments have been proposed in order to detect changes in the state of health over the course of time, in addition to evaluating the prognosis, risks and benefits of a certain therapeutic intervention.[5] Among the instruments most used for making this evaluation, the Medical Outcomes Study, 36-Item Short-Form Health Survey (SF-36), Stanford Health Assessment Questionnaire (HAQ) and the Nottingham Health Profile (NHP) are the most outstanding. However, it is not clear which of these is most recommended for evaluating the different aspects of QoL in patients who suffer from chronic problems resulting from RA.

The SF-36 is a multidimensional, generic questionnaire, which has been shown to be suited to the socioeconomic and cultural conditions of the Brazilian population in patients with RA.[18] Because it is the instrument most adopted in studies at world level by recommendation of the World Health Organization (WHO), it is considered the Gold Standard in the evaluation of QoL.[19] The NHP is a generic instrument for evaluation the QoL of persons with different chronic diseases, but it has been widely used in patients with RA.[20] The HAQ is a questionnaire specifically for RA, with the purpose of quantifying the impact of the disease on the daily functions of individuals.[21,22] It measures the level of difficulty the patient presents in performing activities, as well as the need for assistance.[4,12,23]

The use of these questionnaires allows one to understand the impact of the disease on the individual's life from his/her perception, and not only according to structural and functional markers. In spite of the instruments containing closed questions, they were developed from relevant data related by persons who suffer from the disease. All the instruments

generate scores that have been validated and are determinant for the evaluation of QoL.[15,21] However, each instrument evaluates different aspects of QoL and the choice for application in clinical practice and observational studies, and for responses to differences sometimes becomes random. Therefore, the aim of the present study was to verify the sensitivity and specificity of the instruments used in the assessment of QoL in patients with RA.

Materials and methods

The present accuracy study was conducted in individuals with RA, diagnosed in accordance with the criteria of the American College of Rheumatology,[5] who came from a Reference Outpatients Clinic for the Treatment of Collagenoses, in the municipality of Salvador, Bahia, Brazil. Included in the study were individuals with confirmed diagnosis of RA, with a moderate or high level of activity of the disease, of both sexes, and age equal to or over 18 years. Patients were excluded when they presented limitation in understanding the research instruments, and so were those who presented other associated chronic, degenerative, neurological, orthopedic, pneumological and cardiological diseases, with the potential of being confounding elements.

The patients were contacted by telephone, and data obtained from the clinical record charts were used. Data collection was based on primary data, and was performed in three stages: (1) blood exam; (2) radiographic exam and (3) application of the questionnaires. The participants were directed to a private room, where the objectives of the study and the procedures adopted were explained in a standardized manner. The first two stages constituted the stage of inclusion of the volunteers, in order to determine the level of disease activity. The third stage involved the application of the specific instruments. Data was collected in the period between October 2011 and July 2012.

The research project was approved by the Research Ethics Committee of the Bahiana School of Medicine and Public Health, Protocol No. 002/2011 and was conducted in compliance with all the principles defined by Law Decree 196/96 of the National Health Council with respect to research in human beings. Subjects who agreed to participate, signed the Term of Free and Informed Consent.

To estimate the sample size required to answer the question of the investigation, the following parameters were adopted: standard deviation of 10 for the three curves (HAQ, SF-36 and NHP), error of the estimate of 2 (considering the minimum proximity for the values of the area under the curve) and alpha of 5%. Using the LEE on-line calculator of USP (available at http://www.lee.dante.br/cgi-bin/uncgi/calculo_amostra) it was concluded that 96 individuals would be needed. If application in 10 individuals were considered for each domain of the SF-36, which was considered the gold standard, the estimated sample would be 80 participants. Thus the final sample was estimated at 88 individuals (arithmetic mean of 96 and 80). When calculating a loss of 9 (10%), the sample was increased to 97. From the clinical record chart database of the service, containing 456 registered patients, 97 participants were randomly selected, using a random number table. When the individual

was not available on being contacted, or did not wish to participate, the next number on the table was included in the list of participants until the estimated size was attained.

The sociodemographic characteristics of each individual were evaluated by means of a questionnaire composed of the following information: sex, age, educational level, smoking, alcohol consumption, body mass index (BMI), marital status and socioeconomic class, analyzed by the ABEP criteria of 2008 (Associação Brasileira de Institutos de Pesquisa de Mercado) – a Brazilian market research institute that categorizes socioeconomic conditions into eight classes, from "A1 through to E", in which Class "A1" represents the highest socioeconomic level (best housing qualification and pattern of consumption) and "E", the worst.

Blood was collected to test for the following factors: rheumatoid factor (RF), C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and antinuclear factor (ANF). After this, the radiologic exam was performed, which includes radiographs of the wrists and hands for diagnostic confirmation and identification of the level of disease activity. Only patients with a moderate to high level of disease activity were included, which was evaluated by means of using the DAS-protocol 28.[24]

The questionnaires SF-36 (version 2.0), NHP and HAQ were used to evaluate the QoL. All the instruments were applied in a uniform manner, by the same researchers, and all the recommendations of the authors of the instruments were adopted.[18,20,21] Initially, the quality of life dimensions measured by SF-36 were dichotomized, using the median as cut-off point. Our a priori hypothesis was that we would find positive correlations between the following domains of the SF-36 and NHP: physical aspect (SF-36) and physical abilities (NHP); vitality (SF-36) and energy level (NHP); emotional aspects (SF-36) and emotional reactions (NHP); and social aspect (SF-36) and social interaction (NHP). We also considered that total HAQ score would correlate positively with all the domains of SF-36 and NHP.

Correlation analyses were performed by means of the Pearson linear correlation test and receiver operating characteristic (ROC) curve, area under the curve (AUC) and the Youden Index, which were used to identify which of the instruments would be most specific and sensitive for evaluating QoL in patients with RA. In the Youden Index (J), the best cut-off point was considered that at which the lowest number of incorrect diagnoses (false negative plus false positive) were obtained. The values closest to $J = +1$ were considered the best methods for the evaluation of QoL. If the test did not have a diagnostic value, the index was considered equal to zero ($J = 0$). If the values were between 0 and −1 it was considered that the test was negatively associated with the true diagnosis.[25] The data were analyzed using the statistical software package SPSS, version 21.0, adopting an alpha value of 5% as significant, with the power of the study of 80%.

Results

The research participants were 97 individuals, with predominance of the female sex (92.8%) and mean age of 52.5 ± 11.07 years. The predominant, self-declared skin color was mulatto

Table 1 – Sociodemographic characteristics of patients with rheumatoid arthritis.

Variables n = 97	N Mean	% SD
Gender		
Female	90	92.8
Age	52.5	11.0
Skin color		
White	11	11.3
Red	3	3.1
Black	37	38.1
Mulatto	46	47.4
Social class (ABEP)		
A1	3	3.1
A2	2	2.1
B1	3	3.1
B2	17	17.5
C1	24	24.7
C2	38	39.2
D	10	10.3
Education		
Illiterate (up to 3rd grade)	14	14.4
Up to 4th Grade Primary Schooling	20	20.6
Complete Primary Schooling	19	19.6
Complete High Schooling	34	35.1
Completed College Education	10	10.3
Activity disease level		
Remission	0	0.0
Low	0	0.0
Moderate	31	32.3
High	65	67.7

(47.4%); the social class most frequently cited was C2 (39.2%) and the most frequent educational level was complete secondary education (35.1%) (Table 1). The correlations between SF-36 and the domains of NHP and the total score of HAQ are highlighted in Table 2. In order to detect which of the questionnaires presented the best sensitivity and specificity, ROC curves were built (Fig. 1). Data to describe the area under the curve of each domain NHP and the total score of the HAQ in comparison with the domains of the SF-36 are shown in Table 3.

The dimension theoretically related to the functional capacity of SF-36 (Fig. 1A) was the total score of HAQ, which presented negative correlation in the studied sample ($r = -0.666$; $p < 0.001$) (Table 2). The dimension theoretically related to the physical aspect (Fig. 1B) of SF-36 was the physical ability domain of the NHP, which also presented negative correlation in the studied sample ($r = -0.240$; $p = 0.033$). The dimension theoretically related to the dimension pain (Fig. 1C) of SF-36 was the pain domain of the NHP, which presented no correlation with the SF-36 in the studied sample ($r = 0.210$; $p = 0.063$) (Table 2). As was observed in the correlation tests, none of the variables presented a significant area below the curve. There are no dimensions of HAQ or NHP theoretically related to the general health status (Fig. 1D) of the SF-36. Similarly, in the studied sample, none of the domains of these scales presented correlation with this domain of SF-36. The dimension theoretically related to vitality (Fig. 1E) of SF-36 was the level of energy of the NHP, which presented negative correlation in the studied sample ($r = -0.362$; $p = 0.001$) (Table 2). The dimension theoretically related to the social aspect (Fig. 1F) of SF-36 was the social interaction domain of the NHP, which presented positive correlation in the studied sample ($r = 0.305$; $p = 0.006$), however in the opposite direction to that expected. The dimension theoretically related to the emotional aspect (Fig. 1G) of SF-36 was the emotional reactions domain of the NHP, which presented negative correlation in the studied sample ($r = -0.316$; $p = 0.005$). There are no dimensions of HAQ or NHP theoretically related to the mental health domain (Fig. 1H) of the SF-36. However, all the scales of the NHP and the HAQ total score also presented correlation with the mental health of the SF-36 in the studied sample (Table 2).

Discussion

This study sought to verify the sensitivity and specificity of three of the most used tools in assessing the Quality of Life in patients with rheumatoid arthritis. Using the SF-36 as the gold standard, each of its domains was compared with the HAQ total score and with the different dimensions of the NHP. The results showed that the relationships expected and confirmed in the analyses were as follows: "functional capacity"

Table 2 – Correlation between the domains of the "NHP" and "HAQ" in relation of the SF-36.

SF-36 domains	Domains of the NHP Level of energy		Pain		Emotional reaction		Sleep		Social interaction		Abilities HAQ score Physical			
	r	p	r	p	r	p	r	p	r	p	r	p	r	p
Functional capacity	−0.58	<0.01	−0.59	<0.01	0.31	<0.01	−0.20	0.07	−0.19	0.08	−0.63	<0.01	−0.66	<0.01
Physical aspect	−0.40	<0.01	−0.031	<0.01	−0.24	0.02	−0.07	0.53	−0.19	0.08	−0.24	<0.01	−0.43	<0.01
Pain	0.07	0.49	0.21	0.06	0.15	0.17	0.02	0.81	0.07	0.52	−0.05	<0.60	0.02	<0.80
General health status	−0.06	0.57	−0.09	0.42	−0.14	0.20	0.22	0.05	0.05	0.65	−0.05	<0.61	−0.14	<0.20
Vitality	−0.36	<0.01	−0.29	<0.01	−0.39	<0.01	−0.28	0.01	−0.16	0.15	−0.24	<0.03	−0.26	<0.01
Social aspect	0.03	0.78	−0.19	0.08	0.12	0.28	−0.15	0.17	0.30	<0.01	0.02	<0.85	−0.05	<0.62
Emotional aspect	−0.16	0.15	−0.04	0.68	−0.31	<0.01	−0.03	0.79	−0.36	<0.01	−0.16	<0.14	−0.18	<0.09
Mental health	−0.30	<0.01	−0.32	<0.01	−0.63	<0.01	−0.23	0.04	−0.43	<0.01	−0.22	<0.04	−0.34	<0.01

NHP, Nottingham Health Profile; HAQ, Stanford Health Assessment Questionnaire; SF-36, Short Form-36 item.
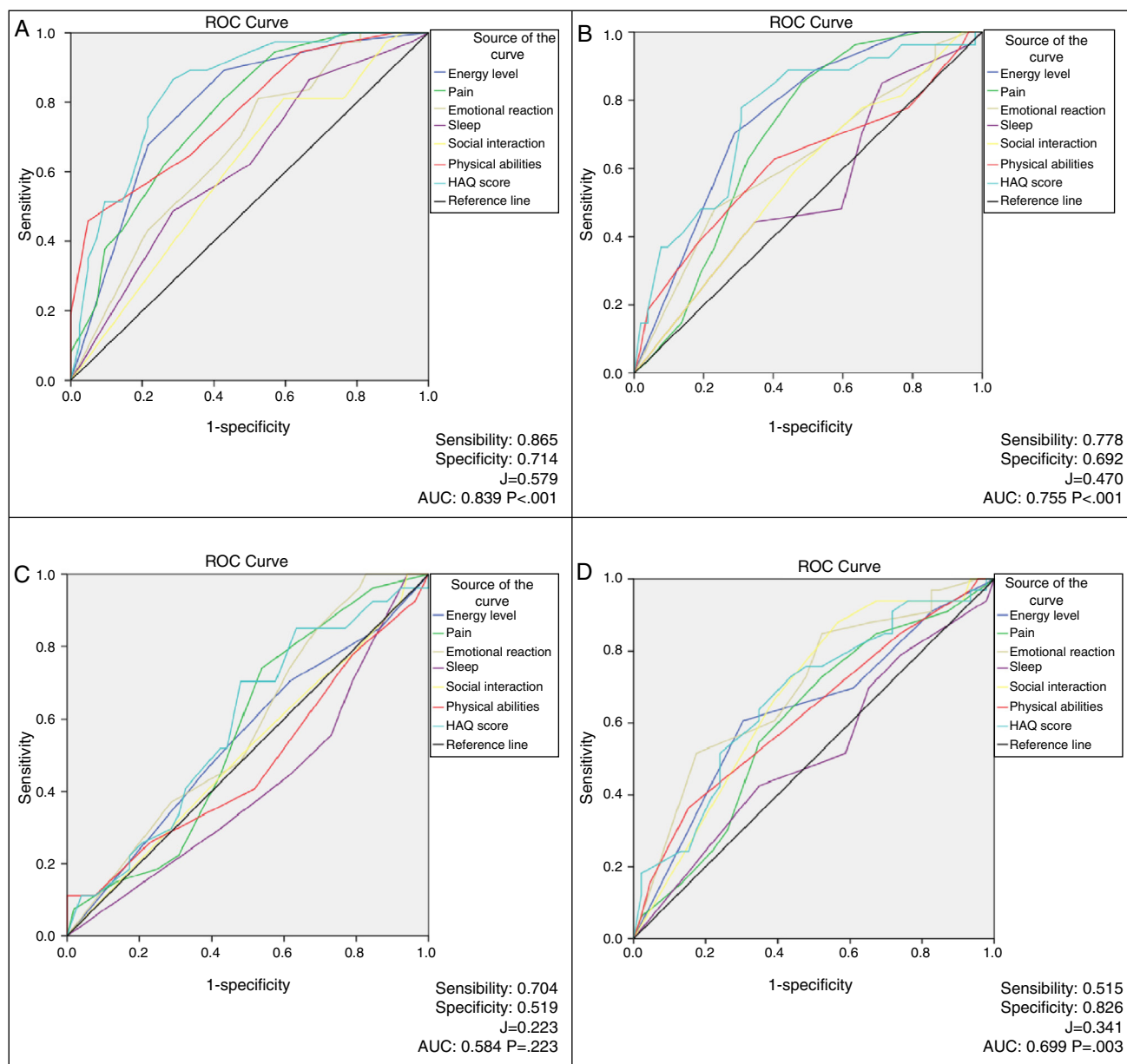
Fig. 1 – Curves ROC for sensibility and specificity measure of instruments to assess quality of life in rheumatoid arthritis individuals. (A) Functional capacity domain; (B) physical aspect domain; (C) general health domain; (D) emotional aspect domain.

with the "HAQ Total Score"; "emotional aspect" with "Emotional Relationships" of the NHP; and "vitality" with the "level of energy" of the NHP.

Both generic and specific instruments are important for studying the health-related aspects of quality of life in rheumatoid arthritis. Generic instruments, such as the SF-36 and NHP may allow comparison with other groups of individuals, however, they may have low sensitivity to the changes in follow-up studies.[20] Whereas, specific instruments, such as the HAQ are more sensitive to changes in health status, however, their results may not be compared with the results of other groups.[26]

The majority of the sample of this study was made up of women (9:1) and was similar to the findings of various studies

that involved persons with RA in Latin American Countries.[4,27] However, it differed from the findings of American studies, which revealed a ratio of 3:1[1,9,28,29] and European, of 2:1.[17] The demographic characteristics may have influenced these results, as there is still a scarcity of Brazilian results.[10,30] Latin American countries present very complex demographic aspects with a highly miscegenated population, and elevated diversity of genetic expression.[1,27] Women also have less propensity to attain remission after treatment.[10] The mean age of our patients was similar to that found in other studies of populations with RA.[8,14,15,31] The majority of the patients in this study presented a low socioeconomic and educational level, which are data compatible with those of the studies of Corbacho[14] and Costa.[4] The similarity to populations of other

Variables		Area	p
Functional capacity	Level of energy	0.786	<0.001
	Pain	0.767	<0.001
	Emotional reaction	0.671	0.009
	Sleep	0.621	0.064
	Social interaction	0.604	0.111
	Physical abilities	0.771	<0.001
	HAQ score	0.839	<0.001
Physical aspect	Level of energy	0.751	<0.001
	Pain	0.699	0.004
	Emotional reaction	0.625	0.069
	Sleep	0.536	0.598
	Social interaction	0.575	0.273
	Physical abilities	0.618	0.087
	HAQ score	0.755	<0.001
Pain	Level of energy	0.493	0.922
	Pain	0.365	0.051
	Emotional reaction	0.411	0.196
	Sleep	0.446	0.435
	Social interaction	0.402	0.154
	Physical abilities	0.479	0.764
	HAQ score	0.476	0.733
Vitality	Level of energy	0.633	0.045
	Pain	0.612	0.091
	Emotional reaction	0.674	0.009
	Sleep	0.679	0.007
	Social interaction	0.498	0.980
	Physical abilities	0.566	0.323
	HAQ score	0.583	0.210
Social aspect	Level of energy	0.477	0.770
	Pain	0.576	0.332
	Emotional reaction	0.467	0.670
	Sleep	0.571	0.359
	Social interaction	0.416	0.282
	Physical abilities	0.471	0.713
	HAQ score	0.531	0.687
Emotional aspect	Level of energy	0.631	0.048
	Pain	0.605	0.113
	Emotional reaction	0.699	0.003
	Sleep	0.518	0.788
	Social interaction	0.675	0.008
	Physical abilities	0.628	0.053
	HAQ score	0.671	0.010
Mental health	Level of energy	0.647	0.025
	Pain	0.637	0.037
	Emotional reaction	0.770	0.001
	Sleep	0.631	0.047
	Social interaction	0.653	0.020
	Physical abilities	0.604	0.113
	HAQ score	0.615	0.080

Table 3 – Area under the ROC curve in the domains of SF-36 in comparison with the aspects of NHP and total score of HAQ.

HAQ, Stanford Health Assessment Questionnaire; NHP, Nottingham Health Profile; ROC, Receiver Operating Characteristic Curve; SF-36, Short Form-36 item.

curve, with elevated sensitivity and specificity. This result was expected, since the items of the scale that measures the functional capacity of the HAQ are related to dependence and functional incapacity, and these patients presented important joint damage with loss of function.[18,20] In the study of Ciconelli,[18] the significant correlations occurred between the functional component of the F-36 and the aspects of mobility and pain of the NHP. In the study of Garip,[8] the questionnaire Quality of Life in Rheumatoid Arthritis (RAQol) was compared with the other scales, and it was observed that the RAQol showed high correlation with the HAQ. The HAQ is a tool capable of reflecting the evolutional condition of the disease, objectively evaluating the functional state of patients, and may possibly be useful for following-up the functional response to treatment.[21,32]

With regard to the physical aspect domain of the SF-36, both the physical ability of NHP and the HAQ total score were shown to be efficient in determining the impact of physical limitations caused by RA, allowing any of the three instruments to be used. However, it was the HAQ that presented the largest area under the curve, and is therefore the instrument most indicated for this evaluation. In an accuracy study using the Cedars-Sinai Health-Related Quality of Life for Rheumatoid Arthritis Instrument (CSHQ-RA), the SF-36 and HAQ demonstrated that the items relative to physical incapacity were strongly correlated with the HAQ and the physical component of the SF-36.[33] Our findings are in agreement with the results of the study of Garip,[8] in which all the subgroups of the NHP presented high correlation with the HAQ.

Whereas, in the evaluation of pain, which has specific domains in both SF-36 and NHP, it was not possible to verify any correlation in the sample of this study. The subjectivity of multiple factors involved in the perception of pain in a chronic morbidity such as RA may possibly be limiting factors for the use of these instruments in this evaluation. This result may also be related to the frequent use of modifying drugs, analgesics and strict control of inflammatory activity in these patients during the course of the disease, factors that may influence this domain.[20]

It was also not possible to find any theoretical basis for comparison of the general health status of SF-36 with any scale of the NHP or total score of HAQ. This fact points out the need for elaboration and development of instruments for evaluating this domain in populations with RA. This finding also suggests that care must be taken when using the total score of the instruments, since the domains such as these may influence the final result.

With regard to the vitality aspect of the SF-36, there was high correlation with the item sleep of the NHP, followed by the emotional reaction and level of energy. This finding may be related to the fact that in chronic diseases with incapacitating characteristics, highly linked to depression and anxiety, it is common to find associated sleep disturbances.[20] Patients consider the dimensions energy/vitality and sleep important in the impact on QoL and development of the disease, and this is an advantage with regard to use of the NHP and SF-36 instruments.[26]

For the social aspect dimension, inverse correlation with the social interaction scale of the NHP was verified, which

studies points to the possibility of extrapolating the findings to other samples.

In this study it was possible to observe that in order to evaluate functional capacity, the best instrument was the HAQ total score, which presented the largest area under the ROC

may be influenced by semantic aspects which deserve more in-depth studies. In the study for validation of the SF-36 in the Portuguese language, in patients with RA, higher mean values were found for the components social aspects and mental health.[18] The domain that evaluates social issues has limitations as regards the validity of the clinical application in both instruments.[20]

With regard to the emotional aspect of the SF-36, correlation was found with the emotional reaction scale of the NHP, and this presented a larger area under the curve. This result is consistent with the tendency to present depression and anxiety.[1] Lillegraven and Kvien[26] revealed that the emotional aspect and emotional reaction domains were similar dimensions. A negative correlation was also observed with the social interaction scale (NHP) and the second highest area under the curve, which may clearly be justified, because the patient's emotional state may have an influence on his/her social relationships and make it possible for him/her to have a tendency toward seeking isolation.[20] The three instruments presented good conditions for evaluating this aspect, however, the NHP was the most suitable.

With regard to mental health, the variable that presented the largest area under the curve was emotional reaction (NHP) and this finding corroborates the study of Ciconelli,[18] which demonstrated good correlation between the NHP and SF-36 in this domain.

The results of the present study indicated that many studies must still be developed before indiscriminate use is made of instruments for evaluating the impact on the quality of life in persons who suffer damage to their health. Persons affected by chronic diseases, such as in the case of RA, need to be constantly followed-up, not only as regards the evolution of objective clinical parameters, but mainly with regard to the subject's perception, involving biopsychosocial aspects of the health-disease process.

An important limitation of this study was the absence of a prospective reassessment of participants to estimate sensitivity to change in QoL. This limitation was consequent to the lack of adherence by the participants, which did not want to come back to a second assessment with the same instruments.

The main conclusion of this study is that the three instruments most used in the evaluation of the impact on QoL of the morbidity of RA, validated and available in the Portuguese language of Brazil, namely: SF-36, HAQ and NHP – are useful and should be applied in clinical studies and scientific researches. All of these instruments demonstrated good sensitivity and specificity in the major part of the domains evaluated. However, it is also possible to conclude that for evaluation of physical and subjective aspects, differences in accuracy between them may indicate differentiated choices for their application. For evaluation of the physical aspects in patients with RA, the HAQ is the most accurate. For evaluation of emotional aspects the NHP is the most indicated. SF-36, HAQ and NHP are easy to understand, auto-applicable and quick to fill (<10 min each), and may be used in clinical and research settings. However, the impact of pain on QoL was not well evaluated by any of the instruments tested.

Conflicts of interest

The authors declare no conflicts of interest.

REFERENCES

1. Mota LM, Cruz BA, Brenol CV, Pereira IA, Fronza LS, Bertolo MB, et al. Consensus of the Brazilian Society of Rheumatology for diagnosis and early assessment of rheumatoid arthritis. Rev Bras Reumatol. 2011;51:199–219.
2. Bertolo MB, Brenol CV, Schainberg CG, Neubarth F, Lima FAC, Laurindo IM, et al. Update on the Brazilian Consensus for the diagnosis and treatment of rheumatoid arthritis. Rev Bras Reumatol. 2007;47:151–9.
3. Boyd TA, Bonner A, Thorne C, Boire G, Hitchon C, Haraoui BT, et al. The relationship between function and disease activity as measured by the HAQ and DAS28 varies over time and by rheumatoid factor status in early inflammatory arthritis (EIA). Results from the Catch Cohort. Open Rheumatol J. 2013;7:58–63.
4. Costa GP [dissertação de mestrado] Confiabilidade da autoaplicação do Health Assessment Questionnaire Modificado (HAQ-M) em uma população de portadores de artrite reumatoide no Brasil. Brasília: Faculdade de Medicina da Universidade de Brasília; 2006.
5. Mota LM, Cruz BA, Brenol CV, Pereira IA, Rezende-Fronza LS, Bertolo MB, et al. Consenso 2012 da Sociedade Brasileira de Reumatologia para o tratamento da artrite reumatoide. Rev Bras Reumatol. 2012;52:135–74.
6. Senna ER, Barros ALP, Silva EO, Costa IF, Pereira LV, Ciconelli RM, et al. Prevalence of rheumatic diseases in Brazil: a study using the Copcord approach. J Rheumatol. 2004;31:3.
7. Sorensen J, Linde L, Ostergaard M, Hetland ML. Quality-adjusted life expectancies in patients with rheumatoid arthritis – comparison of index scores from EQ-5D, 15D, and SF-6D. Value Health. 2012;15:334–9.
8. Garip Y, Eser F, Bodur H. Health-related quality of life in rheumatoid arthritis: comparison of RAQoL with other scales in terms of disease activity, severity of pain, and functional status. Rheumatol Int. 2011;31:769–72.
9. Mendes M, Kowalski SC, Ciconelli RM, Ferraz MB. Evaluation of the sociodemographic, clinical-laboratorial and therapeutic profile of rheumatoid arthritis patients who participated of research projects in the Escola Paulista de Medicina in the last 25 years. Rev Bras Reumatol. 2006;46:103–9.
10. Sokka T, Kautiainen H, Pincus T, Verstappen SM, Aggarwal A, Alten R, et al. Work disability remains a major problem in rheumatoid arthritis in the 2000s: data from 32 countries in the QUEST-RA study. Arthritis Res Ther. 2010;12:R42.
11. Chehata JC, Hassell AB, Clarke SA, Mattey DL, Jones MA, Jones PW, et al. Mortality in rheumatoid arthritis: relationship to single and composite measures of disease activity. Rheumatology. 2001;40:447–52.
12. Stanmore E, Oldham J, Skelton DA, O'Neill T, Pilling M, Campbell AJ, et al. Risk factors for falls in adults with rheumatoid arthritis: a prospective study. Arthritis Care Res. 2013;65:1251–8.
13. Aletaha D, Neogi T, Silman AJ, Funovits J, Felson DT, Bingham CO, et al. Rheumatoid arthritis classification criteria: an American College of Rheumatology/European League Against Rheumatism collaborative initiative. Arthritis Rheum. 2010;62:2569–81.
14. Corbacho MI, Dapueto JJ. Avaliação da capacidade funcional e da qualidade de vida de pacientes com artrite reumatoide. Rev Bras Reumatol. 2010;50:31–43.

15. Wolfe F, Michaud K. The loss of health status in rheumatoid arthritis and the effect of biologic therapy: a longitudinal observational study. Arthritis Res Ther. 2010;12:R35.

16. Brandão L, Ferraz MB, Zerbini CAF. Evaluation of quality of life in rheumatoid arthritis. Rev Bras Reumatol. 1997;37:275–81.

17. Groen MM, Klooster PM, Taal E, Laar MAFJ, Glas CAW. Application of the health assessment questionnaire disability index to various rheumatic diseases. Qual Life Res. 2010;19:1255–63.

18. Ciconelli RM, Ferraz MB, Santos W, Meinão I, Quaresma MR. Brazilian-Portuguese version of the SF-36. A reliable and valid quality of life outcome measure. Rev Bras Reumatol. 1999;39:143–50.

19. Campolina AG, Bortoluzzo AB, Ferraz MB, Ciconelli RM. Validation of the Brazilian version of the generic six-dimensional short form quality of life questionnaire (SF-6D Brazil). Ciênc Saúde Coletiva. 2011;16:3103–10.

20. Teixeira-Salmela LF, Magalhães LC, Souza AC, Lima MC, Goulart F. Adaptation of the Nottingham Health Profile: a simple measure to assess quality of life. Cad Saúde Pública. 2004;20:905–14.

21. Fries JF, Spitz PW, Krains RG, Holman HR. Measurement of patient outcome in arthritis. Arthritis Rheum. 1980;23:137–45.

22. Pincus T, Sokka T. Further development of a physical function scale on a MHAQ (corrected) for standard care of patients with rheumatic diseases. J Rheumatol. 2005;32:1432–9.

23. Maska L, Anderson J, Michaud K. Measures of functional status and quality of life in rheumatoid arthritis. Arthritis Care Res. 2011;63:S4–13.

24. Pinheiro GR. Pooled indices to measure rheumatoid arthritis activity – why and how to use them. Rev Bras Reumatol. 2007;47:362–5.

25. Jalali R, Rezaie M. Predicting pressure ulcer risk: comparing the predictive validity of 4 scales. Adv Skin Wound Care. 2005;18:92–7.

26. Lillegraven S, Kvien TK. Measuring disability and quality of life in established rheumatoid arthritis. Best Pract Res Clin Rheumatol. 2007;21:827–40.

27. Mota LM, Laurindo IM, Santos Neto LL. Características demográficas e clínicas de uma coorte de pacientes com artrite reumatoide inicial. Rev Bras Reumatol. 2010;50: 235–48.

28. Smolen JS, Landewé R, Breedveld FC, Dougados M, Emery P, Gaujoux-Viala C, et al. EULAR recommendations for the management of rheumatoid arthritis with synthetic and biological disease-modifying antirheumatic drugs. Ann Rheum Dis. 2010;69:964–75.

29. Cruyssen BV, Durez P, Westhovens R, De Keyser F. Seven-year follow-up of infliximab therapy in rheumatoid arthritis patients with severe long-standing refractory disease: attrition rate and evolution of disease activity. Arthritis Res Ther. 2010;12:R77.

30. Louzada-Junior P, Souza BDS, Toledo RA, Ciconelli RM. Descriptive analysis of the demographical and clinical characteristics of the patients with rheumatoid arthritis in the State of São Paulo, Brazil. Rev Bras Reumatol. 2007;47:84–90.

31. Aktekin LA, Eser F, Baskan BM, Sivas F, Malhan S, Öksüz E, et al. Disability of arm shoulder and hand questionnaire in rheumatoid arthritis patients: relationship with disease activity, HAQ, SF-36. Rheumatol Int. 2011;31:823–6.

32. Bruce B, Fries JF. The Health Assessment Questionnaire (HAQ). Clin Exp Rheumatol. 2005;23 Suppl. 39:S14–8.

33. Chiou CF, Sherbourne CD, Cornelio I, Lubeck DP, Paulus HE, Dylan M, et al. Development and validation of the Revised Cedars-Sinai Health-Related Quality of Life for Rheumatoid Arthritis Instrument. Arthritis Care Res. 2006;55: 856–63.