

LIFE QUALITY EVALUATION USING “TIME TRADE OFF” METHOD FOR RHEUMATOID HANDS

AVALIANDO QUALIDADE DE VIDA DO PACIENTE COM ARTRITE NAS MÃOS PELO MÉTODO “TIME TRADE OFF”

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ABSTRACT

Objective: Rheumatoid arthritis is a prevalent disease in the population (range 0.5% to 1%) and involves both orthopedic and rheumatologic treatment. The Time Trade-Off (TTO) technique, which determines the number of years the patient or the professional would be allowed before a successful procedure in terms of life expectancy and value of the procedure, has been gaining ground in clinical protocols. From this standpoint, we sought to compare evaluations provided by the patients, orthopedists, and rheumatologists in determining the TTO and to correlate their responses with the clinical repercussions using previously established scores such as the Brief Michigan Hand Questionnaire and the Disease Activity Score-28 (DAS-28). **Methods:** A prospective study was conducted that involved 37 patients with rheumatoid arthritis, orthopedists, and rheumatologists. The TTO questionnaire was administered by an independent evaluator for evaluation using the DAS-28 and the Brief Michigan Hand Questionnaire. **Results:** The descriptive analysis revealed similar medians between the orthopedists, rheumatologists, and patients for single assessments. However, there was a weak correlation between the results from the patient and rheumatologist, the patient and Brief Michigan Questionnaire, and those of the orthopedic surgeon and the DAS-28. **Conclusion:** Similar median values demonstrated equivalent TTO among the orthopedist, rheumatologist, and patient. However, given the weak correlations between the scores, it was not possible to substitute results using a single evaluation scale. **Level of Evidence II, Prognostic Studies.**

Keywords: Arthritis, Rheumatoid/surgery. Hand/surgery. Quality of life. Surveys and Questionnaire.

RESUMO

Objetivo: Artrite reumatoide é uma doença prevalente na população (0,5% a 1%), envolvendo tratamento tanto ortopédico, quanto reumatológico. A técnica do “Time Trade Off”, que determina a quantidade de anos que o paciente ou o profissional daria para ter sucesso absoluto em determinado procedimento, vem ganhando espaço nos protocolos modernos. Diante disto, comparamos a avaliação dada pelo paciente, pelo ortopedista e pelo reumatologista usando “Time Trade Off” e correlacionamos com repercussão clínica e escores já estabelecidos: Brief Michigan Questionnaire (Anexo I) e Disease Activity Score-28 (DAS-28) (Anexo II). **Métodos:** Estudo prospectivo com 37 pacientes diagnosticados com artrite reumatoide, que foram submetidos ao questionário “Time Trade Off” pelo ortopedista, pelo reumatologista e por um avaliador independente, e avaliação através do DAS-28 e do Brief Michigan. **Resultados:** Através da análise descritiva, notou-se medianas semelhantes entre ortopedista, reumatologista e paciente. Entretanto, evidenciou-se correlação fraca entre paciente e reumatologista, paciente e o Brief Michigan; e ortopedista e o DAS-28. **Conclusão:** Valores de mediana semelhantes demonstram “Time Trade Off” equivalentes entre ortopedista, reumatologista e paciente. Mas, diante das correlações fracas entre os escores, não foi possível substituí-los por uma escala única de avaliação. **Nível de Evidência II, Estudo Prognóstico.**

Descritores: Artrite Reumatoide/cirurgia. Mão/cirurgia. Qualidade de Vida. Inquéritos e Questionários.

Citation: Wataya EY, Lijo CEA, Saito M, Pontes MA, Kunitake CT, Rezende MR. Life quality evaluation using “time trade off” method for rheumatoid hands. *Acta Ortop Bras.* [online]. 2018;26(6):374-8. Available from URL: <http://www.scielo.br/aob>.

INTRODUCTION

Rheumatoid arthritis is a systemic disease with a prevalence of 0.5% to 1% in the Brazilian,¹ European, and North American populations,² and affects up to 2.1 million Americans.³ Treatment involves medications, guidelines for joint protection

and energy conservation, as well as reconstructive and prophylactic surgery.⁴

In approximately 20% of patients with rheumatoid arthritis, the hands are affected at disease onset, while over 70% of these patients will also be affected through the course of their lives.⁴

All authors declare no potential conflict of interest related to this article.

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Article received in 05/16/2018, approved in 08/28/2018.



Regarding the socioeconomic implications, Yelin et al.⁵ report that one third of patients will be dismissed from work after five years of illness and after ten years, the remaining 50% will be unable to work. Surgery is indicated when there is no response to drug treatment and in the presence of deformities that compromise function, when other anatomical structures may be placed at risk, or when surgery may represent a functional advantage to the patient.⁶

However, the indication for surgery depends on a referral by the clinician, confirmation of the need for the procedure, and on the patient's understanding of the risks and benefits involved and the decision of whether to opt for surgical treatment.⁷ This entire process is subject to interference.³

Alderman et al.⁹ show that the perception of the benefits of surgery differ for the surgeon and for the rheumatologist, and it follows that the patient's perception may differ from both professionals.

Other studies have also reported a lack of consensus among orthopedic surgeons and rheumatologists and general practitioners as to the optimal timing of indication for a surgical procedure and the benefits that this procedure can deliver.³ An evaluation of the patient's expectations has not been described in the literature.

To address this issue within the context of a sensible use of health resources, the patient's opinion on the value of the treatment balanced with its benefits and risks has been highlighted in studies that determine clinical care protocols. The tools used for this assessment were method ranking, "Standard Gamble," the "Time Trade-Off" (TTO) technique, and the visual analog scale (VAS), among others.⁸ The TTO approach was introduced by Torrance et al.,⁹ and proposes a method of evaluating the value that the patient or professional would give to a certain procedure. This value is measured in years of life. Initially it was used to assess procedures that improve the patient's quality of life, but shorten their life expectancy. Subsequently, this technique has been used to evaluate the value that the patient gives to a certain procedure, thus offering an opportunity for a population to give their opinion on the value of different therapeutic resources. The primary objective of this study was to measure the differences in the value given by the patient, the rheumatologist, and the orthopedist to a hypothetical procedure that would provide the patient with the best possible outcome for the rheumatoid hand using the TTO technique, and thus, assess the degree of disability that the current condition generates in the patient. The secondary objective was to correlate the value obtained through the TTO technique with specific scales used in clinical decision making between orthopedists (Brief Michigan Hand Questionnaire) and rheumatologists (Disease Activity Score [DAS]-28).

MATERIALS AND METHODS

The study began after formal authorization was granted by the Research Ethics Committee of the Institution under number CAAE 69425917.1.0000.068. All patients enrolled in the study signed an Informed Consent Form.

A prospective study was performed with 37 patients diagnosed with rheumatoid arthritis who were submitted to the "TTO" questionnaire and independently assessed by the orthopedist and rheumatologist. An independent evaluator assessed the results obtained from the patient's Disease Activity Score (DAS)-28 Index and the Brief Michigan Hand Questionnaire.

Inclusion criteria:

- Adult patients from the hand surgery outpatient clinic of our institution diagnosed with rheumatoid arthritis
- Patients with hand deformities
- Patients who were followed-up by a rheumatologist from our institution.

Exclusion criteria:

- Patients who did not complete the evaluations
- Patients who did not agree to sign the consent form

EVALUATION

For each patient, the following information was collected:

- Patient's identification
- Diagnosis of hand deformity
- Documentation of comorbidities and medications in use
- Assessment of the degree of hand function through the Brief Michigan Hand Questionnaire adapted for Brazilian Portuguese patients.¹⁰
- Assessment of disease activity (in patients with rheumatoid arthritis) using the DAS-28 index
- Questioning of the patient using the TTO technique
- Questioning of the orthopedist using the TTO technique
- Questioning of the rheumatologist using the TTO technique

Description of the Time Trade-Off technique:

An independent evaluator, not the orthopedist or the rheumatologist, interviewed the patient.

Based on a life expectancy table adjusted for age and sex for the year 2011,¹¹ the evaluator asked the patient the following questions: "Mr./Mrs. [PATIENT NAME], you are currently [X] years old. Based on IBGE's studies, you should live on average up to [Y] years. Thus, you have [Y-X] more years to live.

If you could change a few years of life for your hands to be healed, to a perfect condition, of these [Y-X] years, would you give five years of life to make your hands perfect?"

If the answer was positive, the evaluator repeated the question by increasing the number of years given by the procedure by five.

If the answer was negative, the evaluator repeated the question by decreasing the number of years given to the integer between the two numbers questioned.

The questions were repeated until the maximum number of years the patient would give for the procedure was obtained.

The difference between this age and life expectancy adjusted for the age of IBGE was the value in years that the procedure represented for the patient. This value was defined as TTO-Patient (Z).

To confirm the responses, the interviewer asked the patient: "You've opted for [Z] years. That means you would be willing, instead of living up to [Y] years with your hands in this condition, living up to [Y-Z] years with perfect hands.

If the response was POSITIVE, the value was accepted.

If the answer was NEGATIVE, the questionnaire procedure was repeated.

An orthopedist and a rheumatologist, independently, without consultation with the other, examined the patient's hands and in consideration of their life expectancy and comorbidities, also assessed the value of the procedure in terms of number of years of life. These values were defined as TTO-Orthopedist and TTO-Rheumatologist, respectively.

The difference between the values obtained between the three values of the respondents (patient, orthopedist, rheumatologist) was calculated, considering the TTO as a numerical and continuous variable.

The alpha error value was set at 5% and the beta error value at 20%.

RESULTS

Among the 37 patients enrolled, 22 passed all the evaluations and 11 had the laboratory tests results necessary to calculate the DAS-28.

Of the 22 patients, who completed all the evaluations, 21 were women (95%) and one was a man (5%). The mean age of the sample was 58.0±8.0 years and the mean life expectancy, according to IBGE data, was 82.2±1.8 years.

A descriptive population analysis was performed (Table 1). The Kolmogorov-Smirnov normality test was applied, which showed a non-normal distribution of the population; therefore, it was necessary to use non-parametric tests. Thus, we used the non-parametric statistical tests, Spearman's rho, to obtain the correlation between indices demonstrated in Table 2, interpreting values as follows:

- ±0.9 indicated a very strong correlation.
- ±0.7 to 0.9 indicated a strong correlation.
- ±0.5 to 0.7 indicated a moderate correlation.
- ±0.3 to 0.5 indicated a weak correlation.
- ±0 to 0.3 ± indicated a negligible correlation.

The correlations found, based on this analysis, were:

- Weak positive between orthopedist and rheumatologist
- Weak positive between patient and the *Brief Michigan Hand Questionnaire*
- Weak negative between orthopedist and the DAS-28 score.

Table 1. Descriptive statistics of the Time to Trade-off results.

	Brief michigan	TTO. Patient	TTO. Orthopedist	TTO. Rheumatologist	DAS-28
Mean	45.37 (14 To 97)	7.34 (0 To 30)	2.36 (1 To 4)	2.38 (0 To 7)	2.89 (1.55 to 4.44)
Standard deviation	17.17	9.60	1.01	2.02	0.93
Median	43.75	2	2	2	2.63

TTO: Time to Trade-off.

Table 2. Correlation coefficient (Spearman's rho).

	Brief michigan hand questionnaire	DAS-28	TTO Patient	TTO. Orthopedist	TTO. Rheumatologist
Brief michigan hand questionnaire	1.000	-0.202	0.302	-0.185	-0.281
DAS 28	-0.202	1.000	0.011	-0.308	0.133
TTO. Patient	0.302	0.011	1.000	-0.105	-0.055
TTO. Orthopedist	-0.185	-0.308	-0.105	1.000	0.318
TTO. Rheumatologist	-0.281	0.133	-0.055	0.318	1.000

DISCUSSION

At first glance, the mean TTO values between the orthopedist (2.36) and the rheumatologist (2.38) were similar, unlike the patient's TTO (7.34), which was much higher. A more concordant analysis could be inferred between the orthopedist and the rheumatologist than either in relation to the patient. However, as the population showed a non-normal distribution, the median analysis between the patient, orthopedist and rheumatologist, which was similar (mean 2.0), was also determined. The explanation for the higher mean obtained in the patients is that there were few cases of patients reporting a high TTO, which skewed the results toward a higher mean.

Through the Spearman's rho test, we attempted to correlate the scales to find one scale that could replace the triple assessment (TTO, Michigan, DAS28). The results did not allow unification by any of the scores, with most correlations being negligible and with only three weak correlations.

Although the correlation between the orthopedist and the rheumatologist was low, it presented a positive value, inferring some degree of concordance between the two professionals. This was also true for the analysis between the patient and his Brief Michigan Questionnaire that also presented a positive value, which was to be expected, as the patient completed his own personal Brief Michigan Questionnaire, analyzing functional status.

The weak but negative correlation between the orthopedist and the DAS-28 suggested a non-concordance of values between the two variables, in addition to their statistically low significance.

Considering the results of this analysis, it is recommended that the scales continue to be used, each for the specialty to which it is most familiar – the orthopedist using the Brief Michigan Questionnaire and the rheumatologist using the DAS 28, for example. The same scale is recommended to be used by the patients at different periods in time in order to compare the functional evolution.

The study presented some limitations, such as a small sample size (22 patients) completing all the evaluations, and the seven cases of rheumatologic evaluation performed by different evaluators. Another weakness involved the evaluation by a single orthopedist or rheumatologist for each case. An assessment by more than one professional could be determined to define inter-observer agreement or disagreement.

A strong point of this study was the unprecedented attempt to compare these the scales by the three professional figures typically involved in the treatment of the rheumatoid patient: the patient, the orthopedist, and the rheumatologist.

The TTO technique has the advantage that it can be used for different diseases.¹²⁻¹⁴ Thus, it is possible to estimate which disease or injury may impair the quality of life of the patient. This characteristic leads to the use of the technique in public health policies to determine priorities for inclusion of different diseases or injuries in the coverage list of national health systems.¹² Pathologies that affect a patients' quality of life in a complex manner, however diverse they may be, can have each individual effect compared using this technique.^{13,14} Another strong point of this study was the use of an easy-to-interpret quality of life scale, which has been used in studies for setting priorities in public health.

A potential outcome of this study would be to open the results of TTO evaluations to orthopedists and rheumatologists and to compare the criteria used by each in order to increase the degree of interaction during patient evaluations between the two professionals. After this comparison, it would be possible to evaluate a different group of patients and repeat the study to verify whether there is an increase in the correlation of grades given by the health care professionals.

CONCLUSIONS

The TTO of the patient, orthopedist, and rheumatologist, when analyzed together, have an equivalent value. None of the assessment scales, neither the DAS-28 nor the Brief Michigan Hand Questionnaire, could be replaced by a single scale alone.

AUTHORS' CONTRIBUTIONS: Each author contributed individually and significantly to the development of this article. EYW (0000-0002-0186-8480)*: article writing; CEAL (0000-0002-4257-880X)*: idealization of the project and revision of the article; MS (0000-0002-0909-706X)*: idealization, orientation and revision of the article; MAP (0000-0002-8242-5808)*: data collection; CTK (0000-0003-4934-5395)*: data collection and article structure; MRR (0000-0003-3441-8117)*: conceptualization and revision of the article. *ORCID (Open Researcher and Contributor ID).

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Appendix 1. Brief Michigan Hand Questionnaire.

Patient: _____
 Date: ____/____/____
 Evaluator: _____

VAS

0 _____ 100

Instructions: This survey asks you for your views about your hands and your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Answer EVERY question by marking only one answer. If you are unsure about how to answer a question, please give the best answer you can. Please answer every question, even if you do not experience problems with your hands or wrists. Some questions may ask you about your ability to complete certain tasks. If you do not do a certain task, please estimate the difficulty with which you would have in performing it. Questions pertaining to work include occupational work, housework, and schoolwork. Please circle one answer for each question.

1	Overall, how well did your hand(s) work during the past week?	Very good 1	Good 2	Fair 3	Poor 4	Very poor 5
2	How was the sensation (feeling) in your hand(s) during the past week?	Very good 1	Good 2	Fair 3	Poor 4	Very poor 5
3	How difficult was it for you to hold a frying pan during the last week?	Not at all difficult 1	A little difficult 2	Somewhat difficult 3	Moderately difficult 4	Very difficult 5
4	How difficult was it for you to button a shirt or blouse during the past week?	Not at all difficult 1	A little difficult 2	Somewhat difficult 3	Moderately difficult 4	Very difficult 5
5	In the past 4 weeks, how often were you unable to do your work because of problems with your hand(s)/wrist(s)?	Always 1	Often 2	Sometimes 3	Rarely 4	Never 5
6	In the past 4 weeks, how often did you take longer to do tasks in your work because of problems with your hand(s)/wrist(s)?	Always 1	Often 2	Sometimes 3	Rarely 4	Never 5
7	How often did the pain in your hand(s)/wrist(s) interfere with your daily activities (such as eating or bathing) in the past week?	Always 1	Often 2	Sometimes 3	Rarely 4	Never 5
8	Describe the pain in your hand(s)/wrist(s) in the past week.	Very mild 1	Mild 2	Moderate 3	Severe 4	Very severe 5
9	I am satisfied with the look of my hand(s).	Strongly agree 1	Agree 2	Neither agree nor disagree 3	Disagree 4	Strongly disagree 5
10	In the past week, the appearance of my hand(s) interfered with my normal daily activities.	Strongly agree 1	Agree 2	Neither agree nor disagree 3	Disagree 4	Strongly disagree 5
11	In the past week, how satisfied were you with the motion of your fingers?	Very satisfied 1	Somewhat satisfied 2	Neither satisfied nor dissatisfied 3	Dissatisfied 4	Very dissatisfied 5
12	In the past week, how satisfied were you with the motion of your wrist?	Very satisfied 1	Somewhat satisfied 2	Neither satisfied nor dissatisfied 3	Dissatisfied 4	Very dissatisfied 5

Appendix 2. Disease Activity Score-28 (DAS-28)

DAS28 form

Patient name: _____

Date of Birth: ____/____/____

Observer name: _____

Date: ____/____/____

		Left		Right	
		Swollen	Tender	Swollen	Tender
Shoulder					
Elbow					
Wrist					
MCP	1				
	2				
	3				
	4				
	5				
PIP	1				
	2				
	3				
	4				
	5				
Knee					
Subtotal					
Total		Swollen		Tender	

How active was your arthritis during the past week? – Visual Activity Scale (VAS)

(Please mark the degree of activity on the scale below by placing a vertical line)

Extremely active

Not active at all

Swollen Joint Count (0-28)	
Tender Joint Count (0-28)	
ESR	
Visual Activity Scale (VAS) (0-100mm)	
$\text{DAS28} = 0.56*(t28) + 0.28*(sw28) + 0.70*\text{Ln}(\text{ESR}) + 0.014*\text{VAS}$	
For free online calculator visit www.das28.nl	