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Research Article

Association between the Modified Health Assessment Questionnaire (MHAQ) and the Functional Status Scale (FSS) for Functional Status Measurement in Women with Rheumatoid Arthritis: A Descriptive Observational Study

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Abstract

Objective: Rheumatoid Arthritis (RA) can lead to pain, fatigue, emotional deterioration, and irreversible structural and functional damage. Functional status is a critical assessment to characterize or predict disease's evolution. Several instruments, such as the Modified Health Assessment Questionnaire (MHAQ) and the Functional Status Scale (FSS) provided by the American College of Rheumatology, are available and easily adapted to clinical practice. However, there is no evidence identifying possible associations between these instruments. The primary aim of this study was to compare these two functional status tools in a population of RA women.

Methods: We conducted a descriptive and prospective observational study in RA women undergoing treatment in the rheumatology department of Getúlio Vargas University Hospital (HUGV) at the Federal University of Amazonas (UFAM), Brazil.

Results: Our sample consisted of 44 adult women. Our findings demonstrated that MHAQ and FSS were associated ($p<0.0001$, ANOVA test). When stratified by levels, MHAQ was also significantly associated with FSS ($p < 0.0001$ Fischer's exact test). Although both instruments were able to homogeneously identify women with scores I and II (normal and slightly impaired

functional class), the number of women classified in scores III and IV was low. The women ranked in these scores were not the same as those identified by the two instruments individually.

Conclusions: MHAQ and FSS were associated. However, our findings suggest that differences in strata levels may occur from patient to patient. Future research in the field is necessary to better understand the relationship between functional status tools.

Keywords: Rheumatoid Arthritis; Functional Status; Modified Health Assessment Questionnaire; Functional Status Scale

Introduction

Rheumatoid Arthritis (RA), the most common autoimmune disease, leads to deformity and destruction of the human joints [1,2]. The non-specific symptoms and clinical findings can cause different levels of functional impairment and significant disability [1-4]. The RA prevalence is higher in women (3:1), and it is commonly associated with a distinct RA phenotype, lower age of onset, lower percentage of autoantibody positivity, more pain, and worse functional status, suggesting a higher level of disease activity [2,3]. It is a widely held view that RA can lead to pain, fatigue, functional disability, deterioration of the emotional state, and irreversible structural and functional damage [4,5]. To prevent such cases, health professionals can detect declines in physical abilities (clinically expressed as deficiencies) and provide effective interventions to prevent and slow disease progression [6,7]. Functional status is a standard measure that can be easily adopted in clinical practice and is defined as the individual ability to perform normal daily activities [8,9]. It plays a major role in assessing the actual disease impact on patient's life, helps determine the degree of restriction caused by the disease, and supports diagnostic, prognostic, and morbidity/mortality factors for patient's follow-up [8,9]. Several instruments as the Modified Health Assessment Questionnaire (MHAQ) and the Functional Status Scale (FSS) provided by the American College of Rheumatology (ACR), are available in clinical practice to assess the functional status of RA patients [5,7,10]. However, the lack of evidence identifying possible associations between these instruments is present in the literature. In addition, a clinically significant decline in the functional status strongly predicts mortality and dependence on care [10], and early markers of decreased intrinsic capacity are often not identified, treated, or even monitored [2,4,5,10]. Most of the time, impairment of functional status is only noticed when it drastically reduces individual's ability [5,6]. Therefore, our primary aim in this study was to describe the comparison of two functional status tools, the MHAQ, and the FSS proposed by the ACR, in a population of RA women based on a descriptive observational study. We hypothesize that different measurement tools for functional status (MHAQ and FSS) in RA women can be associated.

Material and Methods

Study Design and Study Population

We conducted a descriptive and prospective observational study in RA women undergoing treatment in the rheumatology department of Getúlio Vargas University Hospital (HUGV) at the Federal University of Amazonas (UFAM), Brazil. We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. Due to local region feasibility and practical aspects, convenience sampling was adopted. We selected participants from an RA population treatment list at the HUGV rheumatology department. Study participants were recruited over the cell phone and conducted to the HUGV, and when necessary, data collectors studied women in their own homes. All RA women diagnosed by the ACR and the European League Against Rheumatism (EULAR) classification criteria were considered eligible for this study. The inclusion criteria were: (1) diagnosed with RA at any stage; (2) age between 18 and 59 years old; (3) using synthetic antirheumatic drugs (DMARDs); (4) having never used immunobiological antirheumatic drugs (DMARDi); (5) absence of respiratory diseases and, (6) non-smoking. Participants who were not able to respond were excluded from this research. Additional exclusion criteria have not been applied.

Screening and Data collection

According to the RA population treatment list in the HUGV rheumatology department, eight hundred and eighty-six (886) participants were considered eligible; seven hundred and ninety-three (793) were excluded by previously defined inclusion criteria, being ninety-three (93) selected. However, forty-nine (49) participants were lost due to outdated contact, death, and exclusion criteria, resulting in a sample of forty-four (44) participants. Contacts and residential addresses were submitted to three monthly updates in the Medical Archive and Statistics Service (MASS) HUGV department at the eligibility phase. For participants who had their addresses updated, visits were scheduled at their residences to provide information about the research and identify the possibility of their participation. Researchers were trained by the Principal Investigator (PI) to contact patients either by cell phone or in their homes. Data collectors also have been previously trained by the PI to standardize the assessment approach and

question levels for patients. Finally, the participants were evaluated according to their functional status levels through the MHAQ and FSS tools. Additional information included height, weight, body mass index (BMI), kilograms/meters2 (Kg/m2), diagnosis time, and medication information. The research has been taken between August 2017 and February 2018.

Functional Status Tools

We assessed the participants using the MHAQ tool, which total score ranged between 0.0– 3.0, in 0.125 increments [11]. Higher scores indicate worse function status and greater disability; scores <0.3 are considered normal. The scores are divided into categories: mild (MHAQ <1.3), moderate (1.3 < MHAQ < 1.8), and severe (MHAQ >1.8), indicating functional losses [7-9]. We also used the FSS proposed by ACR: Class I - able to perform usual activities of daily living (self-care, vocational, and avocational); Class II - able to perform usual self-care and vocational activities but limited in avocational activities; Class III- able to perform usual self-care activities but limited in vocational and avocational activities, and Class IV - limited on ability to perform usual self-care, vocational, and avocational activities [10-12].

Ethical Aspects

The UFAM Institutional Review Board (IRB) approved this study under code: 70481517.5.0000.5020. All included participants provided their written informed consent according to the Declaration of Helsinki and resolution 466/2012 by the National Health Institute (NIH) for clinical studies in Brazil. Tutorial discussions were given for all possible and included participants, providing information and respecting the participant's autonomy in all moments.

Statistical Analysis

In this study, our variables were: age (years - continuous), diagnosis time (years - continuous), Body Mass Index (BMI) (Kg/m² - continuous), MHAQ (continuous), and FSS (ordinal). We assessed data normality through the Shapiro-Wilk test, Kurtosis, Skewness, and graphic distribution. Also, tables with absolute (N) and relative (%) frequencies were used for descriptive analysis. We used mean ± standard deviation (SD) for continuous normal variables and median and maximum/minimum for continuous non-normal variables. Categorical variables were presented as absolute and relative frequencies.

No sample size calculation was estimated due to the study's exploratory analysis characteristic. We used the Pearson correlation test (normal distribution) and the Spearman correlation test (non-normal distribution) to test the degree of correlation between two continuous variables. In addition, the ANOVA test (normal) or the Kruskal Wallis test (non-normal) were used to test the association between categorical variables and continuous variables with more than three levels. We set the significance at 0.05 ($p<0.05$). The software used to run the tests was GraphPad Prism 8.

Results

Participant's Characteristics

Our sample consisted of forty-four (44) adult women with a median age of 50 (27/59) years, median diagnosis time of 9.5 (1/18), and a median BMI of 27.23 (21.71/47.91). All women included in this study were considered overweight. The descriptive analysis of our sample is shown in Table 1.

Characteristics	N (%)	Median	Min/Max
Age (years)	44 (100)	50	27/59
Median diagnosis time (years)	44 (100)	9.5	Jan-18
BMI (kg/m2)	44 (100)	27.23	21.71/47.91
Overweight	31 (70.45)		
Obesity I	12 (27.27)		
Obesity III	1 (2.27)		
Legend: Number (N), Percentage (%). Data are median, minimum, and maximum (Min/Max) and relative frequencies. Body Mass Index (BMI).			

Table 1: The characteristics of the sample.

Functional Status

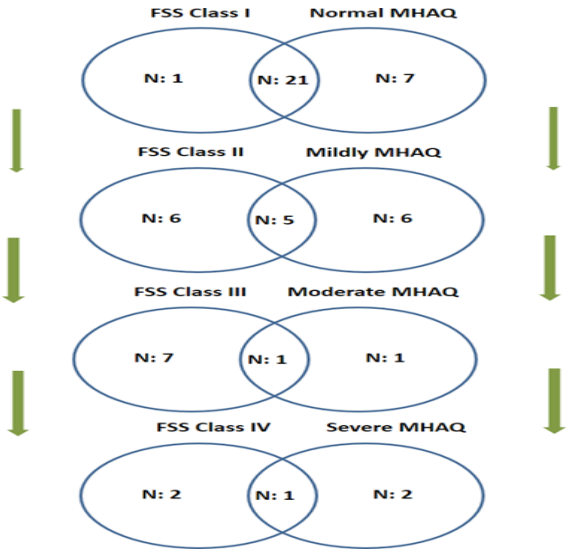
According to MHAQ, most women (63.63%) were classified with normal functional status, 25% mildly affected, 4.54% moderate, and 6.81% severe. According to the FSS, half of the sample (50%) was classified as class I (normal). One-quarter (25%) of the women with RA were class II, approximately 18.18% were classified as class III, and around 6.81% were class IV. In our exploratory analysis, neither the participant's age nor the diagnosis time did not influence the functional status classification (age x MHAQ, p = 0.169 Spearman correlation test; diagnosis time x MHAQ, p = 0.110 Spearman correlation test; age x FSS, p = 0,5714 ANOVA test; and diagnosis time x FSS stratified by class,p = 0.502 ANOVA test). Furthermore, BMI did not show any significant association between the functional status tools (BMI x MHAQ, p = 0.104 Spearman correlation test; and BMI x FSS, p = 0,0570 ANOVA test). As shown in Table 2, most participants classified as normal in the functional status class by MHAQ were also classified as functional class I in FSS. Thus, this study demonstrated that MHAQ and FSS were associated (p<0.0001, ANOVA test). Corroborating with these findings, when stratified by levels, the MHAQ also showed a significant association with FSS (p <0.0001 Fischer's exact test) (Table 3).

FSS Classes	N(%)	MHAQ (Mean ± SD)
Class I	22 (50%)	0,1136 ± 0,1677
Class II	11 (25%)	0,4773 ± 0,4063
Class III	8 (18.18%)	1,172 ± 0,9658
Class IV	3 (6.81%)	1,333 ± 0,6884
Total	44 (100%)	
ANOVA test		p <0.0001
Legend: Number (N), Percentage (%). Data are mean, standard deviation, and relative frequencies. Functional Status Scale (FSS), Modified Health Assessment Questionnaire (MHAQ), One-Way Analysis of Variance (ANOVA), Standard Deviation (SD). Significant Value p<0.05		

Table 2: Association between MHAQ and FSS-ANOVA test.

			MHAQ			
Variable	Normal (%)	Mild (%)	Moderate (%)	Severe (%)	Total (%)	P-value <0.0001*
FSS						
Class I (N)	21 (47,73)	1 (2,27)	0 (0.00)	0 (0.00)	22 (50)	
Class II (N)	5 (11,36)	5 (11,36)	1 (2,27)	0 (0.00)	11 (25)	
Class III (N)	2 (4,54)	3 (6,81)	1 (2,27)	2 (4,54)	8 (18,18)	
Class IV (N)	0 (0.00)	2 (4,54)	0 (0.00)	1 (2,27)	3 (6,81)	
Total	28 (63,63)	11 (25)	2 (4,54)	3 (6,81)	44 (100)	
Legend: Number (N), Percentage (%). Data are in absolute number and relative frequencies, Functional Status Scale (FSS), Modified Health Assessment Questionnaire (MHAQ), and Standard Deviation (SD). * Fischer's exact test. Significant p-value <0.05						

Table 3: Association between MHAQ and FSS-Fischer's exact test.



Legend: Functional Status Scale (FSS), Modified Health Assessment Questionnaire (MHAQ).

Figure 1: The intersection between MHAQ and FSS.

Another interesting aspect observed in this study is that the number of women classified in scores III and IV was low. We identified that women ranked in these scores were not the same as those identified by the two instruments. Figure 1 illustrates the intersection between the two tools, showing the differences between women classified by the same instrument and those who did not.

Discussion

In this study, we identified an association between MHAQ and FSS, suggesting that both tools can similarly reflect the functional status of RA women. Although both instruments were able to homogeneously identify women with scores I and II (normal and slightly impaired functional class), the number of women classified in scores III and IV was low. The women ranked in these scores were not the same as those identified by the two instruments individually. These findings suggest that both tools may not have the same power to identify and classify women with moderate and severe functional classes. Besides being recognized as an important outcome for disabling and chronic diseases, we did not identify possible study associations between these instruments in the literature. We hypothesize that potential differences in recognizing the same patients in moderate and severe levels might be related to each instrument's self and not self-assessment characteristics. Health professionals usually assess FSS, whereas patients broadly answer MHAQ according to their subjectivity [7-13]. Although an association is present between both instruments, the way they are applied may be an indirect source of potential differences that can interfere with a patient's real functional status in moderate and severe cases. Present limitations in this research could be related to the exploratory characteristics of the adopted study design. Thus, unmeasured or unknown confounders could be present. Likewise, not performing sample size calculations could have decreased the study's power and internal validity. It is worth mentioning that using convenience sampling and the current low number of participants with moderate and severe functional status cannot be representative of such assumptions. We tried to eliminate such limitations as possible, visiting patients in their own homes to achieve more participants and providing educational training lectures to the research team to calibrate the evaluation characteristics of both instruments. Furthermore, the strengths of this design allowed us to check the topic relevance, the need for future research, and, finally, the generation of further research questions in this field. This study showed that two different measurement tools (MHAQ and FSS) for functional status in RA women could have similar results in clinical practice. Health professionals must know that these two functional status instruments can provide interchangeable results for RA women. However, possible differences in strata levels may exist due to assessment characteristics and the application itself. The study's relevance for functional status in RA patients is highly encouraged in order to decrease late diagnostic disability and disease burden. Nonetheless, wariness must be taken on, generalizing the results of this study. RA women often tend to develop more serious cases of disability than men do, and the functional status assessment is an essential measure that should be broadly implemented in clinical practice. Regardless of the wide variety of functional status instruments, the choice and use should be based on the capacity of each tool to reflect the real functional status of this patient, thus decreasing the chances of higher disabilities and burden costs for the patient and health system. In conclusion, MHAQ and FSS were associated. However, our findings suggest that differences in strata levels may occur from patient to patient. Therefore, future researches in the field are necessary to understand better the relationship between functional status tools.

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