Original article

Analysis of the psychometric properties of the American Orthopaedic Foot and Ankle Society Score (AOFAS) in rheumatoid arthritis patients: application of the Rasch model

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ABSTRACT

Objective: To tested the reliability and validity of Aofas in a sample of rheumatoid arthritis patients.

Methods: The scale was applicable to rheumatoid arthritis patients, twice by the interviewer 1 and once by the interviewer 2. The Aofas was subjected to test–retest reliability analysis (with 20 Rheumatoid arthritis subjects). The psychometric properties were investigated using Rasch analysis on 33 Rheumatoid arthritis patients.

Results: Intra-Class Correlation Coefficient (ICC) were ($0.90 < \text{ICC} < 0.95$; $p < 0.001$) for intra-observer reliability and ($0.75 < \text{ICC} < 0.91$; $p < 0.001$) for inter-observer reliability. Subjects separation rates were 1.9 and 4.75 for the items, showing that patients fell into three ability levels, and the items were divided into six difficulties levels. The Rasch analysis showed that eight items was satisfactory. One erroneous item have been identified, showing percentages above the 5% allowed by the statistical model. Further Rasch modeling suggested revising the original item 8.

Conclusions: The results suggest that the Brazilian versions of Aofas exhibit adequate reliability, construct validity, response stability. These findings indicate that Aofas Ankle-Hindfoot scale presents a significant potential for clinical applicability in individuals with rheumatoid arthritis. Other studies in populations with other characteristics are now underway.

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Análise das propriedades psicométricas do American Orthopaedic Foot and Ankle Society Score (Aofas) em pacientes com artrite reumatoide: aplicação do modelo Rasch

R E S U M O

Palavras-chave:
Artrite reumatoide
Incapacidade
Escala
Avaliação
Análise Rasch

Objetivo: Testar a confiabilidade e a validade do escore Aofas em uma amostra de pacientes com artrite reumatoide.

Métodos: A escala foi aplicada a pacientes com artrite reumatoide, duas vezes pelo entrevistador 1 e uma vez pelo entrevistador 2. O Aofas foi submetido a exame de confiabilidade teste-reteste (com 20 indivíduos com artrite reumatoide). As propriedades psicométricas foram investigadas pela análise Rasch em 33 pacientes com artrite reumatoide.

Resultados: O coeficiente de correlação intraclasse (CCI) foi de 0,90 < CCI < 0,95 (p < 0,001) para a confiabilidade intraexaminador e 0,75 < CCI < 0,91 (p < 0,001) para a confiabilidade interexaminador. O índice de separação dos indivíduos foi de 1,9 e 4,75 para os itens. Isso demonstra que os pacientes se dividiam em três níveis de habilidade e os itens foram divididos em seis níveis de dificuldades. A análise Rasch mostrou que oito itens foram satisfatórios. Foi identificado um item errôneo, que mostrou percentuais acima dos 5% permitidos pelo modelo estatístico. Além disso, o modelo Rasch sugeriu a revisão do item 8 original.

Conclusões: Os resultados sugerem que a versão brasileira do Aofas apresenta confiabilidade adequada, validade de constructo e estabilidade de resposta. Esses resultados indicam que a escala de tornozelo-retropé Aofas apresenta um potencial significativo de aplicabilidade clínica em indivíduos com artrite reumatoide. Outros estudos em populações com outras características já estão em andamento.

Introduction

Rheumatoid Arthritis is a chronic disabling condition and may result in impairments in functions including musculoskeletal pain, joint stiffness, loss of range of motion, muscular weakness, and joint damage. The disability causes limitations of activities and restrictions in participation.[1]

The number of clinical studies addressing functioning as a study endpoint in patients with Rheumatoid Arthritis has steadily increased during the past decade.[2] It is also important to recognize that measures in Rheumatoid Arthritis have been developed to measure the disease consequences but with little attention to functional aspects.[3] Most trials involving Rheumatoid Arthritis have used the Health Assessment Questionnaire (HAQ). This questionnaire is influenced by social factors such as education level and requires a major change in score to represent a significant functioning change in the patient.[4,5] The HAQ has lower consistency compared with other measures such as C-Reactive Protein (CRP), Erythrocyte Sedimentation Rate (ESR), number of tender joints and patient/physician global assessment.[6] Furthermore, HAQ is a tool with considerable "celling-effect" and thus are unable to detect worsening after reaching a maximum score.[7]

Foot impairment occurs in 85–100% of Rheumatoid Arthritis patients and erosive synovitis is the primary reason for high levels of pain and/or disability.[8,9] Others standardized method more specifically to assess the disability caused by the dysfunction of the feet and gait in Rheumatoid Arthritis patients is necessary for practice clinical. In 1994, the American Orthopaedic Foot and Ankle Society (AOFAS) developed rating scales for the ankle-hindfoot, midfoot, hallux metatarsophalangeal–interphalangeal, and lesser metatarsophalangeal–interphalangeal sites allowing them to be applied to different kinds of injuries and treatments.[10] AOFAS clinical domains were designed to assess foot or ankle problems and are very widely used for this purposed despite the limited evidence, until now, for their reliability and validity in other circumstances.[11]

Rehabilitation programs priorities will be based increasingly on evidence of the cost-effectiveness of interventions on functioning. The reliability of such evidence is substantially dependent on the validity of the methods used to assess health and functioning status. In study of Rodrigues et al.,[12] the AOFAS was translated and culturally adapt for Brazilian Portuguese and its reproducibility and validity were tested for patients with clinical diagnostic of ankle or hindfoot injuries. Up to this date, we do not know of their validation for patients with Rheumatoid Arthritis in Brazil. In the current study, we have tested the reliability and validity of AOFAS in a sample of Rheumatoid Arthritis patients.

Materials and methods

Participants

The study comprised a convenience sample including 33 patients from Arthritis Rheumatoid Service of the Bahia School of Medicine and Public Health. Patients were eligible for inclusion if they had more than 18 years and have a diagnoses of Rheumatoid Arthritis by a rheumatologist satisfying the American Rheumatism Association revised criteria for Rheumatoid arthritis[13] and demonstrated the ability to