

THESIS REVIEW

Swinkels, RAHM. *Measurement Instruments for Patients with Rheumatic Disorders: A Clinimetric Appraisal*.

PhD Thesis

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Rheumatoid disorders have a major societal and personal impact. The prevalence of rheumatoid arthritis (RA) is reported at 0.5–1% in the population worldwide, affecting women more frequently than men¹. The prevalence of fibromyalgia in the United States is reported as 2%, corresponding to 5 million Americans affected. During a 12-month period, the average total cost for workers with RA is \$4,244 greater than for workers without RA. RA was the fourth most costly chronic condition per employee compared to cancer, asthma, bipolar disorder, chronic obstructive pulmonary disease, depression, diabetes, heart disease, hypertension, low back disorders, and renal failure².

The goal for this thesis was to perform a systematic review of the literature to assess the construct validity of measurement tools used for assessment of impairments in body structure and function, disabilities in gait, gait-related activities, and disabilities in personal care activities in patients with rheumatic disorders. The disorders addressed in this thesis include RA, seronegative polyarthritis (including psoriatic arthritis), osteoarthritis, ankylosing spondylitis, polymyositis, and fibromyalgia. With the International Classification of Functioning, Disability, and Health (ICF) used to classify constructs, this thesis investigated convergent and divergent validity of various measurement tools and provides an inventory of the most clinically useful and valid assessment tools.

Chapter 1 delineates the goals of the thesis and presents an overview of the subsequent chapters. It briefly discusses the prevalence and classification of rheumatic disorders according to the American College of Rheumatology (ACR) and the European League against Rheumatism (EULAR). Clinimetrics is defined as “the domain concerned with indices, rating scales, and other expressions that are used to describe or measure symptoms, physical signs, and other distinctly clinical phenomena in clinical medicine”.

Chapter 2 provides extensive background information on the development of the International Classification of Impairments, Disabilities, and Handicaps (ICIDH) that formed the basis of this thesis. A manual and computer-assisted literature review was performed for the period of January 1982 through April 2001. The systematic review included English, French, German, and Dutch literature and was completed just prior to the revision of the ICIDH producing the ICF in 2001.

Chapter 3 describes a systematic review of the literature to assess the construct validity of instruments used to measure impairments in body structures and function in patients with rheumatoid disorders. A measurement instrument was determined to have good construct validity if it was validated against a similar construct and possessed a correlation coefficient of ≥ 0.5 . Pooling of the data was performed within the construct level for each measurement instrument or subscale. Correlation coefficients were scored for the entire measurement instrument as well as for sub-scales whenever separate information about the construct validity of the sub-scales was available. In 10 of 22 instruments, correlations were stronger when instruments were validated against a similar construct versus a dissimilar construct. For 7 instruments, correlations were similar or weaker. For 5 instruments, the results were conflicting. For measurement of impairment in mental functions, the Beck Depression Inventory, Spielberger Trait-Anxiety Inventory, Arthritis Impact Measurement Scale-Emotional Function, and Spielberger State-Anxiety Index met the validity criterion. For the measurement of stiffness, the Bath Ankylosing Spondylitis Disease Activity Index and Morning Stiffness-Severity were deemed valid. For the assessment of pain, all tools except the McGill Pain Questionnaire and Arthritis Impact Measurement Scale-Pain met the criterion. Regarding mobility of joints, the Bath Ankylosing Spondylitis Metrology Index and goniometer and spondylometer instruments (Dunham) were valid. For assessment of muscle force, only the sphygmomanometer (hand-held dynamometer) met the criterion.

Chapter 4 focuses on assessment of impairments in function and recommends the most reliable and valid instruments for use. For impairments in mental function, none of the assessment tools reviewed met the criterion for good

validity and reliability. For stiffness, the Bath Ankylosing Spondylitis Disease Activity Index and Visual Analog Scale-Stiffness had good reliability and validity. For pain, the Arthritis Impact Measurement Scale and Australian/Canadian Osteoarthritis Hand Index (AUSCAN-OHI) met the criterion. For joint mobility, the chest expansion Escola Paulista de Medicina Range of Motion Scale, the goniometer, and the Schober test were deemed acceptable. For muscle force, the sphygmomanometer was recommended. For swelling, the Articular Index was acceptable. In 14 of 21 measurements tools, correlations were higher when the tool was validated against a convergent construct.

Chapter 5 reports which tools were best for assessment of disabilities in gait and gait-related activities. The best assessment tools for gait were the Rheumatoid Arthritis Quality of Life Scale and the Health Assessment Questionnaire. The Walking Time- 50 Feet test may also be useful, but there was lack of information regarding its validity. The authors found that for 10 out of 18 tools, the best construct validity occurred when measured against divergent constructs. In 7 out of the 18, the correlation value was higher when validated against a similar construct. For one tool, the result was the same. The investigators deemed the Functional Index, Dutch (DFI) and Rheumatoid Arthritis Quality of Life sufficiently responsive.

Chapter 6 presents the results for reliability, validity, and responsiveness of instruments used to assess disabilities in personal care. Although the authors determined that there was good reliability and validity for the Health Assessment Questionnaire (HAQ) and the Arthritis Impact Measurement Scale (AIMS), the AIMS was deemed best to assess personal care in this population. The AIMS was responsive, particularly for the self-care subscales, whereas the HAQ had conflicting results regarding responsiveness and weak validity for the sub-scales of hygiene and eating. There was no difference in the strength of correlation with validation against similar or dissimilar constructs.

Chapter 7 discusses the research findings and presents conclusions. Dr. Swinkels suggests that multi-dimensional questionnaires should be validated against multi-dimensional constructs or that each sub-scale should be validated separately against convergent constructs. He also suggests that a questionnaire and a performance test be used for more comprehensive assessment of these patients and comments that the ICF may not be the most ideal framework for the analysis of construct validity of measurement instruments as most measurement tools were created before the ICF was in existence and because the ICF was never intended to develop assessment tools but rather to classify the various domains of a health problem. Dr. Swinkels suggests the work by Bot et al³ for providing a framework for assessing construct validity in future studies via a detailed checklist to evaluate and compare the clinimetric properties of self-assessment questionnaires.

Time seems to have already caught up with Dr. Swinkels' 2005 conclusion with regard to the use of the ICF to validate measurement tools. The ICF has been proposed as a unifying framework and classification system for rehabilitative medicine; ICF Core Sets are now being tested and validated internationally⁴. These ICF Core Sets have been developed for many chronic conditions, including RA, osteoarthritis, low back pain, and stroke^{5,6}. However, this does not detract from the fact that the results of this study are very applicable for therapists treating patients with rheumatic disorders, as they provide guidance for choosing appropriate measurement tools. The profession of physical therapy would benefit from additional research on the psychometric properties of commonly used assessment tools as done by Dr. Swinkels in this thesis, especially with a focus on the most responsive tools to assess change during a course of treatment, thereby providing outcome data to validate the benefit of therapeutic intervention.

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