Improving the evaluation of therapeutic interventions in multiple sclerosis: development of a patient-based measure of outcome

JC Hobart,[1,2*] A Riazi,[1] DL Lamping,[3]
R Fitzpatrick[4] and AJ Thompson[1]

[1] Neurological Outcome Measures Unit, Institute of Neurology, London, UK
[2] Peninsula Medical School, Derriford Hospital, Plymouth, UK
[3] Health Services Research Unit, London School of Hygiene and Tropical Medicine, UK
[4] Division of Public Health and Primary Health Care, Institute of Health Sciences, University of Oxford, UK

* Corresponding author

Improving the evaluation of therapeutic interventions in multiple sclerosis

Executive summary

Health Technology Assessment 2004; Vol. 8: No. 9

Health Technology Assessment
NHS R&D HTA Programme

◆

Executive summary

Background

Multiple sclerosis (MS) is an incurable progressive neurological disorder that has a profound impact on people's lives. Although a wide range of problems has been documented, the impact of MS from the individual's perspective has not been systematically and directly measured. There is no outcome measure that incorporates patients' own perspectives about the impact of MS that is sufficiently rigorous to be used in treatment trials, epidemiological studies and audit. This report describes the development and validation of a new instrument, the Multiple Sclerosis Impact Scale (MSIS-29), a rigorous measure of the physical and psychological impact of MS from the patient's perspective.

Objectives

To develop a patient-based, disease-specific measure of the health impact of MS that is clinically useful, and scientifically sound, and suitable for use as an outcome measure in clinical trials and in routine clinical practice.

Methods

Standard psychometric methods were used to develop the MSIS-29 in three stages.

- Stage 1 (item generation): questionnaire items were generated from 30 patient interviews on the impact of MS on their lives, expert opinion and literature review.
- Stage 2 (item reduction and scale generation): the questionnaire developed in stage 1 was administered by postal survey to 1530 randomly selected members of the MS Society. Standard item reduction techniques were used to develop a rating scale.
- Stage 3 (psychometric evaluation): the rating scale was evaluated for data quality, scaling assumptions, acceptability, reliability and validity in a separate postal survey of 1250 MS Society members. Responsiveness was evaluated in 55 people admitted to hospital for rehabilitation and intravenous steroid treatment of MS relapses.

Results

- Stage 1: a pool of 129 items was generated.
- Stage 2: the item pool was reduced to a 29-item measure of the physical (20 items) and psychological (nine items) impact of MS: the MSIS-29.
- Stage 3: the MSIS-29 satisfied all recommended psychometric criteria for rigorous measurement. Data quality was excellent: missing data were low (maximum 3.9%), item test–retest reliability was high ($r = 0.65–0.90$) and scale scores could be generated for >98% of respondents. Item descriptive statistics, item convergent and discriminant validity, and factor analysis supported summing items to produce two summary scores. MSIS-29 physical and psychological scale scores showed good variability, low floor and ceiling effects, good internal consistency (Cronbach's $\alpha \geq 0.91$) and test–retest reliability (intraclass correlation ≥ 0.87). Correlations with other measures, and confirmation of hypotheses about group differences, provided evidence for the validity of the MSIS-29 as a measure of the physical and psychological impact of multiple sclerosis. Effect sizes (physical scale = 0.82, psychological scale = 0.66) provided preliminary evidence for responsiveness.

Conclusions and recommendations

The 29-item MSIS-29 is a rigorous new measure of the physical and psychological impact of MS. All psychometric criteria were satisfied and there is preliminary evidence of responsiveness. The MSIS-29 is particularly appropriate for use in clinical trials to evaluate therapeutic effectiveness from the patient's perspective.

A limitation of the study is that the MS Society membership database was used to define the sampling frame; the percentage of people in the database with a neurologist-confirmed diagnosis of clinically definite MS, the disease type of those with MS and the representativeness of people who join charitable groups are unknown.

Critical evaluations of the MSIS-29 completed by people with neurologist-confirmed MS in different settings will identify its strengths and weaknesses, and further define its role in clinical practice and research. Head-to-head comparisons of the psychometric properties of the MSIS-29 and other outcome measures for MS will help to determine the relative advantages of different instruments so that the choice of measures for studies can be evidence based.

Publication

Hobart JC, Riazi A, Lamping DL, Fitzpatrick R, Thompson AJ. Improving the evaluation of therapeutic interventions in multiple sclerosis: development of a patient-based measure of outcome. *Health Technol Assess* 2004;**8**(9).

NHS R&D HTA Programme

The NHS R&D Health Technology Assessment (HTA) Programme was set up in 1993 to ensure that high-quality research information on the costs, effectiveness and broader impact of health technologies is produced in the most efficient way for those who use, manage and provide care in the NHS.

Initially, six HTA panels (pharmaceuticals, acute sector, primary and community care, diagnostics and imaging, population screening, methodology) helped to set the research priorities for the HTA Programme. However, during the past few years there have been a number of changes in and around NHS R&D, such as the establishment of the National Institute for Clinical Excellence (NICE) and the creation of three new research programmes: Service Delivery and Organisation (SDO); New and Emerging Applications of Technology (NEAT); and the Methodology Programme.

This has meant that the HTA panels can now focus more explicitly on health technologies ('health technologies' are broadly defined to include all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care) rather than settings of care. Therefore the panel structure was replaced in 2000 by three new panels: Pharmaceuticals; Therapeutic Procedures (including devices and operations); and Diagnostic Technologies and Screening.

The HTA Programme will continue to commission both primary and secondary research. The HTA Commissioning Board, supported by the National Coordinating Centre for Health Technology Assessment (NCCHTA), will consider and advise the Programme Director on the best research projects to pursue in order to address the research priorities identified by the three HTA panels.

The research reported in this monograph was funded as project number 95/01/03.

Criteria for inclusion in the HTA monograph series
Reports are published in the HTA monograph series if (1) they have resulted from work commissioned for the HTA Programme, and (2) they are of a sufficiently high scientific quality as assessed by the referees and editors.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

HTA Programme Director:	Professor Tom Walley
Series Editors:	Dr Ken Stein, Professor John Gabbay, Dr Ruairidh Milne, Dr Chris Hyde and Dr Rob Riemsma
Managing Editors:	Sally Bailey and Caroline Ciupek

ISSN 1366-5278

Published by Gray Publishing, Tunbridge Wells, Kent, on behalf of NCCHTA.
Printed on acid-free paper in the UK by St Edmundsbury Press Ltd, Bury St Edmunds, Suffolk.