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Relative utility of a visual analogue scale vs a six-point Likert scale in the measurement of global subject outcome in patients with low back pain receiving physiotherapy

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Abstract

Background Patients' subjective impression of change is an important construct to measure following physiotherapy, but little evidence exists about the best type of measure to use.
Objective To compare the construct validity and utility of two forms of a global subjective outcome scale (GSOS) in patients with back pain: Likert and visual analogue scale (VAS) GSOS.
Design Two samples of patients attending physiotherapy for back pain completed a questionnaire battery at discharge from physiotherapy including either a Likert or VAS GSOS.
Participants One hundred and eighty-seven {79 males, mean age 52.1 [standard deviation (SD) 15.5] years} patients completed the Likert GSOS and a separate sample of 144 patients [62 males, mean age 55.7 (SD 15.9) years] completed the VAS GSOS upon discharge from physiotherapy.
Main comparisons The two versions of the GSOS were compared using pre- and post-treatment changes in scores using a VAS (pain), Roland–Morris Disability Questionnaire (18-item version) and catastrophising subscale of the Coping Strategies Questionnaire 24.
Results Both versions of the GSOS showed significant ($P < 0.01$) moderate correlations (r between 0.30 and 0.46) with changes in pain and disability. The correlations between the two types of GSOS and changes in catastrophising were trivial and not significant (Likert GSOS: $r = 0.07$, $P = 0.372$; VAS GSOS: $r = 0.10$, $P = 0.267$). There were fewer missing values in the Likert GSOS (1%) compared with the VAS GSOS (8%).
Conclusions The two versions of the GSOS showed similar validity; however, use of the Likert GSOS is recommended because of its greater utility.

Keywords: Global subjective outcome; Visual analogue scale; Likert scale; Back pain

Introduction

A wide range of clinical outcome measures are available for researchers and practitioners in the field of pain management. Expert recommendations point to the value of measures of patients' overall perceptions of treatment outcome, as well as measures of pain and function [1,2]. A common term for scales that measure patients' perceptions of outcome is 'global subjective outcome scales' (GSOS) [3].

The value of a GSOS is that it provides a direct representation of patients' perceptions of their overall outcome. From a research perspective, global subjective outcome measurement is often used as the gold standard against which other subjective self-report measures are validated [4,5].

A GSOS is usually presented in the form of a Likert scale rather than a visual analogue scale (VAS) [6]. One of the attractions of a Likert scale, typically with five to seven

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response points and markers ranging from 'completely better' to 'worse', is its inherent practicality, being easier to understand and score compared with a VAS. However, Cummins and Gullone [7] argued that five-to-seven-point Likert scales are too restrictive, and stated that they are 'hardly likely to exploit the discriminative capacity of most people in terms of their perceived well-being'. Secondary to that argument, a VAS, being a continuous measure, could represent a better option as a GSOS, offering a greater range of potential response points. This forms part of an ongoing debate in the psychometric literature about the relative merits of Likert scales compared with VAS in psychosocial measurement [8]. Debate about the relative merits of each response format, Likert vs VAS, is current in health care. For example, in the context of psychological coping, Flynn *et al.* [9] recommended the use of Likert scales over VAS due to the wider range of transactional coping patterns captured by Likert scales. There is also evidence, with self-rated health measurement scores, of a higher non-completion rate for VAS compared with Likert scales [10].

In the context of musculoskeletal pain, Bolognese *et al.* [11] compared the performance of a Likert scale with a VAS GSOS in a sample of people with osteoarthritis of the knee, and reported them to be psychometrically similar. Within the musculoskeletal literature, no studies were found that compared the use of Likert scales with VAS for the purposes of global subjective outcome measurement in back pain. Therefore, the aim of this study was to compare the two response formats in this population. Specifically, the study aimed to establish the construct validity of each form of GSOS, and compare their utility.

Materials and methods

Design

This paper presents data from two studies that used a GSOS within their data collection strategy. The first was an observational study that recruited participants at discharge from physiotherapy who had previously completed routinely collected questionnaire-based clinical assessment measures. The second was a randomised controlled trial (RCT) where GSOS data were collected as part of a larger study. Data in the current study came from participants in each of the three arms of the RCT, in which participants were randomised to a specialist-physiotherapist-led, a non-specialist-physiotherapist-led or a physiotherapist-led group-based intervention. The first (observational) study took place before the second study and they did not overlap. Ethical approval for the studies was gained from the local research ethics committee for the first sample, and from the National Research Ethics Service for the second sample. All participants gave their written informed consent.

Participants and sampling

Participants in both studies were adults (>18 years old) with back pain attending physiotherapy. In both studies, participation was open to all patients attending the service who were able to understand the questionnaire battery presented in the English language. For both samples, a consecutive sampling method was used within the allocated recruitment time frame for each study.

Setting

For both studies, data collection took place within a single physiotherapy department in the north of England.

Procedure

In both studies, participants completed a clinical outcomes battery before and after treatment that included measures of pain intensity using a VAS pain scale [12], disability using the Roland–Morris 18-item Disability Questionnaire (RM18) [13], and pain catastrophising using the catastrophising subscale of the Coping Strategies Questionnaire 24 [14]. These measures were chosen because they demonstrate good reliability and validity, and have established clinically important change cut-off scores [15–17]. Additionally, at discharge from treatment, participants completed a GSOS.

In the observational study, GSOS scores were collected using a six-point Likert-based GSOS, and patients were recruited at discharge so the questionnaire response rate was 100%. The descriptors used in the Likert-based scale were: 'worse', 'same', 'a little better', 'moderately better', 'a lot better' and 'completely better'. In the RCT study, GSOS scores were collected using a 100-mm VAS GSOS, and patients were recruited at the start of treatment and completed the discharge questionnaire at the time of their last treatment. The number of patients completing treatment and the discharge questionnaire for this study was 144/331 (GSOS data gained from 44% of the original sample). The anchors used at either end of the VAS GSOS were 'worse overall' and 'completely better'.

Analysis

Two aspects of construct validity were tested for each of the two forms of GSOS: convergent and discriminant validity.

Pearson's correlation coefficient tests were used to establish convergent validity linear relationships between the specific GSOS scores and the amount of measured change in pain, disability and catastrophising.

Differences in GSOS scores between responders and non-responders were compared in terms of the measures of pain, disability and catastrophising using independent *t*-tests in order to establish discriminant validity of the two forms of GSOS. Responders scored above the clinically important difference in the selected measures, and non-responders scored