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Journal of Sport and Health Science 4 (2015) 396–398

www.jshs.org.cn

Original article

Evaluation of the test–retest repeatability of the Injury Severity Perception score in patients with acute whiplash-associated disorder

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Received 10 June 2014; revised 24 June 2014; accepted 1 July 2014

Available online 27 October 2014

Abstract

Objective: To determine the test–retest repeatability of the Injury Severity Perception (ISP) score in participants with acute whiplash-associated disorders (WADs).

Methods: Consecutive patients with WAD, presenting in the acute stage to a primary care center, were asked to complete the ISP score. ISP was measured with a numerical rating scale that ranged from 0 to 10, on which subjects were asked to rate how severe (in terms of damage) they thought their injury was. The anchors were labeled “no damage” (0) and “severe, and maybe permanent damage” (10). The ISP questionnaire was administered to the participants at the time of recruitment and again 7 days later. Repeatability was evaluated by calculating percentage agreement and Cohen kappa statistic between the two time points of measurement.

Results: A total of 94 subjects (34 males, 60 females, mean age 40.6 ± 10.0 years, range 19–60 years) were included. The mean ISP score was 4.9 ± 1.7 (range 2–9 out of 10) at the time of recruitment and 5.1 ± 2.1 (range 2–9 out of 10) 7 days later. The percentage agreement between the two repeat measures of the ISP was 86% and the kappa coefficient was 0.79.

Conclusion: This study suggests that the test–retest repeatability for the ISP is high and that it is thus likely to have a low risk of classification bias in prognostic studies. The ISP likely has adequate reliability for use in epidemiological research of WADs.

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Keywords: Injury; Injury Severity Perception; Pain; Whiplash injury

1. Introduction

Previously, the Injury Severity Perception (ISP) score was tested to assess the correlation between expectations of recovery and patients' perceptions of injury severity in participants with whiplash-associated disorder (WAD).¹ The study involved asking acute whiplash-injured subjects their expectations of recovery by asking “Do you think that your injury will ...” with response options “get better soon; get better slowly; never get better; don't know.” Then ISP was measured with a numerical rating scale that ranged from 0 to 10. On this scale, subjects were asked to rate how severe (in terms of damage) they thought their injury was. The anchors were

labeled “no damage” (0) and “severe, and maybe permanent damage” (10). There was a high correlation between expectations and ISP score. That is, those who expected to recover soon and those who expected to get better slowly had lower ISP scores than those who expected to never get better or stated that they did not know when they would recover. Thus, the more slowly whiplash patients expect to recover, or the less sure they are of recovery, the more severe their initial perceptions of injury.

Despite the high correlation observed, and thus the capacity for injury perception to be a potentially useful tool in prognostic studies, little is known about the psychometrics of the ISP. Specifically, little is known about the repeatability (an aspect of reliability) of the ISP. Repeatability is important because this directly correlates to the probability of misclassification bias.² Epidemiological studies that use these types of questions are therefore at risk of estimating effect sizes that are biased

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Peer review under responsibility of Shanghai University of Sport.

toward, or away from the null, depending on the type misclassification present.

The primary objective of this study was to determine the test–retest repeatability of the ISP in a sample of patients with acute WAD. The null hypothesis was that the test–retest repeatability would be below 70%.

2. Methods

2.1. Participants and design

The participants for this study have been described in another study.¹ The author recruited a cohort of consecutive whiplash-injured patients presenting within 14 days of their collision to a single walk-in primary care center. Patients with a motor vehicle collision and suspected WAD were routinely referred from general practitioners at the clinic, directly to the author, who was acting as a specialist consultant within that clinic. The specialist was an internist with an interest in rheumatology and chronic pain. It was the practice during the time of this consultant's presence at the clinic to refer all acute whiplash patients to the consultant. The author gathered data on these participants referred over a 5-month period, the measurements being conducted at the initial and follow-up consultation as part of the routine measures provided to all patients (i.e., as part of usual assessment). Ethical clearance was obtained from the Alberta Health Research Ethics Board.

All subjects were, at the time of the study, in a system of new legislation that places a cap on compensation for whiplash grades 1 and 2, of C\$4000, with a standardized diagnostic treatment protocol applied to each subject. This system has been described elsewhere.³

2.2. Inclusion and exclusion criteria

Prospective participants were further assessed for inclusion and exclusion criteria at the time of the initial interview. Subjects were examined to determine their WAD grade.⁴ WAD grades 1 or 2 patients were included if they were seated within the interior of a car, truck, sports/utility vehicle, or van in a collision (any of rear, frontal or side impact), had no loss of consciousness, were 18 years of age or over, and presented within 14 days of their collision. Patients were excluded if they were told they had a fracture or neurological injury (i.e., grades 3 or 4 WAD), had objective neurologic signs on examination (loss of reflexes, sensory loss, i.e., grade 3 WAD), previous whiplash injury or a recollection of prior spinal pain requiring treatment, no fixed address or current contact information, were unable to communicate in English, had non-traumatic pain, were injured in a non-motor vehicle event, or were admitted to hospital. As part of the objective was a determination of the proportion of recovery at 3 and 6 months, participants who had additional collisions with reported injury during this period of follow-up were also excluded.

2.3. Measures

In addition to gathering data on age and sex, subjects completed the ISP questionnaire, which was measured with a numerical rating scale which ranged from 0 to 10, on which subjects were asked to rate how severe (in terms of damage) they thought their injury was. The anchors were labeled “no damage” (0) and “severe, and maybe permanent damage” (10).

The test–retest repeatability of the ISP was tested by asking participants to complete the scale at the time of recruitment and then again 7 days later. This minimal interval was selected because it minimizes recollection bias when studying conditions that fluctuate in time.⁵

2.4. Data analysis

Sample size was determined by a previous study.¹ This convenience sample was used to test the repeatability of the ISP in the current study. All analyses were completed using STATA/SE, version 10.0 for Macintosh. $p < 0.05$ was considered statistically significant.

3. Results

Of the 94 subjects, there were 34 males, 60 females, with mean age 40.6 ± 10.0 years. The initial mean ISP score was 4.9 ± 1.7 (range 2–9 out of 10). After 5–7 days, mean ISP score was 5.1 ± 2.1 (range 2–9 out of 10). This difference is not statistically significant. Age and gender did not correlate with ISP score. The percentage agreement between the two repeat measures of the ISP was 86% and the Cohen kappa coefficient was 0.79.

4. Discussion

This study shows that the ISP score has high repeatability with little change when administered 1 week apart in a cohort of whiplash-injured subjects. The study has limitations. First, to measure test–retest repeatability, one would optimally need a sample of subjects with a stable condition, which is not expected to be the case in whiplash injury. Yet, a 1-week interval is unlikely to lead to a dramatic change in this condition, and it is not clear that reductions in pain with recovery would affect ISPs. Second, although a period was allowed to reduce the likelihood of remembering a previous response, there was no testing done to assess how many respondents actually remembered their initial score on the ISP. Memory may have an effect on repeatability when the instrument being used has only a single scale or question, as was the case in this study. Future studies can examine the repeatability in the setting of multiple questions to reduce the effect of memory on repeatability. In conclusion, the ISP score appears to be a reliable measure and is thus suitable for future epidemiological work in WADs.

References

1. Ferrari R, Louw D. Correlation between expectations of recovery and injury severity perception in whiplash-associated disorders. *J Zhejiang Univ Sci B* 2011;12:683–6.

2. Streiner DL, Norman GR. *Health measurement scales: a practical guide to their development and use*. 3rd ed. Toronto: Oxford University Press; 2003.
3. Russell A, Ferrari R. Whiplash: social interventions and solutions. *J Rheumatol* 2008;**35**:2300–2.
4. Ozegovic D, Carroll LJ, Cassidy JD. Does expecting mean achieving? The association between expecting to return to work and recovery in whiplash associated disorders: a population-based prospective cohort study. *Eur Spine J* 2009;**18**:893–9.
5. Marx RG, Menezes A, Horovitz L, Jones EC, Warren RF. A comparison of two time intervals for test–retest reliability of health status instruments. *J Clin Epidemiol* 2003;**56**:730–5.