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Research Report:

Correlation between expectations of recovery and injury severity perception in whiplash-associated disorders

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Abstract: Objective: To assess the correlation between expectations of recovery and whiplash patients' perceptions of injury severity using a simplified instrument. Expectations of recovery have been shown to predict rate of recovery from whiplash injury in population-based studies. The perception of having more severe pathology or more ominous diagnostic labels has also been associated with a worse prognosis. Methods: Consecutive patients with whiplash-associated disorder grade 1 or 2, presenting in the acute stage to a primary care centre, were asked "do you think that your injury will…" with response options "get better soon; get better slowly; never get better; don't know." Injury severity perception (ISP) was measured with a numerical rating scale which ranged from 0–10, 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 primary outcome measure was the correlation between the subject's ISP score and expectation of recovery. Results: A total of 94 subjects (34 males, 60 females, and mean age (40.6±10.0) years, range 19–60 years) were included. The initial responses to expectation of recovery were: get better soon (29/94); get better slowly (22/94); never get better (11/94); don't know (32/94). The mean ISP score was 4.9±1.7 (range 2–9 out of 10). There was a high correlation between expectations and ISP scores (Spearman's rank correlation coefficient 0.68). Those who expected to recover soon and those who expected to get better slowly had the lowest ISP scores. Conclusions: The more slowly whiplash patients expect to recover, or the less sure they are of recovery, the more severe their initial perceptions of injury.

Key words: Whiplash-associated disorders (WAD), Expectations of recovery, Injury severity perception (ISP)
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1 Introduction

Whiplash-associated disorders (WAD) are an important public health problem (Carroll *et al.*, 2009a). Studies indicate that 30%–50% of whiplash patients will experience pain for at least six months after the collision, resulting in a significant impact on overall quality of life (Ferrari and Russell, 2008; Carroll *et al.*, 2009b). Additionally, patients will consume, on average, thousands of dollars of treatment and disability benefits. Many psychosocial factors have been associated with poor outcomes after whiplash injury, including compensation systems, expectations, and coping styles (Ferrari and Russell, 2008; Carroll *et al.*, 2009a; 2009b). Beliefs may be particularly important. A population-based study has revealed that patients' expectations of recovery obtained during the acute stage after injury actually predict the rate of recovery (Carroll *et al.*, 2009b). After adjusting for the effect of sociodemographic characteristics, post crash symptoms as well as pain, prior health status, and collision-related factors, those who expected to get better soon recovered over three times as quickly (hazard rate ratio=3.62, 95%

confidence interval 2.55–5.13) as those who expected that they would never get better (Carroll *et al.*, 2009b). Expectations were also predictive for returning to work after whiplash injury (Ozegovic *et al.*, 2009). Findings were similar for resolution of pain-related limitations and resolution of neck pain intensity. In brief, controlling for initial pain, symptoms, gender, age, and numerous other baseline variables, the answer to a graded question early after injury: "Do you think that your injury will get better soon; get better slowly; never get better; or don't know?" is a strong predictor of recovery rate.

Even though, to date, no specific single injury has been consistently demonstrated in whiplash patients, beliefs about the severity of injury may be relevant. Buitenhuis *et al.* (2008) showed, for example, that the belief system concerning one's neck pain is prognostic for recovery. They describe dysfunctional causal beliefs to be the attribution of the acute neck pain to severe, neural, or irreparable causes. In essence, an aspect of the clinical problem that in fact produces a given expectation may be perception, as part of a larger problem of attributional pathosis (Ferrari, 2002).

Additional research in this area has shown that asking patients to rate the strength of their beliefs on a numerical scale (0–10) provides a reasonable assessment of that belief, one that also correlates with recovery (Holm *et al.*, 2008). One belief system that has yet to be assessed is the degree to which whiplash patients attribute their symptoms to actual damage to the spine or other tissues. In other words, how severe do they perceive their injury to be?

Primary care physicians and health care practitioners are often constrained by time in their initial assessment of whiplash patients. If detection of negative perceptions (e.g., attributions of pain to severe damage) is to be important in the initial assessment (to identify those patients most at risk for chronic pain and best suited for early intervention to affect their beliefs), clinicians require instruments that rely on few questions, like the above-noted questions dealing with expectations of recovery. Since expectations appear to predict recovery, and injury severity perceptions (ISP) may also predict recovery, it would be helpful to know how these perceptions correlate with expectations of recovery. Thus, the purpose of the current study was to determine the correlation between expectations of recovery and patients' ISP using a simplified instrument.

2 Subjects and methods

2.1 Subjects and design

This was a cross-sectional study of consecutive whiplash-injured patients presenting within seven days of their collision to a single walk-in primary care centre. They were all patients with a motor vehicle collision and suspected WAD were routinely referred from general practitioners at the clinic, directly to one of the researchers (Robert Ferrari) who was acting as a specialist consultant within that clinic. The researcher/specialist gathered data on these subjects, and the assessment of expectation of recovery being conducted at the initial consultation as part of the routine measures is provided to all patients (i.e., as part of usual assessment). Prospective subjects were further assessed for inclusion and exclusion criteria at the time of initial interview. WAD grade 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 recall of loss of consciousness, were 18 years of age or over, and presented within seven days of their collision. Patients were excluded if they were told they had a fracture or neurological injury (i.e., WAD grade 3 or 4), had objective neurologic signs on examination (loss of reflexes, sensory loss), 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. Ethical clearance was obtained from the Health Research Ethics Board of the University of Alberta, Canada.

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 USD 4000, with a standardized diagnostic treatment protocol applied to each subject. This system has been described elsewhere (Ferrari and Russell, 2008). All subjects had filed a claim with an insurance company to receive treatment benefits.

2.2 Measures

Subjects completed a questionnaire containing a single question concerning expectations of recovery: "Do you think that your injury will…" with response options "get better soon; get better slowly; never get better; don't know" (Carroll *et al.*, 2009b). The ISP was measured with a numerical rating scale which ranged from 0–10, 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).

2.3 Statistical analysis

Crude associations between age, gender, and ISP score were assessed using chi-squared tests, with alpha levels set at 0.05. Spearman's rank correlation coefficient was calculated for expectation score and ISP. As previous studies have indicated that subjects whose expectations of recovery are "don't know" are intermediate between "get better slowly" and "never get better", the former was ranked between these two latter categories. Significance was set at $P<0.05$. All analyses were completed using STATA/SE, version 10.0 for Macintosh.

3 Results

A total of 126 prospective subjects were assessed, and from these 32 were excluded (27 due to previous history, three due to loss of consciousness, and two due to lack of English). Thus, 94 subjects formed the cohort for study.

Of the 94 subjects, there were 34 males, 60 females, with mean age of (40.6±10.0) years. The initial responses to expectation of recovery were: get better soon (29/94); get better slowly (22/94); never get better (11/94); don't know (32/94). The mean ISP score was 4.9±1.7 (range 2–9 out of 10).

Age and gender did not correlate with expectation or ISP score. Table 1 shows the mean ISP for each of the expectation groups. Those who expected to "get better soon" and "get better slowly" had significantly lower ISP scores than those who expected to "never get better" or were unsure "don't know". The Spearman's rank correlation coefficient for ISP score and expectation of recovery was 0.68.

Table 1 Injury severity perception (ISP) score according to expectations of recovery

Expectation group	ISP score*
Get better soon (n=29)	3.6±0.9 (2–5)
Get better slowly (n=22)	3.9±0.8 (3–5)
Never get better (n=11)	7.6±0.9 (6–9)**
Don't know (n=32)	6.0±1.2 (3–8)**

* Data are presented as mean±standard deviation (range). ** Indicates statistically significant difference between groups with expectations to recover more quickly ($P<0.05$)

4 Discussion

This study demonstrates that, in a primary care setting, the whiplash patient's response to the question "Do you think that your injury will get better soon; get better slowly; never get better; or don't know?" correlates with the subject's injury severity perception (the ISP score). Outcome studies are required to verify the independent variance in outcome explained by perceptions. This may provide a measure for primary care practitioners to use early after injury to predict which patients will have a worse prognosis after whiplash injury.

It is not entirely surprising that there should be a correlation between expectation of recovery and ISP. It seems logical that patients who perceive more severe injury would expect slower recovery. But this is exactly what educational interventions, if they are to have any use, must address. It is not enough to ask what people expect, but to ask why they have the expectation. Then there is an opportunity to address that perception and its foundation.

Whiplash patients cannot, for example, know how severe their injury is. Pain is not the same as pathology, and neither patients nor practitioners have any way of accessing the injury severity objectively. By whatever manner these subjects derive their perceptions of injury severity, whether according to pain levels or catastrophizing, or other numerous factors that may be operative, the perceptions do exist, and logically correlate with expectations of recovery, even if patients are mistaken. The observed correlation suggests, however, that other factors besides ISP explain the additional variance in expectations of recovery.

The strengths of the study include the fact that these were consecutive whiplash subjects, attending a

primary care walk-in clinic, a typical setting for presentation of whiplash victims, and thus these patients are likely representative of many primary care populations in Canada. The age and gender distributions are typical of other whiplash populations studied in Canada (Caroll *et al.*, 2009b). The study did not directly assess other predictive factors (Caroll *et al.*, 2009a), which may have correlated with expectation and perception of injury severity. For example, it could be that subjects with more initial pain attribute their pain to more injury. Finally, there is no knowledge of the psychometrics of the injury severity perceptions instrument used in this study. The instrument thus requires a further evaluation.

Expectations for type and duration of whiplash-associated symptoms exist prior to the injury (Bostick *et al.*, 2009). WAD are seen in the general public (those who have never experienced this) as often having a poor prognosis, frequently leading to chronic symptoms (Carroll *et al.*, 2009a; 2009b). It seems likely that these prior beliefs are influential in the expectations individuals form for their own recovery after an actual injury; and that these expectations for recovery are modified by the immediate injury experience (for example initial pain intensity and extent), as well as by early experiences with health care professionals. Health care practitioners may inadvertently create and/or promote false perceptions of injury severity. There are, again, no diagnostic methods for determining the degree of tissue injury in grades 1 and 2 WAD. More pain does not mean more injury. The findings of this study suggest that it is worthwhile for practitioners to assess expectations for recovery and perceptions regarding injury severity as a means of identifying those injured patients at risk for poor recovery. At particular risk are those who either anticipate never getting better, or appear unsure of what to expect, and with further study, perceptions may also be found to be an independent predictor of outcome.

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