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The smallest worthwhile effect of nonsteroidal anti-inflammatory drugs and physiotherapy for chronic low back pain: a benefit−harm trade-off study

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Abstract

Objective: The aim of this study was to determine the smallest worthwhile effects of two treatments for nonspecific low back pain (LBP).

Study Design and Setting: The benefit−harm trade-off method was used to estimate the smallest worthwhile effect of nonsteroidal anti-inflammatory drugs (NSAIDs) and physiotherapy for LBP. Patients seeking care for chronic LBP were interviewed by telephone before treatment commenced and 4 weeks later.

Results: Patients need to see a median of 30% (interquartile range [IQR]: 10−40) more improvement in pain and 20% (IQR: 10−40) more improvement in disability than would occur without intervention to perceive the effect of NSAIDs are worthwhile. They would need to see 20% (IQR: 0−30) more improvement on pain and disability over natural recovery to perceive that the effect of physiotherapy was worthwhile. There was no difference in estimates of the smallest worthwhile effect elicited at baseline and 4 weeks later.

Conclusions: People with chronic back pain need to see larger effects on pain of NSAIDS than physiotherapy to consider the effects of these interventions worthwhile. These estimates of the smallest worthwhile effect can be used to interpret the findings of clinical trials and to design adequately powered clinical trials.

Keywords: Minimum clinically important difference; Sufficiently important difference; Low back pain; Clinical trials; Research design; Drug therapy

1. Introduction

In 1989, Jaeschke et al. [1] defined the ''minimum clinically important difference'' as ''the smallest difference in score in the domain of interest, which patients perceive as beneficial and which would mandate, in the absence of troublesome side effects and excessive cost, a change in the patient's management.'' Since Jaeschke's seminal article, many studies have been conducted to ascertain the smallest worthwhile effects of a range of interventions. Robust estimates of the smallest worthwhile effect of interventions can be used to inform sample size calculations in clinical trials and to interpret the findings of clinical trials [2].

A recent systematic review located 31 studies and 129 estimates of the smallest worthwhile effect of interventions for nonspecific low back pain (LBP) [2]. Most of the studies identified in the review used anchor- or distribution-based methods. These methods have important limitations that, we argue, mean they should not be used to inform sample size calculation for clinical trials or to interpret treatment effects observed in clinical trials [2]. For instance, the review found that, of the 129 estimates elicited, only 5% were based directly on patients' judgments, only

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What is new?

- Patients with chronic low back pain (LBP) need to see larger effects with nonsteroidal anti-inflammatory drugs (NSAIDs) than with physiotherapy to consider the intervention worthwhile.
- These estimates do not change over time and are in general not associated with symptom severity, duration, or mood.
- The smallest worthwhile effects elicited in this study reflect patients' opinions; are based on between-treatment differences; and consider the costs, risks, and inconvenience of intervention.
- We advocate the use of these estimates in sample size calculations and interpretation of trial findings of NSAIDs or physiotherapy for chronic LBP.

4% were intervention specific (i.e., considered the costs, risks, and inconveniences of intervention), and all were based on changes in symptoms over time rather than on differences in outcomes with and without intervention. The latter is an important limitation of existing estimates because changes in outcomes that are measured over time may partly reflect not only the effects of intervention but can also be influenced by many other factors [3]. Effects of intervention can only be understood in terms of differences in outcomes with and without intervention [4,5]. Thus, any attempts to identify the smallest worthwhile effects of intervention must define the smallest worthwhile effect in terms of the difference in outcomes with and without intervention [2].

In 2005, Barrett et al. [6−8] described the use of a form of contingent analysis, the ''benefit−harm trade-off method,'' to estimate the smallest worthwhile effect of health interventions. This method has been previously used to estimate the smallest worthwhile effect of interventions for the common cold [7], cancer therapies [9−17], and larval therapy [18]. It overcomes the limitations of anchor- and distribution-based methods because it captures the judgments of recipients of care; allows participants to weigh the benefits of treatment against the risks, costs, and inconveniences of treatment; and potentially provides estimates that are based on an intervention−control comparison.

In the present study, we use the benefit−harm trade-off method to elicit estimates of smallest worthwhile effect for two common treatments for nonspecific LBP, namely nonsteroidal anti-inflammatory drugs (NSAIDs) and physiotherapy (including manual therapy and exercise). In both cases, the comparator was no intervention. The aims of the study were to determine: (1) the distribution of the smallest worthwhile effect for NSAIDs and physiotherapy, (2) if patients assign different smallest worthwhile effects after 4 weeks of intervention, and (3) if duration or severity of symptoms (pain and disability) or mood (depression, stress or anxiety) is associated with these estimates.

2. Methods

The study was approved by the University of Sydney Human Research Ethics Committee (application 10859). A sample of 102 patients with chronic nonspecific LBP was recruited by inviting consecutive patients presenting to two private physiotherapy practices in Sydney, Australia, to participate between February 2009 and February 2010. Patients with specific spinal pathology (e.g., nerve root compromise, inflammatory disorders, fracture, or malignancy) were excluded, as were those experiencing a back pain episode of less than 3 months duration. The sample size of 102 participants has a better than 80% power to detect partial correlations among the six predictors and outcomes of as small as 0.4, assuming a fully exchangeable correlation among predictors of 0.2 [19]. The level of significance was set at 0.05.

2.1. Estimation of the smallest worthwhile effect

All patients who gave consent were contacted by phone before treatment commenced. During the interview, baseline measures were obtained of pain intensity, disability, mood, and duration of the current episode of back pain. Pain intensity over the last 24 hours was measured on an 11-point pain scale, anchored at ''no pain'' and ''worst pain I have ever experienced.'' Disability was measured using the Roland Morris Disability Questionnaire (a 0−24-point scale). Mood was measured using the Depression, Anxiety, and Stress Scale (DASS-21; a 0−42-point scale) [20]. These measures were only used to describe the cohort and did not inform the estimates of the smallest worthwhile effect. The benefit−harm trade-off method was used to obtain estimates, for each participant, of the smallest worthwhile effect of NSAIDs and of a course of physiotherapy for treatment of LBP, when compared with no treatment. In addition, participants were questioned about their age, gender, education level, smoking, number of previous episodes of back pain, presence of leg pain, country of birth, past experience with NSAIDs and physiotherapy, and work status.

A trained interviewer interviewed each participant using standardized scripts, which had been formally piloted on 10 patients with LBP (Appendix; available on the journal's website at www.jclinepi.com). First, the interviewer described to the participant how much improvement could be expected in the next 2 weeks without any treatment (natural recovery). This was the counterfactual against which the outcome was compared. Specifically, the interviewer indicated that, without treatment, the participant could expect a 30% improvement in pain and disability, and recovery from the current episode of pain in 14 days. The