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Letter to the Editor: What Are the MCIDs for PROMIS, NDI, and ODI Instruments Among Patients With Spinal Conditions?

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To the Editor,

I read the study by Hung et al. [5] with great interest. The authors reported a median estimated minimum clinically important difference (MCID) of 8 for the Patient-Reported Outcomes Measurement Information System (PROMIS®) physical function version 1.2 measure. Because this measure is scored on a T-score metric (mean of 50 and SD of 10 in the U.S. general population), 8 is 0.8 SD. This estimate is implausibly large because the methods used to estimate the MCID were flawed.

(RE: Hung M, Saltzman CL, Kendall R, et al. What are the MCIDs for PROMIS, NDI, and ODI instruments among patients with spinal conditions? *Clin Orthop Relat Res.* 2018;476:2027-2036.)

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The MCID refers to the minimum amount of group-level difference that is large enough to be important or meaningful to patients and clinicians. In contrast, the minimum detectable change (MDC), or coefficient of repeatability, refers to the minimum amount of change required for statistically significant individual change [4]. The size of the MDC is directly related to the standard error of measurement. The MDC was used incorrectly as an estimate of the minimally important group change (the MCID) by Hung et al. [5].

Estimates of the MCID from the retrospective rating of change anchor item were based on all those that changed (much worse, worse, slightly worse, slightly improved, improved, much improved) rather than restricting the estimate to people that have changed by a minimal but important amount (slightly worse or slightly improved). In addition, 1/2 SD and 1/3 SD were used as MCID estimates, but these so-called “distribution-based estimates” are fixed effect sizes rather than estimates [2]. If 1/2 SD is a “medium” effect size then it is not “minimal” (ie, an MCID) [1]. Finally, the items were administered using computer adaptive testing, but internal consistency reliability (coefficient alpha) rather than

item response theory (scale information) estimates of reliability was reported [3]. The authors used the same erroneous methods to estimate MCIDs for the PROMIS pain interference measure, Oswestry Disability Index, and the Neck Disability Index.

Unfortunately, others have adopted the thresholds suggested by Hung et al. [5]. For example, a study of lumbar spine surgery [6] used the median physical function estimate of 8 as the MCID. Ironically, the MDC estimates reported by Hung et al. [5] are appropriate for this application because they indicate the amount of individual change that represents statistically significant change on the measure [4]. The amount of change required for significant individual change is typically much larger than what is needed for statistically significant group mean change because the denominator to assess individual change ($\sqrt{2} \text{ SD} \sqrt{1 - \text{reliability}}$) exceeds the standard error of the mean (SD_d / \sqrt{n}). That is, when the group sample size is 6 or larger and the reliability of the measure is 0.90 or less, the amount of group mean change needed to be statistically significant will be less than the amount needed for statistically significant individual change (assuming $\text{SD} = \text{SD}_d$).

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