Scandinavian Journal of Pain 12 (2016) 108–109

Contents lists available at ScienceDirect

Scandinavian Journal of Pain

journal homepage: www.ScandinavianJournalPain.com

Editorial comment

The Brief Pain Inventory (BPI) – Revisited and rejuvenated?

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In this issue of the *Scandinavian Journal of Pain*, Walton and coworkers [1] examine the Brief Pain Inventory (BPI) a ubiquitously used generic comprehensive pain scale. The BPI has been included in 1760 items on the PubMed, retrieved by the single search term "Brief Pain Inventory" (April 16, 2016). The BPI was introduced 1989 [2], and though, originally developed for cancer pain [3], due to its psychometric consistency, it has also been successfully validated in chronic non-cancer pain [4] (the interested reader may refer to an E-bibliographic *tour de force* by one of the principal architects of the BPI [5]). BPI has been used as an outcome measure, particularly concerning the impact of pain on functioning (interference), in a large number of pharmacological and psychological intervention studies and thus BPI is one of the research measures recommended by the *Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials* (IMMPACT [4]).

1. Pain interference with seven or ten items

In the article [1], a companion paper to a recently published Rasch analysis [6,7], the authors state that "[the BPI's] simplicity and broad applicability has led to translation into several languages and application across a variety of conditions." The BPI is a self-administered questionnaire capturing the location and severity of pain, the interference of pain with daily life and the efficacy of pain treatments. The short form BPI, the standard for use in clinical and research applications [5], is a 9-item questionnaire (item 1–9), where the principal item, number 9 contains a 7-item (item A–G) subscale on pain interference, i.e., physical (general activity, walking ability, normal work), affective (mood, relations, enjoyment of life) and sleep domains. An expanded 10-item version of the subscale on pain interference has been proposed [8], including interference with self-care, recreational activities and social activities, but the additional value has not been systematically evaluated across different pain conditions.

2. Pain interference with physical activities, affective functions, and sleep

The authors evaluated the factorial and concurrent validity of the 7-item and 10-item versions of the interference subscale of the BPI in a large heterogeneous sample of community-dwelling chronic pain patients ($n = 2000$) from the Quebec Pain Registry (QPR).

Using two independent exploratory factor analyses and a confirmatory factor analysis it was concluded that the addition of 3 extra items to the original 7-item interference subscale did not improve psychometric properties. However, "the combined results lead us to endorse a 3-factor structure (Physical, Affective, and Sleep Interference) as the more statistically and conceptually sound option."

3. Importance of valid and reproducible patient outcome measures

Well, the authors could not show any statistical difference in model fit between the 7-item and 10-item versions of the interference subscale. The sceptically inclined reader might tell us that the study thus has been conducted in vain. The devoted reader, on the other hand, would strongly argue, that there are important incentives for carrying out exploratory and confirmatory analyses, particularly on ubiquitously used generic pain interference scales. *First*, our epidemiological research tools should always be tested and honed ensuring a valid performance status during various pain conditions, preferably in large scale studies. *Second*, the reproducibility of all research data, not only epidemiological data, depends critically on the quality of our research tools. Most readers are probably familiar with the provocative essay published 2005 by Ioannidis "Why most published research findings are false" [9], cited more than 3600 times[1] (Google Scholar, April 16, 2016). The author uses statistical modelling for a number of causative factors explaining the fallacies and inadequacies of contemporary research reasoning. Among these (mostly statistical) causative factors are: "...where there is greater flexibility in designs, definitions, outcomes, and analytical modes...". This would almost certainly apply to research scenarios where measurement methods are used, not measuring precisely and accurately what they are intended to measure. Imprecise and inaccurate, non-valid research methods introduce variability and heterogeneity in the collected research data, obviously affecting study authenticity and data replicability. In the "*Reproducibility Project: Psychology*" a multinational

DOI of refers to article: http://dx.doi.org/10.1016/j.sjpain.2016.05.002.
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[1] https://scholar.google.dk/scholar?cites=15681017780418799273&as_sdt=2005&sciodt=0,5&hl=en.

http://dx.doi.org/10.1016/j.sjpain.2016.04.003

collaboration involving 270 researchers, 100 published experimental and correlational psychological studies from three well-esteemed psychology journals using high-powered designs, were repeated to investigate if the results could be replicated [10]. While 97% of the original studies had statistically significant results, only 36% of the replications had statistically significant results. Subjectively, 39% of effects were rated to have replicated the original result. The study concluded that replication effects were half the magnitude of the original effects, representing a substantial decline. In pre-clinical research, it has been stated that the low reproducibility rate of research data not only undermines the cumulative knowledge production but also contributes to delays and increases in expenditures for therapeutic drug development, at an estimated annual cost of 28 billion USD alone in the U.S.A. [11].

4. Conclusion: a revisited and rejuvenated Brief Pain Inventory

The lack of standardization of research methods is one of several vulnerable points in contemporary research paradigms. The authors are therefore to be congratulated for a diligent job and for graciously helping future pain researchers: the Brief Pain Inventory – has not only been revisited but also rejuvenated.

Conflict on interest

The author is supported by NIHDA 37621.

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