


Efficacy of Cognitive Behavioral Therapy Combined with Exercise in Patients with Chronic Pain: A Systematic Review and Meta-Analysis [Response to Letter]

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Dear editor

We sincerely thank Hu and Chen for their careful reading of our article and for raising valuable methodological comments. We greatly appreciate the opportunity to clarify our analytical procedures.

In our article, we stated that “shared control groups were split proportionally”; however, more precise wording would have been that “shared arms were split proportionally”. In multi-arm trials, the arm requiring adjustment is the shared arm, which may be either the intervention arm or the comparator arm, depending on the specific analytic contrast. In the studies by Hrkac et al (2022a, b) and McBeth et al (2012a, b, c), the CBT combined with exercise arm eligible for inclusion in our review was shared across multiple eligible comparisons; therefore, the sample size of this shared combined-intervention arm was divided across the relevant comparisons to avoid double-counting, while the original means and standard deviations were retained unchanged. Thus, the apparent splitting of the experimental arm in the forest plots reflected the analytic structure of these multi-arm trials rather than an error in the implementation of the adjustment.

Regarding the labels used for the comparisons with Hrkac and McBeth studies, we acknowledge that they could have been more clearly defined in the main text. To improve clarity and reproducibility, we clarify here that Hrkac (2022a) referred to CBT-informed + graded activity + education versus supervised exercise + education, whereas Hrkac (2022b) referred to CBT-informed + graded activity + education versus usual care. Similarly, McBeth (2012a) referred to CBT + graded exercise versus graded exercise, McBeth (2012b) referred to CBT + graded exercise versus CBT, and McBeth (2012c) referred to CBT + graded exercise versus usual care.

The rule for allocating an additional unit of sample size when a shared arm could not be divided equally also required further clarification. Intervention intensity was determined according to the number and specificity of active therapeutic components in the comparator arm. In the present analyses, usual care was regarded as the least intensive comparator, followed by single-component active interventions such as CBT alone or graded exercise alone, whereas supervised exercise combined with education was considered more intensive than usual care. Accordingly, when an additional unit of sample size had to be assigned after splitting a shared arm, it was allocated to the comparison involving the least intensive comparator.

We also conducted sensitivity analyses to evaluate whether this allocation rule affected the pooled estimates. The additional unit of sample size was assigned to the alternative eligible comparison, while the original means and standard

deviations were retained unchanged. For example, the estimate for pain intensity at the three-month follow-up changed only from SMD = -0.59, 95% CI: [-1.00, -0.17], $P = 0.006$, $I^2 = 77\%$ to SMD = -0.58, 95% CI: [-1.00, -0.17], $P = 0.006$, $I^2 = 76\%$; the estimate for functional disability at the three-month follow-up remained SMD = -0.71, 95% CI: [-1.16, -0.26], $P = 0.002$, with I^2 changing slightly from 68% to 69%; and the fear of movement at post-intervention changed only from MD = -1.87, 95% CI: [-3.02, -0.72], $P = 0.001$, $I^2 = 36\%$ to MD = -1.86, 95% CI: [-3.01, -0.71], $P = 0.001$, $I^2 = 36\%$. The pooled estimates for anxiety and depression, and the physical and mental component summaries of quality of life were unchanged. These results indicate that the allocation rule did not materially affect the overall interpretation of the findings.

Taken together, the comments raised by Hu and Chen underscore the importance of clearer reporting of shared-arm adjustments and comparison labels in multi-arm trials. We appreciate the opportunity to clarify the analytical procedures used in our study, and the sensitivity analyses supported the stability of the pooled estimates. These clarifications do not change the main findings or conclusions of our meta-analysis.

We sincerely appreciate the commentators' constructive observations and believe that this discussion contributes meaningfully to improving methodological transparency and reproducibility in systematic reviews and meta-analyses of complex behavioral and exercise-based interventions.

Disclosure

The authors report no conflicts of interest in this communication.

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