

Can Systematic Review Findings on Treatment Effectiveness Be Trusted? The Case of Pilates Exercise and Chronic Low Back Pain

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Evidence based practice (EBP) is the integration of the best available research evidence, expert clinical reasoning and client values in treatment-decision making [1]. While most clinical practitioners will aim to practice from a context of a strong evidence base, it is a challenge to keep up-to-date and informed regarding the evidence-base underlying different interventions [2,3]. It takes considerable time, effort and skill to search for, and critically review the available research evidence. Moreover, clinicians must reflect on the relevance of the research evidence to individual client presentations and preferences [2,4].

Systematic reviews provide an efficient method for clinicians to ascertain the evidence-base for various treatments [5]. In a systematic review, a comprehensive search of the literature is undertaken to answer a focused research question. Specifically, the search strategy, criteria for selection and critical appraisal of evidence are defined, quantitative rather than qualitative results are reported and evidence-based inferences are made [6,7]. Systematic reviews are often considered to represent the highest level of evidence on hierarchies of evidence [6,7]. Their methodological quality, however, can vary, and as such, affect the credibility of results [8,9]. Clinicians should, therefore, critically appraise the methodological quality of a systematic review before accepting the conclusions [4,9].

An obvious indication for clinicians to appraise the methodological quality of systematic reviews is when the results of systematic reviews on the same topic are different. An example of conflicting systematic review findings is found when examining the evidence underpinning the use of Pilates exercise to treat people with chronic low back pain (CLBP). Over the last six years, five systematic reviews have been published on the efficacy of this approach [10-14]. All of these systematic reviews report variable findings of effectiveness of Pilates exercise in people with CLBP, despite having similar research questions, and including, in many cases, the same primary studies [8].

To gain an understanding of how interpretation of the same evidence can produce different conclusions, it can be helpful to appraise the level of evidence and methodological quality of systematic reviews [8]. According to the National Health and Medical Research Council of Australia's hierarchy of evidence, systematic reviews that include only randomised controlled trials represent higher levels of evidence than systematic reviews that include non-randomised controlled trials [15]. When examining systematic reviews of Pilates exercise in people with CLBP, all five reviews included non-randomised controlled trials [8]. This means that the overall level of evidence represented by these reviews is lower than expected, and findings may provide information regarding trends of effectiveness, rather than definite measures of effectiveness [8,15]. Another example where a systematic review is unable to provide definitive findings on effectiveness due to the inclusion of non-randomised controlled trials is in relation to the chiropractic treatment of pregnancy-related low back pain [16].

To appraise the methodological quality of the Pilates systematic reviews, we used the Revised Assessment of Multiple Systematic

Reviews (R-AMSTAR) critical appraisal tool [8,17]. Four of the five systematic reviews on Pilates exercise in people with CLBP received high scores for methodological quality [10,12-14]. The methodological quality of several included primary studies, however, was poor [8]. The risk of bias in systematic review findings was, therefore, increased due to the inconsistency in methodological quality of primary studies [8,15,17,18]. A similar situation is observed when appraising evidence underlying massage for low back pain, where systematic review findings are compromised by poor quality primary studies [19].

Another factor that challenged the validity of three of the five Pilates systematic review findings was the inappropriate use of meta-analyses [10,12,13]. Meta-analyses provide an estimate of the effect size of an intervention by pooling together findings from multiple primary studies [5]. If primary studies are clinically and/or statistically heterogeneous meta-analyses may provide misleading results [20,21]. In the case of Pilates exercise in people with CLBP, primary studies varied in their application of Pilates exercise and comparison treatments [8]. This meant that the pooling of results in meta-analyses could not provide a realistic estimate of treatment effect for Pilates exercise, even when a random effects model was used to account for the statistical heterogeneity [8]. When examining research evidence for acupuncture in people with chronic low back pain, the clinical heterogeneity of primary studies also decreases the validity of meta-analysis findings regarding efficacy [22].

In our systematic review of systematic reviews, we concluded that the effectiveness of Pilates exercise in people with CLBP cannot be supported by current research evidence [8]. This is due to the small number, variable methodological quality and heterogeneity of primary studies [8]. We, therefore, recommend that clinicians carefully consider the potential for bias in all research studies, including systematic reviews, before using findings to direct clinical practice. Systematic reviews traditionally may represent the highest level of evidence, but their ability to provide credible results can, in some circumstances, be compromised by the inclusion of non-randomised controlled trials, primary studies of poor methodological quality and the inappropriate use of meta-analyses.

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