

## Clinical Yoga Research: Current Status and Recent Developments

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### Introduction

Complementary approaches to health care, including yoga, continue to increase in recent years, as documented in recent surveys, including a longitudinal analysis covering a 10 year period between 2002 and 2012 [1]. Among the practices surveyed were three forms of contemplative movement, namely yoga, Tai chi and Qi gong. During this 10 year period, while the percentage of respondents using Tai chi and Qi gong remained stable (averaging 1.13% and 0.3%, respectively), yoga showed a robust increase in popularity, nearly doubling from 5.1% (2002) to 9.5% (2012). A survey of yoga practitioners that same year by Yoga Journal (2012) estimated that there are currently more than 20 million practitioners just in the US, with an annual economic impact in excess of 10 billion dollars. Clearly, yoga is a growing in popularity and influence in both leisure/recreational and healthcare settings.

And yet, from the standpoint of clinical research, it's fair to inquire whether or not its growing popularity has been matched by a commensurate increase in the nature and rigor of research methodology used to evaluate its effectiveness in complementary health care. Early reviews of the research literature by Innes and Vincent [2], Khalsa [3], Yang [4], Birdee et al. [5] concluded that, despite showing promise, acceptance of yoga as a clinical intervention was hampered by significant research shortcomings. Nevertheless, the promise of yoga was sufficient to attract the interest of clinical researchers who, in the intervening years, have conducted studies of increasing methodological rigor. In this commentary, we summarize aspects of recent outcome research, which represent positive steps in the evolution of clinical yoga trials, as well as make note of shortcomings that need to be addressed in future studies.

A paper we published in 2009 brought to the attention of practitioners in clinical psychologists and related fields emerging evidence of health benefits associated with Yoga [6]. It was published in a science-based international journal, Cognitive and Behavioral Practice, the mission of which is to span the gap between clinical research and practice by disseminating accounts of evidence-based assessment and therapy procedures. More recently, we conducted a selective follow-up review of research on clinical applications of yoga to assess the evolution of research methodology and the status of empirically supported outcomes (Bayley-Veloso and Salmon, submitted for publication) [7].

From our vantage point in health and clinical psychology, we are struck by the degree to which yoga, and indeed other forms of potentially therapeutic movement have remained on the periphery of clinical practice for treatment of conditions such as anxiety and affective disorders. A notable exception to this omission concerns therapeutic use of yoga and other movement-based practices to treat traumatic stress, exemplified by the work of van der Kolk [8] who has developed interventions that effectively truly integrate mind and body. Overcoming trauma through yoga, for example, by Emerson and Hopper, exemplifies work of this nature [9].

In our 2009 paper, we noted that despite a proliferation of clinically-oriented research, much of it was of a quality that did not meet benchmark standards for the health sciences. Among the most notable methodological shortcomings of early research studies were the relative

absence of randomized controlled trials, marked variations in yoga protocols that made it difficult to compare outcomes, lack of follow-up data, and lack of diversity in clinical populations. However, focusing attention on methodologically rigorous studies (especially randomized controlled-trials) in fact revealed evidence of robust outcomes on medical conditions as diverse as diabetes, low back pain, and elevated blood pressure, as well as on psychological factors including emotional wellness and stress management. Inconsistent findings such as these are not surprising in new areas of investigation, where research progresses slowly but systematically in the direction of greater methodological consistency.

Our most recent review is a selective evaluation of yoga research employing randomized controlled trials (RCTs). It focuses on studies published since 2011, a year in which there was a pronounced increase in published RCTs. These were compiled in a comprehensive bibliometric analysis by Cramer et al. which revealed that both the number and the quality of clinical yoga studies was increasing at an accelerating pace [10]. However, it was equally evident that many published studies lacked specificity in regard to the nature of the yoga practices employed, a persistent shortcoming of research that makes it difficult to either compare or replicate methodology. We therefore selectively focused our review on studies containing detailed descriptions of the yoga practices employed, which consisted of sequences of standing, seated, prone, and supine poses (asanas). Across variations in the form of yoga employed 'Iyengar', 'Hatha' and 'Yoga therapy' being the most common), all employed movement sequences beginning with movements and stretches preparatory to more sustained poses, and ending with quiet rest (savasana). A total of 52 studies emerged from this selection process, covering a wide range of clinical conditions, the most common of which were cancer, diabetes, post-stroke recovery, high-risk pregnancy, and chronic lower back pain. In all studies, yoga was taught in a group format, along with an expectation of outside home practice (though this was seldom systematically analyzed). Intervention programs ranged up to one year in duration, with a modal value of 12 weeks. The most common session duration was one hour, and more than half of the programs met more than once per week. Overall, program adherence in these studies was high, averaging an 80% completion rate.

A striking finding of our review, across variations in clinical diagnoses, form of yoga, and program duration, was that virtually all studies reported positive outcome effects, comparing yoga to either usual/standard care (56%) or active control conditions (44%).

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Positive outcomes were reported for general health parameters (blood pressure, body composition, blood glucose, sleep quality), psychological functioning (depression, anxiety, schizophrenia) and some disease-specific symptoms (for example, arthritis pain, diabetic insulin metabolism, respiratory function in asthma). These results are consistent with the conclusion we reached in 2009, suggesting that increased methodological rigor tends to reinforce, rather than diminish, support for yoga as clinically beneficial for a wide range of conditions.

Despite promising developments in research methodology, clinical studies of yoga need further refinement. Among the most significant stumbling blocks to more widespread adoption in clinical settings is the proliferation of yoga schools and forms of practice that currently exist. As yet, there does not appear to be a unified model that has attained widespread acceptance in clinical settings. The effect of this diversity is two-fold: First, it limits comparisons between studies, due to lack of consistency in the yoga practices employed. Second, it's difficult to replicate studies that employ different practices, in much the same way that drug or psychotherapy trials would be difficult to conduct were there not clinically standardized protocols for the interventions employed. What is needed, at least from the standpoint of research methodology, is greater specificity and uniformity in regard to yoga practices suitable for use with various clinical populations. Along with greater specificity, other refinements in research methods are needed as well, including study replications, long-term follow-up assessment, increasing use of matched control designs, and attendance and adherence/compliance data to assess dose-response effects. And as emphasized in previous reviews, greater attention needs to be given to ethnic and demographic factors if yoga is truly to become culturally diversified.

Based on our two reviews of clinical yoga applications, we believe that future research will further validate its importance as a form of complementary care. This is a welcome finding because, like other forms of complementary health and medical care such as meditation that initially evolved in radically different cultural, philosophical,

contexts, yoga was not originally designed for this purpose. Rather, it evolved as a comprehensive system of ethical, behavioral, and spiritual guidelines for living a principled, enlightened life. Extracting a single element having to do with physicality does not do justice to the larger system in which it is embedded. And yet for many practitioners, even such limited exposure to yoga has been and will continue to be a vital source of strength and well-being.

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