Reviewer’s report

Title: An Explorative study of metabolic responses to mental stress and yoga practices in yoga practitioners, non-yoga practitioners and people with metabolic response

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Reviewer: Patricia L Gerbarg

Reviewer’s report:

This is a good quality exploratory study using careful measures and appropriate statistical analysis. The findings are clearly reported. In addition, the authors have organized and incorporated relevant scientific literature in the Introduction and Discussion sections.

I was particularly impressed by the fact that the authors noted a possible bias in their study by acknowledging that inexperienced subjects may not have performed the yoga practices as well as the experienced YPs. When people are learning new yoga practices and often during the first couple of weeks, they may exert more effort in performing the practices than those who are more experienced. Therefore, the authors were astute to de-emphasize inter-group differences in measures taken after yoga practices. In contrast, all groups showed comparable increases in OC with the arithmetic stress. This is a more valid stress test in that it is not likely to be affected or biased by differences in experience. This also increases the validity of the finding that there were significant differences in the recovery from this math stress among the groups.

Overall, the building of the arguments to support the hypotheses is sound, but with a few exceptions, as will be described below.

The authors acknowledge that the small sample size of the study is a limitation. Yet, despite the small size, results reached statistical significance.

Overall this is a valuable study with some important new findings. With minor essential revisions, it will be worthy of publication.

MINOR ESSENTIAL REVISIONS

1. Title change to: An exploratory study of metabolic responses to mental stress and yoga practices in yoga practitioners, non-yoga practitioners and individuals with metabolic syndrome.

2. INTRODUCTION

2.1 Paragraph 2: The last sentence is incorrect. There are numerous studies of energy expenditure in metabolic syndrome patients. Here are 2 for example:


Larsen I1, Welde B, Martins C, Tjønna AE. High- and moderate-intensity aerobic

2.2. Paragraph 3: Define what you mean by mind-body coherence

Rewrite the first sentence and add relevant references. Dr. Benson’s 1975 work on ‘relaxation response’ was written long before the role of the mind-body activation of the parasympathetic system was recognized. The techniques used to induce the relaxation response were relatively mild in their effects compared to many yoga and mind-body practices. The physiological and psychological changes that occur in association with yoga and other mind body practices that activation of the PNS, SNS and balance the autonomic system, are far more extensive than was described in association with the relaxation response.

3. Materials and Methods

3.1. Asking subjects to abstain from smoking tobacco for 8 hours prior to their session would allow enough time to pass that they could be experiencing nicotine withdrawal, which would have exacerbated their level of stress and potentially affected their results. In future studies, it would be less problematic to exclude smokers. This leads to a more fundamental flaw in the methodology.

3.2. The use of non-randomized comparison groups is a weaker study design because there may be numerous differences among the groups. For example:

a. The mean age of the MS group was ten years older than of the other groups.
b. The baseline VO2 was lowest in the YP, higher in the NY and highest in the MS.
c. Among the MS group there were smokers, but none among the YP.
d. The YP were long-term ashram residents and the NY groups were ‘temporary’ ashram residents. These groups were living in a very different environment compared with the MS subjects who were living outside the ashrams such that they were subjected to all of the stresses of everyday life. In comparison the ashram residents were living in an enriched environment, removed from everyday life stresses and pressures where they were not only performing yoga “at least 90 minutes daily,” but they were also involved in the other limbs of yoga such as meditation, contemplation, chanting, group practices, yoga philosophy, discussion to foster personal development, meetings with spiritual leaders and teachers, Ayurvedic diet, structured daily routines for sleep, meals, etc. All of these may affect the stress response systems and allostatic load. The description of the YP group as “yoga practitioners” is misleading to readers who may assume that the difference in their response to stress was due to their 90 minute daily practice of asanas and breathing practices. It would be better to give a fuller description of their life at the ashrams and to take into account that these other parameters may have contributed to the results.

4. RESULTS

4.1. Paragraph 5 states that the three groups differed significantly in every phase except for during kapalbhati breathing. It was interesting that they did not differ during kapalbhati. Perhaps the authors could discuss the physiology that might
explain why this was so.

5. DISCUSSION

5.1. Paragraph 2 makes an important point. Paragraph 3, 4, 5 also very good.
5.2. Paragraph 6: The last sentence is less clear.
5.3. What is the evidence that ‘relaxation response’ is associated with mitochondrial phosphorylation efficiency? I doubt that this has been studied or reported.
5.4. Paragraph 7 First sentence needs revision.
This study did not demonstrate that yoga practice optimizes sympathetic response to stressful stimuli. This is both an overstatement and an incomplete statement.
5.5. Paragraph 8 is fine up until the second sentence where it states that, “These results………suggest that regular yoga practice may reduce the risk of metabolic syndrome.”
Though it may be true that yoga practice may reduce the risk of metabolic syndrome, these results do not suggest it. This is the fundamental problem with the study design. Nothing in this study shows reduced risk of metabolic syndrome. Finding differences in OC and stress response in 3 different groups cannot be used to make such a suggestions. The most that you could state, based on this kind of study, would be to say something like, “These results are consistent with other studies that report that regular yoga practices enhances metabolic function and improves metabolic syndrome.” As you cite RTCs reporting this effect, it is not a new finding. What is new in your study is, as you say, the documentation of differences in OC, stress response, and recovery from stress.

6. CONCLUSIONS

6.1. Sentence 1: Rather than greater metabolic variability, perhaps you mean flexibility to adaptability
6.2. The second sentence could be written more clearly.

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests.