COMMENTS AND RESPONSES

Comment on: Hegde et al. Effect of 3-Month Yoga on Oxidative Stress in Type 2 Diabetes With or Without Complications: A Controlled Clinical Trial. Diabetes Care 2011;34: 2208–2210

I read with great interest the article by Hegde et al. (1), which investigated the effects of 3-month yoga practice on oxidative stress, glycemic control, blood pressure control, and anthropometry in type 2 diabetic patients with or without complications, in comparison with control subjects on standard care. In the face of the increasing prevalence of type 2 diabetes around the world, it is very important to assess different, and perhaps more enjoyable, methods of care. Nevertheless, some statistical issues concerning the results of the cited work need to be clarified.

First, statistical analyses were not clear. The authors stated that they used paired *t* tests and the Wilcoxon signed rank test "to compare the differences in various parameters before and after intervention between the two groups." However, both tests are designed for paired (dependent) variables. Therefore, they can only be used to compare before-after results within the same group. Thus, my question is, did the authors mistakenly use tests designed for paired variables with unpaired variables? If not, what was the test used for the independent comparisons? If yes, the impact of this on the results is unpredictable.

In fact, comparisons of the differences between groups using *t* tests or similar are not the best approach in this situation, as past studies have proven (2,3). The best approach in this case is through a two-way ANOVA (time × group) with repeated measures (time), and the desired effect is the interaction group × time. The correct use of statistics in the case presented by the authors is crucial because when comparing differences, it is not possible to distinguish variances between groups before the intervention with those that emerged after the intervention, which would be the real indication of the effect of the intervention. Because there were no results presented comparing groups before intervention, the suggested approach becomes even more important. How could this approach change the results?

The authors also did not clarify whether the time effect was significant for both groups. This is very important to the understanding of the results. For instance, any parameter that appears as significant in the control group represents a decrease in health status after the treatment period. Since the yoga group performed standard care plus yoga classes, the yoga classes were able to stop this negative effect of standard care and improve the health status. If this is the case, it means that standard care is, really, a bad choice under any circumstances because of decreased performance in a short period. This is a very important conclusion that should be highlighted, if it is true.

In short, it would be of great help if the authors could clarify why they did not use the ANOVA approach to the problem, what the statistical test used for between-groups comparisons was, and how they explain the significant decrease of the health status of the control group under standard care.

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