Integrative Cancer Therapies
Volume 18: 1

DOI: 10.1177/1534735419891252
journals.sagepub.com/home/ict
SAGE

Bone Mineral Density and Qigong Training in Breast Cancer Survivors

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Submitted October 2, 2019; accepted November 1, 2019

To the Editor:

The article by Fong and colleagues[1] published in *Integrative Cancer Therapies* studied changes in the bone mineral density of breast cancer survivors after Qigong training. The authors did not find changes ($P > .05$) in lumbar spine or total hip bone mineral density, which were similar between the 3 studied groups (intervention, control without intervention, and healthy control). Although well designed and analyzed, we would like to discuss the results obtained by the authors regarding bone mineral density, as the authors concluded that Qigong may not be able to improve the bone mineral density of breast cancer survivors; however, we believe that the study does not allow a conclusion as to whether Qigong training improves bone mineral density due to its methodological design.

We would like to focus on the sample size calculation proposed by the authors for their observational study. The authors correctly used G*Power software version 3.1.0 (Franz Faul, University of Kiel, Germany) and estimated the sample size based on a statistical power of 0.8 and a 2-tailed α level of 0.05. For these calculations, an estimation of the effect size for the primary outcome was used. The expected effect size for bone mineral density changes ranged from 0.5 to 1.1 according to a previously published study by Waltman and colleagues[2]; thus, an effect size of 1.0 was used to compute the sample size, and a minimum of 17 participants per group was anticipated.

The anticipation of an effect size of 1.0 based on the study of Waltman and colleagues[2] is questionable, as Waltman and colleagues measured changes in the bone mineral density of postmenopausal breast cancer survivors who were enrolled in a weight training program that involved strength/weight exercises for the first 9 months of the study, and then, from 10 to 24 months, the subjects exercised using weight machines at a nearby fitness center. As the Qigong training program was developed to be used by the participants for 3 months, it is quite unexpected that the effect size on the bone mineral density provided by the Qigong training program would be as high as that provided by a 24-month strength/weight program.

Does this mean that the Qigong training program does not improve bone mineral density in breast cancer survivors? Not at all; it means that, with the methodology applied by the authors, a negative result ($P > .05$) was highly expected. In fact, it is easily comprehensible, when viewing the data provided by the authors in their Table 3, that there were effect sizes for bone mineral density that ranged from 0 to 0.28. If the authors expected to have enough statistical power to detect (with a statistical power of 0.8 and 2-tailed α level of 0.05) an effect size of 1.0, it is reasonable to report a lack of statistically significant results that, in fact, do not indicate that Qigong has no potential to improve the bone mineral density but instead indicate a lack of statistical power. In this case, we consider that the absence of statistical significance represents a case of Type II error due to a small sample size that was not able to detect statistically significant results as the effect size for the Qigong training was overestimated.

We encourage the authors to increase the sample size and to replicate their study with a more convenient experimental design that could truly determine if Qigong has the potential to improve the bone mineral density in a reasonable time frame in breast cancer survivors.

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