



Comment on “Exercises improve body composition, cardiovascular risk factors and bone mineral density for menopausal women: A systematic review and meta-analysis of randomized controlled trials”



We read with interest the systematic review and meta-analysis from Yeh, Liao, Hsu, Chung, and Lin (2018) published in *Applied Nursing Research* about exercise effects on body composition, cardiovascular risk factors, and bone mineral density of menopausal women. We have focused in the bone mineral density results and have found some inaccuracies that might affect the final conclusion of the manuscript.

First we observed that the study from Janzen in 2006 was not included in the references section of the systematic review. We suppose that authors refer to the study of Janzen and colleagues about the effect of unilateral and bilateral strength training on the bilateral deficit and lean tissue mass in post-menopausal women (Janzen, Chilibeck, & Davison, 2006) published in the *European Journal of Applied Physiology*.

Additionally there are major concerns about the inclusion of Revel, Mayoux-Benhamou, Rabourdin, Bagheri, and Roux (1993) study in the meta-analysis. The outcome considered by Yeh et al. regarding the bone mineral density was studies with bone mineral density measured through dual energy X-ray absorptiometry on the lumbar spine (Yeh et al., 2018). A total of 5 studies were included in the meta-analysis however the manuscript from Revel et al. did not measure the bone mineral density by dual energy X-ray absorptiometry but trabecular bone mineral density measured by quantitative computed tomography expressed in mg/cm^3 (Revel et al., 1993). While dual-energy X-ray absorptiometry scan provides a quantity of calcium hydroxyapatite divided by the area scanned (g/cm^2) including both trabecular and cortical bone, the quantitative computed tomography provides a volumetric measurement (mg/cm^3) of trabecular bone density without superimposition of cortical bone and other tissues (Li et al., 2013).

Data extraction regarding the outcome of interest is a vital part of meta-analysis. Elements determining inclusion in the analysis are study design, population characteristics, type of treatment or exposure, and finally outcome measures (Berman & Parker, 2002). We do not describe here a situation derived from pooling data with different metrics (but obtained from the same outcome) in this circumstance the measure of bone mineral density by quantitative computed tomography provides data that is not comparable to measures obtained from dual-energy X-ray absorptiometry so the study from Revel et al. should not be included in the meta-analysis.

As five randomized controlled trials were included in the meta-analysis for the lumbar bone mineral density. However, the Tai Chi

Chun study (Chan et al., 2004) was excluded from the pooled analysis due to the use of a form of exercise different from those used in the other studies (based in the sensitivity analysis) and we propose here that the study form Revel et al. should not be also included due to the use of a different outcome, so a total of three studies should be analyzed in the pooled meta-analysis and hence, the conclusion of the study of Yeh et al. might be biased.

Declaration of competing interest

There are no conflict of interest.

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