

Letter to editor

Zumba Gold[®]: Are The Physiological Responses Sufficient to Improve Fitness in Middle-Age to Older Adults?

Dear editor-in-chief

Zumba[®] is currently one the most popular group-based exercise classes in the world with an estimated 12 million people of all shapes and sizes participating in Zumba classes on a weekly basis (Luetzgen et al., 2012). Previous research by Luetzgen and colleagues (2012) has found Zumba to be a highly effective workout for young women of various fitness levels. It was reported that participation in a single Zumba exercise class burned on average 360 calories and elicited a heart rate response equivalent to 80% of maximal heart rate (Luetzgen et al., 2012). Zumba Gold[®] is a modified form of Zumba that was designed to meet the anatomical, physiological, and psychological needs of seniors. However, to our knowledge there is no research examining the physiological responses to Zumba Gold in the older-adult population. Understanding the cardiovascular and metabolic responses to exercise is essential for designing safe and effective physical activity and rehabilitation programs. For example, it would be beneficial to understand the metabolic equivalent (MET) value associated with a Zumba Gold exercise class. A MET value would allow the quantification of Zumba Gold exercise intensity as low, moderate, or vigorous in nature, and hence, aid in establishing a safe and effective target workload. The lack of research concerning the physiological responses to Zumba Gold in middle-aged and older adult populations coupled with its increasing popularity prompted the present study. Therefore, the purpose of this study was (a) to assess the cardiovascular and metabolic responses to Zumba Gold and (b) to determine if Zumba Gold meets current guidelines for im-

proving and maintaining cardiorespiratory fitness.

Sixteen men and women participated in this study. All descriptive characteristics of the participants are presented in Table 1. This study was approved by the Human Research Committee at Western State Colorado University. Prior to participation, each participant signed an informed consent form and underwent baseline testing.

All measurements were obtained on non-consecutive testing days. Day 1 consisted of the collection of individual physical and physiological measures and measurement of resting metabolic rate and the maximal exercise test. Day 2 consisted of assessment of the cardiovascular and metabolic responses to a 45-minute Zumba Gold exercise class led by a certified Zumba Gold instructor. Testing sessions were separated by 2 days to 2 weeks. Resting metabolic rate and oxygen uptake during the Zumba Gold exercise class and maximal exercise test were measured using an Oxycon Mobile portable calorimetric measurement system. Continuous HR measurements were obtained using a Polar F1 heart rate monitor interfaced with the Oxycon Mobile system.

Cardiovascular and metabolic responses (mean \pm SD) to the Zumba Gold exercise class session are presented in Table 2. Overall heart rate for the 45-min Zumba Gold exercise class session was 114 ± 14 beats/min, which corresponded to $50.1 \pm 10.1\%$ HRR and $49.6 \pm 8.4\%$ VO_2R . Absolute exercise intensity in METs was 4.3 ± 0.4 . Total energy expenditure for the Zumba Gold exercise class was 197.9 ± 38.0 kcal/session.

The main finding of the present study is that participation in a single exercise class of Zumba Gold in middle age and older adults elicits cardiovascular and metabolic responses that fulfill exercise intensity

Table 1. Descriptive characteristics of the participants. Data are means (\pm SD).

| Parameter | Women (n = 9) | Men (n = 7) | Combined (n = 16) |
|-----------------------------------|---------------|----------------|-------------------|
| Age (years) | 63.0 (8.7) | 64.0 \pm 6.9 | 63.4 \pm 7.7 |
| Height (m) | 1.64 (.04) * | 1.71 (.04) | 1.67 (.05) |
| Weight (kg) | 60.8 (5.7) * | 74.6 (14.2) | 66.8 (12.2) |
| Resting heart rate (beats/min) | 71 (6) | 66 (6) | 69 (6) |
| Maximal heart rate (beats/min) | 166 (14) | 147 (23) | 158 (20) |
| Maximal oxygen uptake (mL/kg/min) | 27.8 (5.9) | 30.9 (8.8) | 29.2 (7.2) |
| Resting oxygen uptake (mL/kg/min) | 3.5 (.4) | 3.7 (.4) | 3.6 (.4) |

* denotes sex difference, $p < 0.05$.

Table 2. Cardiovascular and metabolic responses to Zumba Gold. Data are means (\pm SD) [range].

| Parameter | Women (n = 9) | Men (n = 7) | Combined (n = 16) |
|-------------------------|----------------------|----------------------|----------------------|
| HR (beats/min) | 119 (9) [87-155] | 107 (17) [70-142] | 114 (14) [70-155] |
| %HRR | 50.3 (5.8) [21-70] | 49.8 (14.5) [87-155] | 50.1 (10.1) [87-155] |
| % VO_2R | 47.7 (5.2) [17-75] | 52.0 (11.4) [19-84] | 49.6 (8.4) [17-84] |
| METs | 4.1 (.5) [2.1-6.9] | 4.4 (.3) [2.1-6.8] | 4.3 (.4) [2.1-6.9] |
| kcal/min | 4.2 (.3) [2.2-6.4] * | 5.0 (.8) [2.3-8.7] | 4.6 (.7) [2.2-8.7] |
| kcal/session | 191.5 (11.9) * | 225.7 (34.0) | 197.9 (38.0) |

HR, heart rate; %HRR, percentage heart rate reserve; kcal, kilocalories; METs, metabolic equivalents; % VO_2R , percentage oxygen uptake reserve); *denotes sex difference, $p < 0.05$.

guidelines for improving and maintaining cardiorespiratory fitness (Bryant and Green, 2010; Pescatello, 2014). Exercise intensity is arguably the most critical component of the exercise prescription model. Failure to meet minimal threshold values may result in lack of a training effect, while too high of an intensity could lead to overtraining and negatively impact adherence to an exercise program (Franklin, 2007). Results from the present study indicate Zumba Gold exercise can be classified as “moderate” according to various organizations definition of physical activity intensity (Bryant and Green, 2010; Pescatello, 2014). In both the U.S. Surgeon General report on physical activity (U.S. Department of Health and Human Services, 1996) and elsewhere (Pescatello, 2014), moderate-intensity physical activity in metabolic terms has been classified as 3 to 6 METS. In the present study, the MET response to Zumba Gold exercise averaged 4.4 and ranged from 2.1 to 6.9. Thus, participants in the present investigation exercised at workloads during the Zumba Gold exercise class that elicited metabolic responses within the accepted moderate-intensity range. This is an important finding given the fact that moderate-intensity exercise has been widely recommended for health benefits (U.S. Department of Health and Human Services, 1996). MET values described in the present study compare favorably to more traditional and non-traditional exercise values. For instance, treadmill and over ground walking at 3.0 miles per hour is an equivalent moderate-intensity physical activity at 3.3 METS. Likewise, Guderian and colleagues (2010) recently reported that playing Wii Fit video games is a feasible alternative to more traditional aerobic exercise modalities for middle-aged and older adults that elicit a 3.5 mean MET value response.

To our knowledge, this is the first study to investigate the cardiovascular and metabolic responses to Zumba Gold exercise in middle-aged and older adults. Findings from the present study support Zumba Gold exercise as a feasible alternative to traditional exercise modalities for older adults that fulfills guidelines for improving and maintaining cardiorespiratory fitness. This is critical, as low cardiorespiratory fitness may contribute to premature mortality in this segment of the population and contribute to a reduction in physiological functional capacity and eventually can result in loss of independence (Fitzgerald et al., 1997). Overall, these findings are important for exercise professionals, physical therapists, and others who design exercise programs for older adult populations.

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