

3rd World Congress on
Cardiology

&

16th International Conference on
Nutrition and Fitness

October 29-30, 2018 | London, UK

Physical health in females competing in aesthetic fitness sports; Symptoms of Relative Energy Deficiency in sport (RED-s)

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Relative energy deficiency in sports (RED-s) involves insufficient energy intake by athletes compared to their total energy needs, potentially impairing health and performance. Athletes competing in weight-sensitive or aesthetic sports are specifically prone to this syndrome, and cardiorespiratory exercise, meal skipping, and low-kcal diets are common methods used for weight regulation. On the contrary, aesthetic fitness athletes are known for practicing resistance exercise, and regular, protein dense meals while dieting before competitions. However, the health effects from their specific practice is not known. In this study, we aimed at evaluating symptoms of RED-s in dieting, competitive fitness athletes. A cohort of 31 female fitness athletes (FA) and 28 female control persons (CP) aged 18-40 years were evaluated by indirect calorimetry, resting heart rate, DXA, and a 4-day diet registration before competition diet was initiated (pre), 2 weeks prior to fitness competition (mid), and

+1month after competition (post). Mean (SE) resting metabolic rate (kcal) changed from pre to mid by -207.57 (68.9) in FA and -5.26 (62.3) in CP, with 60% of FA and 28% of CP being hypo-metabolic at mid. Concurrently, resting heart rate (BPM) changed by -10.34 (1.6) in FA and -2.51 (1.6) in CP ($P < 0.001$ between groups). Body weight (kg) changed by -4.44 (0.6) in FA and 0.11 (0.6) in CP, with change in body fat percent -7.3 (0.6) in FA and 0.9 (0.6) in CP ($P < 0.001$ between groups). Energy intake per kg lean body mass (kcal/LBM) at pre and mid was lower in FA compared to CP ($P < 0.001$), with 39% of FA defined with low energy availability at mid. Most variables returned to normal at post. Current results indicate that symptoms of RED-s might be a problem in fitness athletes and further long-term follow up studies are warranted to learn more about possible long-term consequences for health.

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