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THE EFFECTS OF HIGH-INTENSITY INTERVAL TRAINING ON PAIN PARAMETERS AND SLEEP QUALITY IN OVERWEIGHT AND HEALTHY-WEIGHT WOMEN

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Abstract

The relationship between overweight, pain and poor sleep quality is a complex network of cause and effect, potentially mediated by central adiposity. Exercise, more specifically high-intensity interval training (HIIT), may reduce pain and improve poor sleep quality. However, limited research on the effects of HIIT on pain and sleep quality is available, especially in an overweight, female population. The dissertation assessed the efficacy of a 14-week HIIT intervention for reducing pain and improving sleep quality in overweight and healthy weight women.

Overweight (n=21) and healthy-weight (n=17) women were grouped into exercising (overweight n = 10, healthy-weight n = 10) and non-exercising groups (overweight n = 11, healthy-weight n = 7). Exercising groups participated in a 14-week home-based, dynamic resistance HIIT intervention, whereas non-exercising groups maintained habitual sedentary activity. Anthropometry, pain perception (cold-, heat-, mechanical-, pressure pain thresholds, ischaemic pain rating) and sleep quality (Pittsburgh sleep quality index; PSQI) were assessed before and after the 14-week intervention.

The 14-week HIIT intervention reduced waist circumference of the overweight women (baseline = 112.9 (21.7) cm; post-intervention = 101.3 (18.6) cm; p<0.001), but did not alter body mass, body fat percentage, hip circumference, waist-to-hip ratio or VO_{2peak} in either the healthy-weight or the overweight women. Post-intervention cold pain sensitivity was increased in the exercising (baseline = 6.9 [5.2-9.9] °C; post-intervention = 12.3 [10.0-25.1] °C; p<0.05) and non-exercising (baseline = 8.1 [5.5-12.3] °C; post-intervention = 17.6 [10.7-20.9] °C; p<0.05) overweight women. Baseline sleep quality was poor in the overweight women according to PSQI global scores (baseline PSQI; overweight exercising group = 8.0 (1.9), overweight non-exercising group = 4.9 (3.3)). The sleep quality component score of the PSQI was improved in the exercising overweight women (baseline = 1.8 (0.8); post-intervention = 0.8 (0.4); p<0.05). Post-intervention pain perception and sleep quality of healthy-weight women remained unaltered. Associations were observed between the following variables: decreased heat pain sensitivity and increased body mass index (r=0.301, p=0.042); increased waist circumference and both poor sleep quality (r_s=0.325, p=0.049) and reduced sleep duration (r_s=0.488, p=0.005) assessed at baseline in the combined study sample.

The current dissertation demonstrates that HIIT may be a time-efficient intervention for improving sleep quality in overweight women with poor sleep quality. Moreover, the results support the notion that exercise may increase pain sensitivity in an overweight population. Additionally, this study shows that increased BMI may mediate increased pain perception while increased waist circumference may mediate poor sleep quality in South African women.