

ABSTRAK

Latar belakang: Gaya hidup tidak aktif adalah salah satu faktor utama yang terkait dengan obesitas. Banyaknya faktor penghambat aktivitas fisik bagi penderita obesitas menyebabkan munculnya beragam model latihan seperti *High Intensity Interval Training* (HIIT) sebagai alternatif *Continuous Training* (CT). Selain faktor lingkungan seperti latihan fisik, kita tidak dapat mengabaikan faktor genetik dalam obesitas. Salah satunya adalah gen *uncoupling protein 2* (UCP2) -866G/A. Parameter obesitas dapat dilihat dari komposisi tubuh, mediator inflamasi dan stres oksidatif. Peneliti tertarik untuk melihat pengaruh latihan fisik yang berupa CT dan HIIT terhadap parameter obesitas. **Metode:** Penelitian ini merupakan penelitian *Randomized Controlled Trial*. Populasi penelitian adalah wanita obesitas. Subjek penelitian yang memenuhi kriteria subjek dikelompokkan menjadi dua kelompok yaitu kelompok latihan fisik CT dan HIIT dengan metode *stratified randomization*. Intervensi latihan fisik dilaksanakan selama 14 minggu, yang terdiri dari 2 minggu adaptasi latihan fisik dan 12 minggu intervensi latihan fisik. Variabel komposisi tubuh, mediator inflamasi dan stres oksidatif diperiksa sebelum dan sesudah intervensi latihan fisik. Selain itu, variasi genetik UCP2 -866G/A subjek juga diperiksa. Analisis data menggunakan uji T berpasangan dengan uji alternatif *Wilcoxon Signed Rank*, uji T tidak berpasangan dengan uji alternatif *Mann Whitney*, uji *One Way Anova* dengan uji alternatif *Kruskal Wallis* dan uji *Repeated Anova* yang dilanjutkan dengan uji *Paired Wise Comparison*. Tingkat kemaknaan pada $p < 0,05$. **Hasil:** Intervensi latihan fisik baik CT maupun HIIT mampu memperbaiki secara bermakna variabel komposisi tubuh, mediator inflamasi dan stres oksidatif dengan $p < 0,05$. HIIT memperbaiki kadar stres oksidatif MDA lebih baik dari CT ($p < 0,05$), sedangkan pada variabel lain HIIT sama efektifnya dengan CT untuk memperbaiki parameter obesitas ($p \geq 0,05$). Terdapat pengaruh bermakna variasi genetik UCP2 -866G/A terhadap berat badan dan IMT ($p < 0,05$), varian genotip GG memiliki respon perbaikan yang paling rendah. Sedangkan pada variabel lain tidak didapatkan pengaruh variasi genetik UCP2 -866G/A yang bermakna ($p \geq 0,05$). **Kesimpulan:** Intervensi latihan fisik baik CT maupun HIIT mampu memperbaiki variabel komposisi tubuh, mediator inflamasi dan stres oksidatif. HIIT dan CT sama efektifnya dalam memperbaiki variabel komposisi tubuh dan mediator inflamasi. HIIT memperbaiki kadar MDA lebih baik dari CT. Terdapat pengaruh variasi genetik UCP2 -866G/A terhadap berat badan dan IMT.

Kata kunci: *high intensity interval training*; komposisi tubuh; mediator inflamasi; stres oksidatif; UCP 2

ABSTRACT

Background: Sedentary lifestyle is one of the main factors associated with obesity. The number of factors that inhibit physical activity for obese people causes the emergence of various exercise models such as High-Intensity Interval Training (HIIT) as an alternative to Continuous Training (CT). Apart from environmental factors such as exercise, we cannot ignore genetic factors in obesity. One of them is uncoupling protein 2 gene (UCP2) -866G/A. Parameters of obesity can be seen from body composition, inflammatory mediators, and oxidative stress. Researchers are interested in knowing the effect of exercise in CT and HIIT on obesity parameters based on genetic variation. **Methods:** This research was a Randomized Controlled Trial. The research population was obese women. Research subjects who met the subject criteria were grouped into two groups, namely the CT and HIIT groups, with the stratified randomization method. The exercise intervention was carried out for 14 weeks, consisting of 2 weeks of adaptation and 12 weeks of exercise intervention. The body composition variables, inflammatory mediators, and oxidative stress were examined before and after the exercise intervention. In addition, the genetic variation UCP2 -866G/A was also examined. Data analysis used a paired T-test with the alternative Wilcoxon Signed Rank test, the unpaired T-test with the Mann Whitney alternative test, the One Way Anova test with the Kruskal Wallis alternative test, and the Repeated ANOVA test followed by the Paired Wise Comparison test. The level of significance at $p < 0.05$. **Results:** Training interventions, both CT and HIIT, were able to significantly improve body composition, inflammatory mediators, and oxidative stress variables with $p < 0.05$. HIIT improved MDA levels better than CT ($p < 0.05$), while in other variables, HIIT was as effective as CT for improving obesity parameters ($p \geq 0.05$). There was a significant effect of genetic variation of UCP2 -866G/A on body weight and BMI ($p < 0.05$), the GG genotype variant had the lowest response. Meanwhile, there were no significant effect of UCP2 -866G/A genetic variation on other variables ($p \geq 0.05$). **Conclusion:** Training interventions, CT and HIIT, improved body composition variables, inflammatory mediators, and oxidative stress. HIIT and CT were equally effective in improving body composition variables and inflammatory mediators. However, HIIT improved MDA levels better than CT. There was an effect of genetic variation of UCP2 -866G/A on body weight and BMI.

Keywords: high-intensity interval training; body composition; inflammatory mediators; oxidative stress; UCP 2