

INTISARI

Aktivitas olah raga berhubungan dengan tingginya produksi panas yang dihasilkan dari proses metabolisme, karena sekitar 80% energi yang digunakan menghasilkan panas. Tingginya produksi panas dari proses metabolisme ditambah dengan lingkungan yang panas dan lembab serta terbatasnya kesempatan untuk berhidrasi mempunyai beberapa resiko bagi kesehatan seperti pusing, mual, dehidrasi, sakit kepala, muntah, atau pingsan. Wanita muslimah biasanya menggunakan pakaian yang menutup seluruh tubuh dalam segala aktivitasnya. Pakaian yang menutup seluruh tubuh mempunyai insulasi termal yang lebih tinggi dari pakaian yang menutup sebagian anggota tubuh. Disamping itu pakaian yang menutup seluruh tubuh mempunyai dua model pakaian yaitu pakaian ketat dan pakaian longgar. Pakaian ketat dan longgar mempunyai respons termal yang berbeda. Bahkan penelitian tentang pakaian ketat dan longgar masih jarang dilakukan. Oleh karena itu tujuan dari penelitian yaitu mengidentifikasi pengaruh pakaian olah raga yang ketat dan longgar terhadap respons fisiologis, keseimbangan termal, dan respons subjektif.

Penelitian dilakukan di Laboratorium Ergonomika UGM. Responden adalah sepuluh wanita yang mempunyai usia 21.1 ± 0.60 tahun, tinggi badan 157.2 ± 1.43 cm, berat badan 52.63 ± 1.09 kg, BMI 21.29 ± 0.32 , A_D 1, 51 ± 0.02 m², HR_{max} 187.6 ± 1.93 bpm, $70\% HR_{max}$ 4.79 ± 0.08 km/h, dan VO_{2max} 32.73 ± 0.97 ml/kg/min. Responden melakukan pengukuran HR_{max} untuk menentukan kecepatan setiap responden yang diambil dari $70\% HR_{max}$ responden. Dalam eksperimen, responden melakukan fase *baseline* selama 10 menit, fase *exercise* selama 30 menit, dan fase *recovery* selama 20 menit.

Hasil penelitian menunjukkan bahwa peningkatan temperatur timpani, temperatur tubuh, dan *physiological strain* pada penggunaan pakaian longgar lebih rendah dari penggunaan pakaian ketat ($p < 0,05$). Temperatur kulit dan denyut jantung menunjukkan perbedaan yang tidak signifikan antara kedua kondisi selama eksperimen ($p > 0,05$). Pada keseimbangan termal, penggunaan pakaian longgar mempunyai *body heat storage* yang lebih rendah dari penggunaan pakaian ketat ($p < 0,05$). Responden juga merasakan sensasi panas yang lebih rendah, sisa keringat yang lebih sedikit, dan lebih nyaman ketika mengenakan pakaian longgar dibandingkan dengan pakaian ketat ($p < 0,05$).

Kata kunci: pakaian olah raga wanita, pakaian ketat dan longgar, respons fisiologis dan subjektif, keseimbangan termal

ABSTRACT

Sport activity is associated with a high level of metabolic heat production, as about 80% of the energy appears as heat. A high amount of metabolic heat production, combined with a hot-humid environment and limited opportunities to hydrate, has some health risks such as dizziness, nausea, dehydration, headache, vomiting, or fainting. Muslim woman who wears whole body covered attire during daily activities, performs sport activity by wearing Islamic sportswear that encapsulates almost 80 to 90% of the body surface area. During performing sport activity, muslim woman may be imposed greater heat strain due to the clothing insulation that inhibits evaporative and convective from the skin. The aim of this study was to investigate the differences in physiological responses, thermal balance, and subjective responses during and after exercise between skin-tight type and loose type of Islamic sportswear in females.

Respondents were ten healthy female who had a mean (\pm SD) age of 21.1 ± 0.60 years, height of 157.2 ± 1.43 cm, body mass of 52.63 ± 1.09 kg, BMI of 21.29 ± 0.32 , body surface area of 1.51 ± 0.02 m², HR_{max} of 187.6 ± 1.93 bpm, and VO_{2max} equal to 32.73 ± 0.97 ml/kg/min. They performed a 30 min treadmill exercise tests at an intensity of 70% predetermined HR_{max} followed with a 20 min recovery period in an environment set at 30°C and 70% relative humidity. Two types of women's Islamic sportswear made of 93% polyester and 7% elastin were chosen for the experiment. Both garments covered the entire participant's body, except face and hands. The differences between the two garments were the looseness and the head cover; one was tight-fit garment with head cover prepared to cover and compressed the head and the neck, while the other one was loose garment with head cover prepared to cover head, neck, and chest with compression on the head only, so as not to outline the shape of the body. They wore each garment during exercise in separate occasion and in random order.

The result showed that the increase of tympanic temperature, body temperature, and physiological strain were smaller in the loose-fit garment compared to those in the tight-fit one ($p < 0.05$). Skin temperature and heart rate did not show any significant difference between the two garment during experiment ($p > 0.05$). Heat body storage during exercise was lower when wearing loose-fit clothing than that when wearing the tight one ($p < 0.05$). Subjects also reported a lower thermal sensation, a lower sweat rate perception, and a greater thermal comfort when wearing the loose-fit clothing compared to when wearing the tight-fit clothing ($p < 0.05$).

Keywords: woman's sportswear, tight-fit and loose-fit garment, subjective responses, physiological responses, thermal balance