

INTISARI

Peningkatan suhu permukaan global setiap tahunnya berpotensi menimbulkan *heat stress* dan *heat strain* yang dirasakan manusia. Meskipun demikian, kegiatan olahraga di luar ruangan yang dilakukan oleh masyarakat Indonesia terus meningkat. Berdasarkan penelitian terdahulu, warna pakaian menjadi salah satu properti pakaian yang dapat dipertimbangkan ketika beraktivitas dalam paparan radiasi matahari diukur dari nilai absorbansinya. Namun, belum banyak penelitian yang membahas terkait pengaruh warna pakaian terhadap respon fisiologis dan *perceptual response*. Penelitian ini bertujuan untuk mengetahui pengaruh warna pakaian terhadap respons fisiologis dan *perceptual response* saat melakukan aktivitas dalam paparan radiasi matahari dan menentukan warna pakaian yang sebaiknya digunakan untuk memperoleh *heat strain* paling kecil.

Subjek pada penelitian ini terdiri dari 12 mahasiswa laki laki berusia $21,2 \pm 2$ tahun. Subjek diminta berlari di atas *treadmill* dengan kecepatan setara dengan 70% HRmax mengenakan pakaian putih, abu-abu, dan hitam di lingkungan bersuhu $35.4 \pm 0,2$ °C, $54.6 \pm 0,2$ % *relative humidity*, $635.3 \pm 0,9$ W/m² *solar irradiance*, dan $30.3 \pm 0,1$ °C *wet-bulb globe temperature* selama 40 menit. Setelah berlari di atas *treadmill*, subjek diminta untuk beristirahat sebagai fase pemulihan.

Hasil penelitian menunjukkan bahwa warna pakaian tidak berpengaruh signifikan pada *perceptual response*, namun memiliki pengaruh signifikan terhadap respons fisiologis saat melakukan aktivitas fisik dalam paparan radiasi matahari. Berdasarkan respons fisiologis, semakin gelap warna pakaian yang digunakan, semakin banyak keringat yang dilepas keluar dari tubuh, namun dengan perubahan temperatur kulit lebih kecil. Hal ini mengindikasikan bahwa pakaian yang berwarna lebih gelap memiliki kemampuan *dry heat loss* dan *evaporative sweating* yang lebih rendah daripada pakaian yang lebih terang. Dari hasil penelitian ini, dapat disimpulkan bahwa warna pakaian terang dapat direkomendasikan untuk digunakan dalam mencegah *heat strain* ketika melakukan aktivitas olahraga di bawah paparan radiasi matahari.

Kata Kunci : Warna pakaian, Respons fisiologis, *Perceptual responses*, *Heat strain*, *Exercise*

ABSTRACT

The annual increase in global surface temperature has the potential to induce heat stress and strain in humans. Nevertheless, the Indonesian community has continued to engage in outdoor sports activities. Previous studies have indicated that clothing color is one of properties to consider when engaging in activities under solar radiation exposure, as measured by its absorbance value. However, few studies have explored the influence of clothing color on physiological and perceptual responses. This study, therefore, aims to determine the effects of clothing color on physiological responses and perceptual responses during activities under solar radiation exposure and to determine the recommended clothing color to minimize heat strain.

The subjects in this study comprised 12 male students with an average age of 21.2 ± 2.0 years. They were instructed to run on a treadmill at a speed equivalent to 70% of their HRmax wearing Putih, Abu-abu, or Hitam clothing in an environment with a temperature of 35.4 ± 0.2 °C, $54.6 \pm 0.2\%$ relative humidity, 635.3 ± 0.9 W/m² solar irradiance, and 30.3 ± 0.1 °C wet-bulb globe temperature for 40 minutes. The clothing color conditions were randomized in separate days. Following the treadmill running, subjects were instructed to rest during the recovery phase.

The results of the study suggested that clothing color did not significantly affect perceptual responses but had significant effects on physiological responses during physical activities under simulated solar radiation. It was observed that the darker the color of the clothing worn, the greater the amount of sweat released, but with a smaller change in skin temperature. This suggests that darker clothing has a lower capacity for dry heat loss and evaporative sweating than brighter clothing. From this study, it can be concluded that bright-colored clothing can be recommended to prevent heat strain during outdoor sports activity under sun radiation.

Kata Kunci : *Clothing color, Physiological response, Perceptual response, Heat strain, Exercise*