Chen-Peng Chen et al., Occup Med Health Aff 2014, 2:3
http://dx.doi.org/10.4172/2329-6879.S1.018

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Occupational Health & Safety
June 24-25, 2014 Valencia Conference Centre, Valencia, Spain

Change in metabolic load and thermoregulation as a result of using N95 masks under influence of temperature

Chen-Peng Chen, Hui-Chen Wei, Shun-Hua Ho and Yi-Chun Lin
China Medical University, Taiwan

N95 masks are commonly used in a variety of environmental settings to protect the workers from inhalation of airborne particulates. However, the confinement of the nose and mouth when using a mask interrupts the direct exchange of metabolic heat with the air, risking an excess physiological strain, particularly in the workplaces where elevated temperature and humidity may be expected. We studied the change in metabolic load and thermoregulation when N95 masks of different face piece designs were used. In the study, twenty participants (10 males and 10 females) were evaluated for physiological properties involved in thermoregulation, including those of body-core thermal load (metabolic rate, blood pressure, pulse rate, and core temperature) and of peripheral heat exchange (trans epidermal water loss, skin moisture, and skin temperature), when they used N95 masks (a cup-shaped and a three-flap foldable mask) in a climatic chamber pre-set at a temperature of 19-34°C and a relative humidity of 65%. The readings of physiological indicators were taken during the periods of acclimation and respirator use and were compared to analyze the thermal strain attributed to respirator use. The results revealed a significant level of thermoregulation, evidenced by the increase in TEWL and skin moisture, as required for the dissipation of metabolic heat when the N95 masks were used. The males showed a greater thermoregulatory response to respirator use than the females. When using a respirator, the users should consider a mask of greater flexibility and reduce the duration of each single use to alleviate the thermal strain.

Biography

Chen-Peng Chen is an Associate Professor at the Department of Occupational Safety and Health, China Medical University, Taiwan. He received his PhD in Environmental Toxicology from the University of Wisconsin-Madison and his postdoctoral training from the Colorado School of Mines. He was a Scientist at the US National Institute for Occupational Safety and Health in affiliation with the National Occupational Research Agenda Dermal Exposure Research Program from December 2001 to May 2006, and also the Acting Director of the Program from 2005 to 2006. He has published over 70 papers, with 20 being SCI-indexed journal articles.

chencp@mail.cmu.edu.tw