Cardiovascular health effects following exposure of human volunteers during fire extinction exercises - DTU Orbit (09/12/2018)

**Cardiovascular health effects following exposure of human volunteers during fire extinction exercises**

Background: Firefighters have increased risk of cardiovascular disease and of sudden death from coronary heart disease on duty while suppressing fires. This study investigated the effect of firefighting activities, using appropriate personal protective equipment (PPE), on biomarkers of cardiovascular effects in young conscripts training to become firefighters.

Methods: Healthy conscripts (n = 43) who participated in a rescue educational course for firefighting were enrolled in the study. The exposure period consisted of a three-day training course where the conscripts participated in various firefighting exercises in a constructed firehouse and flashover container. The subjects were instructed to extinguish fires of either wood or wood with electrical cords and mattresses. The exposure to particulate matter (PM) was assessed at various locations and personal exposure was assessed by portable PM samplers and urinary excretion of 1-hydroxypyrene. Cardiovascular measurements included microvascular function and heart rate variability (HRV).

Results: The subjects were primarily exposed to PM in bystander positions, whereas self-contained breathing apparatus effectively abolished pulmonary exposure. Firefighting training was associated with elevated urinary excretion of 1-hydroxypyrene (105%, 95% CI: 52; 157%), increased body temperature, decreased microvascular function (-18%, 95% CI: -26; -9%) and altered HRV. There was no difference in cardiovascular measurements for the two types of fires.

Conclusion: Observations from this fire extinction training show that PM exposure mainly occurs in situations where firefighters removed the self-contained breathing apparatus. Altered cardiovascular disease endpoints after the firefighting exercise period were most likely due to complex effects from PM exposure, physical exhaustion and increased core body temperature.

**General information**

State: Published
Organisations: Department of Micro- and Nanotechnology, National Research Centre for the Working Environment, University of Copenhagen, Danish Technological Institute, Bispebjerg University Hospital
Number of pages: 9
Publication date: 2017
Peer-reviewed: Yes

**Publication information**

Journal: Environmental Health: A Global Access Science Source
Volume: 16
Issue number: 1
ISSN (Print): 1476-069X
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 4.44 SJR 1.662 SNIP 1.398
Web of Science (2017): Impact factor 4.376
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.71 SJR 1.586 SNIP 1.379
Web of Science (2016): Impact factor 3.816
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 4.12 SJR 1.715 SNIP 1.413
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 3.41 SJR 1.567 SNIP 1.408
Web of Science (2014): Impact factor 3.372
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 3.1 SJR 1.225 SNIP 1.479
Web of Science (2013): Impact factor 2.713
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.94 SJR 1.236 SNIP 1.549