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Prolonged usage of PPE induces headaches in frontline healthcare workers

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Healthcare workers with combined exposure to N95 face-mask and protective eyewear (e.g. goggles) used for more than 4 hours per day were predisposed to the development of new-onset PPE associated headaches.

A study conducted by a team of clinical researchers from the National University Hospital (NUH) during the current COVID-19 outbreak found that the majority of frontline healthcare workers developed new-onset headaches due to the wearing of Personal Protective Equipment (PPE) for long hours. The study was conducted from February to March 2020 shortly after a surge in COVID-19 cases in Singapore and involved 158 healthcare workers at NUH who donned PPE while caring for COVID-19 patients in high-risk hospital areas.

The study, whose findings have been published in the reputable scientific journal *Headache,* found that healthcare workers with combined exposure to N95 face-mask and protective eyewear (e.g. goggles) used for more than 4 hours per day were predisposed to the development of new-onset PPE associated headaches. Furthermore, the headaches in responders with a background history of migraine or tension-type headache worsened. In addition, the location of pain or discomfort upon the head was found to correspond anatomically to the areas of compression by either the mask or goggles and their straps.

Dr Jonathan Ong, the lead author, and Consultant at the NUH Division of Neurology said, “Our findings are clinically relevant especially for the occupational health and work performance of our fellow colleagues. Given that the current pandemic may last for a longer period of time, better strategies targeted at optimising work-rest cycles, thereby limiting the duration of PPE exposure could be considered. In the longer term, we need to improve the design of personal protective equipment so that they are better tolerated and more comfortable to don when used for a more prolonged duration. Despite experiencing headaches, we have observed that our colleagues have remained steadfast to their call of duty and continue to care for their patients with commendable spirit and resilience”.

PPE include gears such as close-fitting N95 face masks, protective eyewear (goggles), gowns, surgical gloves, and sometimes the use of powered air-purifying respirators (PAPR). As per Dr Chandra Bharatendu, Consultant at the NUH Division of Neurology, who is a co-investigator for this study, the findings are consistent with the viewpoint article on the

Covid-19 experience in Singapore published in the journal *JAMA* (February 2020), that “working with PPE is cumbersome and uncomfortable” and is one out of the many critical “issues that require attention and action”.

***Image Caption**: The NUH clinical research team who designed and conducted the study. From left to right: Dr Chandra Bharatendu, Consultant at the Division of Neurology, Ms Ong Shi Ting, Nurse at the Department of Emergency Medicine, Dr Jonathan Ong, Consultant at the Division of Neurology, A/Prof Vijay Sharma, Senior Consultant at the Division of Neurology, and Dr Jonathan Tang, Associate Consultant from the Department of Emergency Medicine.*