The Effect of N95 Respirators on Vital Parameters, PETCO2 and Physical Comfort among Healthcare Providers at the Pandemic Clinics

Emre Karsli[1], Atakan Yilmaz[2], Ramazan Sabirli[1], Omer Canacik[1], Mert Ozen[3], Murat Seyit[3], Levent Sahin[1], Alten Oskay[3], Ibrahim Turkcuer[3], and Aykut Kemanci[3]

[1]Kafkas University Faculty of Medicine
[2]Pamukkale Universitesi Tip Fakultesi
[3]Pamukkale University School of Medicine

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Abstract

Background Wearing face shields and masks, which used to have very limited public use before the Covid-19 outbreak, has been highly recommended by organizations, such as CDC and WHO, during this pandemic period. The aim of this prospective study is to scrutinize the dynamic changes in vital parameters, change in end tidal CO2 levels, the relationship of these changes with taking a break, and the subjective complaints caused by respiratory protection while healthcare providers are performing their duties with the N95 mask. Methods The prospective cohort included 54 healthcare workers (doctors, nurses, paramedics) who worked in the respiratory unit of the emergency department (ED), performed their duties by wearing valved N95 masks, face shields. The vital parameters and end-tidal CO2 levels were measured at 0-4th-5th-and 9th hours of the work-shift. Results Only the decrease in diastolic BP between 0-9 hours was statistically significant (p=0.038). Besides, MAP values indicated a significant decrease between 0-9 hours and 5-9 hours (p= 0.024 and p=0.049, respectively). In terms of the vital parameters of the subjects working with and without breaks, only PETCO2 levels of those working uninterruptedly increased significantly at the 4th hour in comparison to the beginning-of-shift baseline levels (p=0.003). Conclusion Although the decrease in SBP and MAP values is assumed to be caused by increased fatigue due to workload and work pace as well as increase in muscle activity, the increase in PETCO2 levels in the ED healthcare staff working with no breaks between 0-4 hours should be noted in terms of PPE-induced hypoventilation.

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Figure-1. A valved N95 respirator