THE SELECTED ABSTRACTS

23rd Conference on Epidemiology in Occupational Health

EPICOH 2.0.13: IMPROVING THE IMPACT

178 Fit of N95 filtering facepiece respirators influenced by gender, design of facepiece, and activity engaged in use

Y.C. Lin, C-P. Chen
China Medical University, Taichung, Taiwan

Session: *18. Exposure Assessment III*

Session Date: 20/06/2013
Presentation Time: 16:35 - 16:50

Abstract
Objectives: The N95 filtering facepiece respirators are often used as the last line of defense protecting the workers against threats of airborne particulate contaminants, and its leakage around the faceseal could result in a direct exposure to the unfiltered air. This study investigated the fit of N95 respirators among young Taiwanese under the influences of gender, facepiece design, and activity engaged when the respirators were used.
Methods: In the study, all participants (60 males and 60 females) were first characterized for 19 facial dimensions frequently applied in fit-test panel design using anthropometric equipments. The participants were then qualitatively fit-tested with N95 masks of three distinct facepiece designs (cup, flat fold, and liner with exhalation valve). During the fit-test, the participants were required to perform a series of seven exercises. The results were compared using Principle Component Analysis to identify key facial dimensions influencing the respirator fit as well as their distributions.
Results: Only 27% of the participants passed all seven exercises without a leakage detected, with the proportion in males significantly higher than that of females. The percentage of participants failing all exercises was the greatest with the liner model and the least with the flat-fold model. When the flat-fold and cup models were tested, deep breathing and talking resulted in higher rate of leakage than the others activities. The facial dimensions identified as being significant to respirator fit included face width, interpupillary distance, nose breadth, face length, nose protrusion, and subnasale-sellion length.
Conclusions: The facial dimensions significant to respirator fit among Taiwanese suggested a need for a Taiwanese-based respirator fit-test panel. The users should include the flexibility of facepiece and the activity engaged when using the respirator as factors to consider when selecting a respirator so to reduce potential exposure due to inappropriate fit.

Abstract

Abstract title	Fit of N95 filtering facepiece respirators influenced by gender, design of facepiece, and activity engaged in use
Author	Lin, Y.C., China Medical University, Taichung, Taiwan (Presenting author)
Co-author(s)	Chen, C-P., China Medical University, Taichung, Taiwan
Topic	Exposure assessment

Objectives: The N95 filtering facepiece respirators are often used as the last line of defense protecting the workers against threats of airborne particulate contaminants, and its leakage around the faceseal could result in a direct exposure to the unfiltered air. This study investigated the fit of N95 respirators among young Taiwanese under the influences of gender, facepiece design, and activity engaged when the respirators were used.

Methods: In the study, all participants (60 males and 60 females) were first characterized for 19 facial dimensions frequently applied in fit-test panel design using anthropometric equipments. The participants were then qualitatively fit-tested with N95 masks of three distinct facepiece designs (cup, flat fold, and liner with exhalation valve). During the fit-test, the participants were required to perform a series of seven exercises. The results were compared using Principle Component Analysis to identify key facial dimensions influencing the respirator fit as well as their distributions.

Results: Only 27% of the participants passed all seven exercises without a leakage detected, with the proportion in males significantly higher than that of females. The percentage of participants failing all exercises was the greatest with the liner model and the least with the flat-fold model. When the flat-fold and cup models were tested, deep breathing and talking resulted in higher rate of leakage than the others activities. The facial dimensions identified as being significant to respirator fit included face width, interpupillary distance, nose breadth, face length, nose protrusion, and subnasale-sellion length.

Conclusions: The facial dimensions significant to respirator fit among Taiwanese suggested a need for a Taiwanese-based respirator fit-test panel. The users should include the flexibility of facepiece and the activity engaged when using the respirator as factors to consider when selecting a respirator so to reduce potential exposure due to inappropriate fit.

Back


EPICOH 2013
IMPROVING THE IMPACT
18 - 21 JUNE 2013 UTRECHT, THE NETHERLANDS