Human Rhinovirus Infections are Associated with Temperature and Humidity in a Cold Climate

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Objective
Both temperature and humidity may independently or jointly contribute to the risk of human rhinovirus (HRV) infections either through the effects of climatic factors on the survival and spread of viruses in the environment, or due to changes in population susceptibility to acute respiratory infections. We examined the relations between the level and decrease of temperature, humidity and the risk of HRV infections in a subarctic climate during military training. In these conditions both cold exposure and exercise may predispose subjects to respiratory infections (1,2).

Methods
We conducted a case-crossover study among military conscripts (KIAS-study, n=892) seeking medical attention due to respiratory symptoms during their military training period and identified 146 HRV cases by PCR. Meteorological data such as measures of average and decline in ambient temperature and absolute humidity (AH) during the 3 preceding days of the onset (hazard period) and two reference periods, prior and after the onset were obtained.

Results
The average temperature preceding HRV onset was -9.9±4.9°C and AH 2.2±0.9g/m³. Both an average [OR 1.07 (95% CI 1.00-1.15)] and maximal [OR 1.08 (1.01-1.17)] change in temperature increased the risk of HRV infections by 8% per 1°C decrease. Furthermore, average [OR 1.20 (1.03-1.40)] and maximal decrease [1.13 (0.96-1.34)] in AH increased the HRV infection risk by 13% and 20% per 0.5 g decrease in humidity. A higher average temperature during the 3 preceding days was positively associated with HRV infections [1.07 (1.00-1.15)].

Conclusions
A decrease rather than low temperature and humidity per se during the preceding 3 days increase the risk of HRV infections in a cold climate. The information is applicable for proper prevention and protection from cold-related adverse health effects.

References


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