

SUMMARY

Infections of the respiratory tract are the most common diseases in humans. The highest number of respiratory infections are caused by rhinoviruses and influenza viruses. Apart from the characteristics of the causative agent (pathogenicity, invasiveness, virulence) and those of the host (immune status, chronic diseases, smoking habits, socioeconomic status, malnutrition) other factors such as air pollution and climatic conditions may also play a role in the development of respiratory infections. Influenza related mortality rates have been established in many countries; nevertheless, studies focusing on the Central European population have been rare to date.

The main study objective was to compare mortality rates while taking into account the influenza incidence to be able to evaluate seriousness of this disease. Subsequently, excess mortality rates were established for the influenza epidemic periods. Another study objective was to evaluate the effect of climatic factors on the known seasonal trend in the incidence of acute respiratory infections (ARI) including influenza.

We assess mortality attributable to influenza by comparing all cause mortality and mortality due to diseases of the circulatory system during influenza epidemic and non-epidemic periods, as defined by acute respiratory infection surveillance data. Data on total mortality, mortality due to diseases of the circulatory system and surveillance data for influenza and other respiratory infections were used in a general linear model for dependence of left censored mortality data over time, and week as a categorical factor. Results of the analysis show statistically significant differences in excess mortality rates between influenza epidemic and non-epidemic periods in the Czech Republic between 1982-2000. The mortality rates peak almost simultaneously with the ARI incidence rates. We estimate that 2.17% of all cause mortality, and 2.57% of mortality due to diseases of the circulatory system throughout the study period was attributable to influenza, with an estimated annual average of 2661 and 1752 deaths, respectively. The highest numbers of deaths were reported during seasons when influenza A/H3N2 was the predominant circulating strain. Improving vaccination coverage against influenza is considered to be the primary strategy for prevention of influenza associated mortality.

Daily data on air temperature, rainfall and air humidity from 1992 – 2000 were also used for analysis of the effect of climatic factors on the incidence of ARI. Multivariate models based on the general linear model for censored data were created for data analysis. Correlation between climatic factors and the incidence rates of acute respiratory infections was found. Both temperature that shows a significant seasonal trend and season (calendar week) have an important effect on the ARI incidence. Nevertheless, which one of these variables, i.e. temperature or season, plays the primary role is the question of interpretation since temperature is closely associated with season. Anyway, the fact that a rise in the incidence of acute respiratory infections is usually observed at a 1 to 2-day interval after a decrease in air temperature is of practical relevance.