Comparison of a 10-year cumulative age standardized incidence rate of lung cancer among metropolitan cities in Korea

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Background
According to the annual report of cancer statistics in South Korea in 2014, lung cancer is common in both males and females in Korea, and each metropolitan region shows different incidence rates. Smoking is known to be the most common cause of lung cancer making up about 80% of the cause. Others include genetic factors, history of respiratory infection, diet, occupational and environmental factors and so on. We hypothesized that regional difference of lung cancer incidence may come from the environmental and occupational difference of each region.

Aim
• To calculate the risk of lung cancer in each target area
• Look for the cause of regional difference in lung cancer risk

Methods
• Study subjects: 1 January 2000 – 31 December 2009
  - Korea National Cancer Incidence Database (KNICIDB)
  - C33, C34 based on ICD-10, 7 metropolitan cities
• Assessment of Occupational and environmental hazards
  - data of pollutant release and transfer register (PRTR)
  - annual report of ambient air quality in Korea
• smoking rate: to adjust in analysis
• Analysis: comparison of lung cancer risk
  - ANOVA: to compare concentration of pollutants
  - Standardized Rate Ration (SRR): to compare risk of lung cancer among target regions
  - Adjusted SRR (aSRR): smoking rate adjusted SRR, ratio of
  - 10-year cumulative age-standardized incidence rate (asRR) of lung cancer from 2000 to 2009 in each 7 region versus that of total South Korea (reference region)

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SRR^* = \frac{ASR_I}{ASR_R}
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\(SRR^*\): relative ratio of standardized rate for ASR1 versus ASR2

Results
From the result, the total amount of carcinogenic substance emission was highest from 2001 to 2009 in Ulsan which means that the city with the highest environmental risk factors was Ulsan. Also, from 2000 to 2009, Ulsan showed the highest ASR of the lung cancer in all adults, males and females. Similarly, SRR and aSRR were significantly higher in both males and females in Ulsan.

Conclusions
By comparing the lung cancer risk, region with higher environmental risk factors, such as Ulsan, showed significantly elevated lung cancer risk. Based on the result of this study, it can be concluded that the environmental factor may have an impact on the lung cancer development. Furthermore, in this study, 10 year cumulative incidence, age-standardization and smoking rate adjustment were all taken into account which made the validity of this study higher than that of previous studies. Thus, it can be used as good reference data for the future study of cancer in Korea.

Abbreviation: ASR, age standardized ratio; SRR, standardized ratio; aSRR, adjusted standardized rate ratio; 95% CI, 95% confidence interval

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