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92 04 01   92 12 31

93   2   3

NO_2　CO　O_3　SO_2　PM_{10}

CO　NO_2　SO_2

O_3　PM_{10}
PM_{10}　O_3　CO　NO_2　SO_2

1996

2001　　　　　　　　　　　　　　　　　1994　　2002

PM_{10}　O_3

CO　NO_2　SO_2

( )　1996　　2001
( )　1994　　2002

( )

( )
-0.16~0.09　-0.12~0.22　-0.33~0.13

( )　　Poison

regression　　　　　　　　　　　　　　　　　　　　>=65

(　　　relative risk,

RR>1.00, p<0.001)

( )

1994　2002
( )　　　　　　　　　　　>=65

(RR>1.00)　( )

(RR>1.00)　( )

(RR>1.00)

Previous epidemiological studies have reported significant associations between air pollutants, including NO_2, CO, O_3, SO_2, PM_{10}, and increased daily emergency room visits or hospital admissions due to respiratory disease or daily mortality from respiratory causes. The relationships between these potential health effects and air pollution in Taiwan population are not well understood and merit further investigation. The purpose of this study was to investigate the association between NO_2, CO, O_3, SO_2, PM_{10} exposure, respectively, and respiratory disease emergency room visits, hospital admissions, and daily mortality among population of the seven major air quality districts in Taiwan. We collaborated with sub-project 1 in assessing the exposures to air pollutants, NO_2, CO, O_3, SO_2, PM_{10}, for population of the seven major air quality districts. The data regarding respiratory disease emergency room visits and admissions during 1996 and 2001 were collected from National Health Insurance Research Database, and respiratory mortality during 1994-2001 from the mortality database of the Department of Health. Data analysis included descriptive statistics of health outcomes, comparisons of outcomes among population of seven districts and among years, and generalized additive model and Poisson regression analysis for assessing the association between each air pollutant and each of the health outcomes. Major results from the first-year study are described as follows. First, we had the descriptive statistics for daily count of respiratory disease death, hospital admissions, and emergency room visits of residents (0-14, 15-64, 65+ y/o) in seven districts. Second, the correlation coefficients ranged from -0.16 to 0.09, -0.12 to 0.22, and -0.33 to 0.13, respectively, for daily concentration of each air pollutant and daily respiratory death, hospital admissions, and emergency room visits. When considering time lag and moving average, the correlation coefficients differed for air pollutants and for seven districts. Results of the Poisson regression analysis, with adjustment for calendar year, weekday, temperature, and dew point, showed that (1) daily respiratory disease death count was significantly associated with all five air pollutants for people aged 65+ years in the North, Yun-Gia-Nan, and Kao-Pin districts (relative risk, RR > 1.00, p<0.001); (2) daily count of respiratory disease hospital admissions was significantly associated with four or five of the air pollutants for people of the North, Ju-Miao, Central, Yun-Gia-Nan, and YiLan districts (RR > 1.00, p<0.001); (3) daily count of emergency room visit for respiratory diseases was significantly associated with four or five air pollutants in all seven districts (RR > 1.00, p <0.001). This study had two major limitations. First, air quality district was used as the study unit and the results might be biased by misclassification of exposures. Second, daily counts of the hospital admissions and emergency room visits were calculated for hospitals in respective district, whereas patients might have come from other districts. The exposure-disease association could be biased. Further studies are suggested to assess the effects of air pollution on respiratory health of residents living near air monitoring stations.

Key words: air pollution; ozone; particulate matter; respiratory diseases; hospital admissions; mortality; epidemiology