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Plastic Effects of Industrial Air Pollution among Surrounding Residents

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Abstract

In today's world, air pollution (AP) is the leading environmental cause of disease and premature death. In 2015, an estimated 9 million premature deaths were attributed to AP-related diseases, or 16% of all deaths worldwide. Organic chemicals like polycyclic aromatic hydrocarbons (PAH), metals like iron and nickel, gases like ozone, biological agents like plant pollen, endotoxins, and bacteria, and minerals like quartz and asbestos make up the toxic mixture of gases and particulate matter (PM) that is AP. Meteorological conditions and variations in human activity over time are linked to variations in composition in each location. Acute inflammation can be caused by air pollutants; Increased recruitment and activation of inflammatory cells and mediators, as well as activation of intracellular oxidative stress through the generation of free radicals and depletion of protective antioxidants and their enzymes, were demonstrated in human, animal, and in vitro experimental studies.

Keywords: Macro plastics; Air pollution

Introduction

In respiratory diseases like COPD (chronic obstructive pulmonary disease) and asthma, which are characterized by inflammation of the airways, respiratory symptoms like wheezing, coughing, and shortness of breath are common. Asthma, chronic obstructive pulmonary disease (COPD), and deteriorating lung function have all been linked to particulate matter exposure. Subjects with the highest self-reported exposure to traffic were found to have significantly higher rates of wheeze, shortness of breath attacks, bronchitis symptoms, and impairment in lung function in a recent study. A significant dose–response relationship between short- and long-term personal PM2.5-bound polycyclic aromatic hydrocarbons (PAHs) exposures and decreased lung function was found in a longitudinal study involving 224 Chinese community members.

The area of Civitavecchia, situated along the northern shoreline of Rome (Focal Italy), has been an explanation of worry for quite some time due to different wellsprings of natural contaminations, including an enormous harbor, a concrete production line, and three major thermoelectric plants, that may possibly influence the private networks. Additionally, urban traffic and biomass combustion for civil heating have a significant impact on the region's air quality. Workers and residents are both at high risk for respiratory diseases and lung cancer, according to previous research in this area. A residential cohort study found that, after controlling for occupational exposure and socioeconomic status, industrial pollution was associated with resident's' cause-specific mortality. After acute (short-term) and chronic (long-term) exposures, air pollution-particularly particulate matter, nitrogen dioxide, and ozone—can exert its effects on health. Several non-communicable diseases, including cardiorespiratory conditions and lung cancer, and a shorter life expectancy are linked to long-term exposures. The ESCAPE project (European Study of Cohorts for Air Pollution Effects; www.escapeproject.eu) in Europe investigated the long-term effects of air pollution on adult cohorts. Chronic exposure to air pollutants is linked to natural mortality, cardiovascular events, lung, brain, breast, and digestive tract cancer, according to ESCAPE results [1-4].

Discussion

The purpose of this study was to evaluate the association between air pollution from industrial plants, harbour, traffic, and biomass heating and respiratory symptoms and lung function in the population living in the area. However, some aspects still need to be clarified, such as the effect of air pollution on respiratory function, especially from pollution sources other than road traffic, such as industrial sources, civil heating, and cruise ships. In the area under investigation, there are three thermoelectric power plants: Tor Valdaliga North (TVN), Fiumaretta, and Tor Valdaliga South (TVS). TVN was the only one working during the study period, and it was about 5 km from the town center. Since 1984, it has been producing 2640 MW of power. In 2010, it was converted into a coal-fired power plant. Outflows from the power plants incorporate particulate matter (PM), nitrogen oxides (NOx) and sulfur dioxide (SO2). The TVN plant is permitted to release 2100 tonnes of sulfur dioxide, 3450 tonnes of nitrogen oxides, 160 tonnes of dust, 2000 tonnes of carbon monoxide, and 195 tonnes of ammonia annually (source: Dec. Min.114 of 05.04.2013). Arsenic, mercury, vanadium, nickel, cadmium, and chromium are just a few of the other micropollutants that are released. Through three similar-looking metal tubes, the flue gases are released into the atmosphere: 110 °C at the flue gas exit temperature; 16 m/s flue gas outlet velocity; chimney's internal diameter is 5.7 meters. The three pipes are inside a chimney that is 250 meters high [5-7].

The Civitavecchia harbor has traditionally been used by ferry traffic, merchant ships, and tankers. It has 241,000 square meters, 26 operational piers, and 23 berths for up to 100-meter yachts. Cruise ships (from 50 ships in 1996 to 950 ships in 2013) and ferries (from 1500 a year to up to 4 million a year) have increased significantly as a result of improvements made to passenger facilities and docks over time.

Urban traffic also has an effect on the area's air quality. Approximately 84,000 vehicles per day in 2012 (65,000 cars; 6000 vehicles; It has been estimated that 13,000 motorcycles) are moving

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in the area, with a significant number of vehicles in transit due to the harbor. Summertime sees an increase in traffic of approximately 10,000 vehicles per day (700 heavy vehicles). Body weight (Kg) and standing height (cm) was measured for each subject. During the ABC clinical visits, a trained respiratory specialist assessed the patient's lung function. Spirometer with the COSMED spirometer device system was used to measure lung function in accordance with ATS/ERS recommendations. Throughout the study, the same device was utilized. Each subject had to complete at least three successful forced expiratory maneuvers with a nose clip out of a maximum of eight trials. Only forced expirations that met the ATS/ERS's recommendations were accepted by the operators. From each expiration, the Spiro metric indices listed below were calculated: forced expiratory volume in one second (FEV1), forced vital capacity (FVC), and forced expiratory flow at 25-75% (FEF25-75) Cotinine levels in the urine were taken to check for exposure to cigarette smoke.

The annual mean exposure estimated at the resident's home address was used to model PM10 (thermoelectric plants, harbors, and biomass combustion) and NOx (traffic) concentrations as a fixed continuous variable. The linear association was estimated for an increment equal to the difference between the 95th and 5th percentiles of each pollutant's distribution because of the variable magnitude of the exposure indicator [8-10].

Conclusions

Means and standard deviations (SD) were calculated for continuous variables in descriptive analyses. Modified Poisson regression models were used to evaluate the relationship between exposure variables and cough with phlegm due to the relatively high prevalence of the outcomes in the study sample. The associations between the exposure (as continuous variables) and the dichotomous outcomes (wheezing and dyspnea) were evaluated using logistic regression (odds ratio, ORs, and corresponding 95% CIs). Finally, linear mixed effects models and cross-correlation were used to investigate the connections between exposure and lung function. We included the questionnaire's smoking status in the analysis to determine whether the individual was an active smoker, a nonsmoker, or an ex-smoker. We were able to take into account the possibility of being exposed to secondhand smoke thanks to the additional information on the urinary cotinine. A sensitivity analysis on healthy individuals who answered no to the question, "Have you ever had a physician diagnosis of asthma, COPD, emphysema, or chronic bronchitis?" and by gender were carried out. For the statistical analyses, SAS (SAS Institute Inc., North Carolina, NC, and USA) and STATA ver.12 (Stata Corp., Texas, TX, USA) software programs were utilized.

References

1. Chamberlain DE, Vickery JA, Glue DE, Robinson RA, Conway GJ, et al. (2005) Annual and seasonal trends in the use of garden feeders by birds in winter. Ibis 147: 563-575.
2. Cleary GO, Coleman BR, Davis AD, Jones DN, Miller KK, et al. (2016) Keeping it clean: bird bath hygeine in urban and rural areas. J Urban Ecol 2: 1-4.
3. Clergeau P, Vergnes A (2011) Bird feeders may sustain feral rose-ringed parakeets Psittacula krameri in temperate Europe. Wildl Biol 17: 248-252.
4. Cox DT, Gaston KJ (2015) Likeability of garden birds: importance of species knowledge & richness in connecting people to nature. PLoS ONE 10: e0141505.
5. Cox DT, Gaston KJ (2016) Urban bird feeding: connecting people with nature. PLoS ONE 11: e0158717.
6. Robb GN, McDonald RA, Chamberlain DE, Bearhop S (2008) Food for thought: supplementary feeding as a driver of ecological change in avian populations. Front Ecol Environ 6: 476-484.
7. Robinson RA, Lawson B, Toms MP, Peck KM, Kirkwood JK, et al. (2010) Emerging infectious disease leads to rapid population declines of common British birds. PLoS ONE 5: e12215.
8. Sidra S, Ali Z, Chaudhry NM (2013) Avian diversity at new campus of Punjab University in relation to land use change. Pakis J Zool 45: 1069-1082.
9. Strubbe D, Matthysen E (2009) Experimental evidence for nest-site competition between invasive ring-necked parakeets (Psittacula krameri) and native nuthatches (Sitta europaea). Biol Conserv 142: 1588-1594.
10. United Nations, World Urbanization Prospects: The 2014 Revision, Highlights (ST/ESA/SER.A/352). New York, NY: The United Nations.