EXPOSING THE PROBLEM OF AIR POLLUTION IN INDIA - A STUDY

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Relevance. Outdoor air pollution is a major environmental health problem affecting everyone in developed and developing countries alike. WHO estimates that in 2012; 72% of outdoor air pollution-related premature deaths were due to ischaemic heart disease and strokes, whereas 14% of the deaths were due to chronic obstructive pulmonary disease or acute lower respiratory infections and 14% of them were due to lung cancer [WHO, 2016]. Every year, roughly 5.8 million Indians die from heart and lung diseases, stroke, cancer and diabetes. In other words, 1 in 4 Indians risks dying from an NCD before they reach the age of 70 [WHO, 2015]. Aim. To establish the basic characteristics of the atmospheric pollution in India. Materials and methods. The literary data on air pollution over the last 5 years have been selected for analysis. Analytical and statistical methods of research were used. Results. The problem of air pollution in India is established by many researchers: Gokhale SB, Patil RS, Gadgil AS, Jadhav RS, Gupta AK, Gupta SK, Gupta I, Joseph AE, Jain N, Pathak H, Mitra S, Bhatia A, Jain R, Dwivedi Dev Km, Gupta AB, Lone PM, Khan AA, Shah SA, Reddy MK, Rama Rao KG, Rammohan Rao I, Mukherjee I, Chakrabarty SN, Misra AK, Prasad R. and others. After analyzing their work, we have established the basic characteristics and peculiarities of air pollution in the most polluted cities in India. The most polluted cities in India are New Delhi, Lucknow, Mumbai, Calcutta, and Visakhapatnam. Suspended particulate matter (SPM), sulfur dioxide (SO2) and oxides of nitrogen (NOx), which are main criteria of pollutants in India. The major pollutants have reached the critical level and are rapidly going beyond threshold (bearable limit). For example, particulate matter concentration in Greater Mumbai is higher than the prescribed standards and WHO guidelines, the excess quantity ranged from 1.4 to 2.65 times. The main sources of these pollutants, as in Ukraine, are industry and transport. Also, in some cities, a popular air pollutant such as methane is worrying. Methane (CH4) with its current concentration of 1.72 ppmV in the atmosphere accounts for 15 per cent of the enhanced greenhouse effect. The atmospheric concentration of CH4 is increasing at 0.3 per cent/y. Lowland rice soil is considered to be one of the major contributors of atmospheric methane. It should be noted that much has been done to reduce the levels of atmospheric pollutants. But first of all, we want to draw attention to the existing state monitoring system. The National Air Quality Monitoring Program (NAMP) is CPCB's innovative program to monitor the ambient air quality in India. NAMP network consists of three hundred and forty two (342) operating stations covering one hundred and twenty seven (127) cities/towns in twenty six (26) states and four (4) Union Territories of the country. This program also takes care of preventive and corrective measures to control air pollution by identifying the critically polluted areas. NAMP identified four air pollutants i.e., Sulphur Dioxide (SO_2), Oxides of Nitrogen as NO2, Suspended Particulate Matter (SPM) and Respirable Suspended Particulate Matter (RSPM / PM10) for regular monitoring at all the locations under its ambit and also integrated with the monitoring of meteorological parameters like wind speed and wind direction, relative humidity (RH) and temperature. The monitoring of pollutants is carried out for 24 hours (4-hourly sampling for gaseous pollutants and 8-hourly sampling for particulate matter) with a frequency of twice a week, to have one hundred and four (104) observations in a year. The monitoring is being carried out with the help of Central Pollution Control Board; State Pollution Control Boards; Pollution Control Committees; National Environmental Engineering Research Institute (NEERI), Nagpur. CPCB co-ordinates

with these agencies to ensure the uniformity, consistency of air quality data and provides technical and financial support to them for operating the monitoring stations. N.A.M.P. is being operated through various monitoring agencies. Large number of personnel and equipments are involved in the sampling, chemical analyses, data reporting etc. Conclusions. The main air pollutants in India are suspended particulate matter, sulfur dioxide and oxides of nitrogen. WHO has also recognized them as a priority pollutants throughout the world. The Government of India is pursuing an active policy to reduce pollution levels, which gives its results. But it is still too early to talk about stabilizing this problem.

References

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PARTICULATE MATTER AS A REAL DANGER FOR HEALTH FOR ZAPORIZHZHIA CITIZENS

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Relevance. Air pollution represents the biggest environmental risk to health. In 2012, one out of every nine deaths was the result of air pollution-related conditions. Of those deaths, around 3 million are attributable solely to ambient (outdoor) air pollution [WHO, 2016]. Particulate matter (PM) affects more people than any other pollutant. Their fine fractions are the most destructive for health – 10 micron or less diameter ($\leq PM_{10}$). The danger of these substances is determined, forward because of the fact that they consist of the difficult mixture of solid and liquid particles of organic and inorganic substances, which are present in the increased level in the air, and because of ability to penetrate deeply to lungs and sag there. There is a close, quantitative relationship between exposure to high concentrations of small particulates (PM_{10} and $PM_{2.5}$) and increased mortality or morbidity, both daily and over time. Conversely, when concentrations of small and fine particulates are reduced, related mortality will also go down – presuming other factors remain the same [WHO, 2016]. The goal of the study.The analysis of content of weighted solid particles of respirable fractions of particulate matter (PM_{10} and PM_4) in the atmospheric air of the city. Materials and methods. Consentration PM_{10} and PM_4 measurements were carried out using the piezoelectric aerosol analyzer KANOMAX – 3521. The analytical and statistical methods were used to process the indexes. Results. The studies continued for the last 5 years. We have discovered for this period that PM_{10} and PM_4 which are always in the air environment of the all districts of the city, but the highest levels of pollution are fixed in the Zavodskyi and Voznesenyvskyi districts of the city, and at 9 intersection of the motorways. In the residential areas of the most polluted districts the concentration of PM_{10} exceeded the maximum permissible concentration 20- minute mean, only in unit cases the multiplicity of excess was 1.1-1.2 times. At the evaluation of average daily concentrations, it was discovered that PM_{10} which systematically exceeded the maximum permissible concentration 24-hour mean, the multiplicity of excess varied from 1.06 to 3 times. The highest values of surplus of maximum permissible concentration 20- minute mean at intersections were 2.2- 5.5 times for PM_{10}, but it is necessary to say that these values were registered only at dry airless weather at the condition of high temperature in the summer. Thanks to the every second