Effects of Environmental Pollution on Changes in Blood Biochemical Parameters

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Abstract

A metabolic marker in the blood of individuals exposed to air pollution is plausible as some environmental pollutants have been observed to enter the blood stream directly from lungs. The main objective of the current review is to find out changes in biochemical parameters of human blood as a result of environmental pollution. Spatio temporal models involving measurement of Air Quality Index were accommodating to find out the results of development of an aggregate air quality index. Results depicted that mean values of RBC and hemoglobin concentration in blood of exposed children were significantly different from those of non-exposed group. Air pollution may adversely affect children's erythrocytes, particularly PM10 have a significant negative relationship with hemoglobin and RBC numbers while a positive significant relationship with WBC and platelet count. Higher concentrations of air pollutants exposed to pregnant women significantly higher the incidence of pregnancy anemia's. A strong dose-response relationship was confirmed for both contaminants. It is difficult to establish a causal relationship between specific environmental exposures and complicated multifactorial health outcomes, the application of non-targeted metabolite profiling to assess the effect of air pollution on blood metabolite. Therefore in the present study the main emphasis has been made on the effects of various polluted environment contaminants, their biochemical effects on the composition of blood and various associated disease.

Keywords: Blood Disease, Environment, Erythrocytes, Pollutants

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INTRODUCTION

Ambient air pollution is the global health threat causing serious ill health effects. Association between several environmental pollutants and changes in respiratory parameters of health was observed by measuring the blood of individuals exposed to air pollution about 2-18 hours. Their association with markers of vascular inflation and coagulation measured in peripheral blood that was collected at the same time and point was also observed (1).

A study led by Environmental Working Group (2004) in United States, in cord blood from a sample of total ten randomly selected births in different hospitals, there were 413 different environmental related toxins and with an average of 200 toxins detected chemicals in each blood sample of cord and overall toxins tested positive were 287.

BLOOD DISEASES

Hematologists have reported many blood diseases that have been properly detected, diagnosed and treated, some of

these include non-cancerous and other types includes blood cancerous. This could be involved in blood cellular portion (RBC, platelets and WBC). In clotting they could also be involved in blood proteins. Every blood disorder does not require treatment. By community hematologist, here is the list which blood disorder has been treated, it includes blood cell disorder, aplastic anemia, anemia, thalassemia, sickle cell anemia, myelofibrosis, blood cell disorders, myelodysplasia, myeloma, lymphoma, leukemia, immune thrombocytopenic purpura, platelet disorder, hemophilia, clotting disorder, hypercoagulable state, von willebrand disease and hemochromatosis (2).

Hospital visits and mortality of patients have been increased due to environmental pollutants (3). Primarily affected systems are the respiratory system and cardiovascular system as indicated by epidemiological and animal model data. It could influenced the functions of other several organs (4).

LITERATURE REVIEW

To apply the parameters as indicators of disease and stress such as hemoglobin, hematocrit, different blood seamers, red

and white cells counts, plasma glucose level, erythron profiles and genetic damages indicators here this work intended to research hematological parameters (5).

In a study Children in the comparative group were designated as unexposed group ($n = 139$) attended schools in high air pollution municipalities and ($n = 215$) subjects were with low levels of air pollution. Different scientists have used regression model to examine the association of particulate matter and nitrogen dioxide and modified variance on hemoglobin concentrations and prevalence of anemia (6).

The average value (g / mL) of hemoglobin in exposed children was 10.97 ± 0.38 , and the average value in non-exposed children was 11.09 ± 0.78 . Diagnosis of iron deficiency anemia was made using predefined criteria. From 1990 to 2000, the concentration of air in the deposits of black smoke, nitrogen dioxide, sulfur dioxide, and lead was measured.

At the Niš Health Center laboratory, blood specimens were collected from subjects during each pregnancy stage. Anemia was diagnosed for values of hemoglobin $<105 \text{ g} / \text{l}$ and hematocrit $<34\%$.

Fig. 1. Complex mixture of air pollution.

In a study children exposed to air pollution were screened for erythrocytes. About 354 students lived in the same house for over 10 years aged 11-14 were the subjects. Mean RBC count and hemoglobin concentration of exposed children were significantly different from those of non-exposed group ($P < 0.001$). This depicts the effect of air pollution on erythrocytes count in children that may adversely affect children's erythrocytes count [6].

As anemia exposure to air pollution can lead to pathological conditions. In pregnant women exposed to different large amounts of air pollutants, this study was designed to evaluate the frequency of anemia with regard to ambient air pollution. Good physical condition, and are not exposed to harmful drugs in the workplace as subjects lived for over 5 years in Niš and NiškaBanja with pregnant women ($n = 327$), non-smokers of 20-30 years old. Our results show that to higher concentrations of air pollutants the incidence of pregnancy anemia is significantly higher in pregnant women exposed (7).

Lung inflammation caused by the action of microparticles on the alveoli Regardless of whether this is the result of blood changes secondary. It repeatedly measures the hematological factors of the elderly and relate them to measurements of exposure to air Particles that were studied. Results Estimates

of individual exposure to PM 10 over the past 3 days showed a negative correlation with hemoglobin concentration, packed cell volume (PCV) and erythrocyte count (8).

Anemia, a very common obstacle in the elderly population, is associated with a number of abnormal vascular health problems, including higher mortality, impaired function and cognitive impairments (9).

Fig. 2. Data showing the number of exposed air pollution at a typical workday.

Human individuals show continuous growth till the end of puberty. Children in all stages of growth and development should be protected from environmental health hazards. As new chemical substances are introduced daily and are released in the environment. Since World War II, about 80,000 new synthetic chemical substances have been produced. Many synthetic chemicals are already present in umbilical cord blood, due to long-term effects of single chemical exposure, how these multidrug resistances affect fetal development. It is difficult to establish a causal relationship between specific environmental exposures and complicated multifactorial health outcomes (10).

Today, the air in large cities around the world is burdened with the gas produced by the car. The mortality rate due to pollution of automobiles is rapidly rising in metropolitan areas. The polluted air has a serious impact on their health, climate and the economy, over time people have realized.

The increase in cases of asthma and allergy has become an important health problem all over the world. These diseases they are affecting the majority of the population of many areas, these diseases were not common diseases several decades ago. In the human body and the subsequent health effects, this analysis was further expanded and described the occurrence of these sufferings. On the importance of air pollution and the relationship between allergy and asthma, this document was organized to give an overview of the current state of research (11).

By intercepting particulate matter on the plant surface and absorption of gaseous pollutants through leaf pores, trees remove atmospheric pollution. However, the magnitude and value of the influence of woody matter and forests throughout the United States on air quality and human health remain unknown. By computer simulation using local environmental data, the forests of the US trees and forests will have 17.4 million tons of air pollution (range: 9,023.2 million tons) in 2010, human health effects of 6.8 billion US dollars range: 1.5 trillion 13 billion Dollar). Health effects included avoidance of more than 850 fatal accidents and occurrence of 670,000 acute

respiratory symptoms (12). Microplastic is a pollutant of environmental problems. It is reported that it exists in foods ingested by humans and foods in the air. Upon inhalation or ingestion, microplastic accumulates and may exert local particle toxicity (13).

Fig. 3. Source to exposure to outcome continuum.

According to the Urban Air Database released by the World Health Organization (WHO) in September 2011, the Delhi metropolitan area has exceeded the limit value of PM 10 by nearly 10 times at 198 $\mu\text{g} / \text{m}^3$. In the past decade, to lower the level of air pollution in the Delhi Metropolitan area, several measures have been taken. However, it is necessary to do more, in order to reduce air pollution level further (14). By air pollutants affected by air pollutants (here defined as part of blood metabolites) and compounds present in the blood derived from endogenous metabolites, biological perturbations caused by air pollution are caused may be reflected. In response to exposure to short-term air pollution, we aimed to assess the perturbation of blood metabolites. Sustainable development have caused various changes in the environment, plans to hurt without respecting population growth, rapid industrial technology development, urbanization,. Human activities cause changes in the environment in the form of pollution and perturbation, causing extensive damage to biological creatures. As a result, the whole life support system facing extinction is increasing, the ecological balance has collapsed and the threat (15).

CONCLUSION

Human activities cause changes in the environment in the form of pollution and perturbation, causing extensive damage to biological creatures. As a result, the whole life support system facing extinction. The ecological balance has collapsed and facing dire threat. The polluted air has a serious impact on their health, climate and the economy. Result estimates of individual exposure to PM 10 over the past 3 days showed a negative correlation with hemoglobin concentration, packed cell volume (PCV) and RBC count. This review highlighted that higher concentrations of air pollutants have also more life threatening effects on pregnancy anemia. Citizens should be realized that their safe life lies under clean and green environment. Government should take concrete steps to minimize the pollution, especially in major cities to ensure safe health of the citizens.

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