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Health Effects of Particulate Matter: Another Reason behind Stroke (A Case Study of Gauhati University Area, Jalukbari, Assam)

[1]Nisha.Sharma, [2]Hari P.Sarma, [3].Dr.Gufran Beig.
1Research Fellow (MAPAN Project) Department of Environmental science, Gauhati University, Gauhati
2Rector (G.U) & Prof. Department of Environmental science, Gauhati University, Gauhati
3. Chief project scientist, MAPAN, IITM, PUNE

Abstract: *Suspended particulate matter has now become aconcern in the global environment due to the health problems and environmental degradation cause by it. So this paper summarizes the evidence about the effects of air quality (particulate matter) on human health and damage to Materials, vegetation, animals, waterbodies.The aim of the paper is to stimulate the development of effective strategies to minimize air pollution and its effects on health.In this regard effective control strategies have been undertaken for adequate air quality management in theGauhaticity, Assam.*

Key words:*particulate matter, health, environment, STROKE*

I. Introduction

Particulate matter is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles (larger than 2.5 micrometers) come from a variety of sources including windblown dust and grinding operations. Fine particles (less than 2.5 micrometers) often come from fuel combustion, power plants, and diesel buses and trucks.They are of health concern because they easily reach the deepest recesses of the lungs and a series of significant health problems, including: Premature death; Respiratory related hospital admissions and emergency room visits; Aggravated asthma; Acute respiratory symptoms, including aggravated coughing and difficult or painful breathing; Chronic bronchitis.

Table 1. Below shows the various standards and their ex-ceedence in Nigeria, the World Health Organization, South Africa and developed nations (The United States and the United Kingdom)

Table 1. PM10and PM2.5Standards for Various Nations

		Nigeria	WHO (µg/m3	World Bank	UKEPA	USEPA	South Africa
PM10	Annual 24 hours	- -	**20** **50**	- **80**	- **150**	**40** **50**	**60** **180**
PM2.5	Annual 24 hours	- -	**10** **25**	- -	**15** **35**	**25** -	- -

Table2 .Monthly Variation of PM2.5From January to December (2013 & 2014) (Gauhati university area)

SPM	**PM2.5(2013)**	**PM2.5(2014)**
Months	**µg/m³**	**µg/m³**
jan	128	115
feb	88.5	166.5
mar	91	79.5
april	52	73
may	25	49.5
june	21.5	25
july	14.5	15.5
august	19.5	12
september	26	16.5
october	35	32
november	61.5	46.5
december	103	57

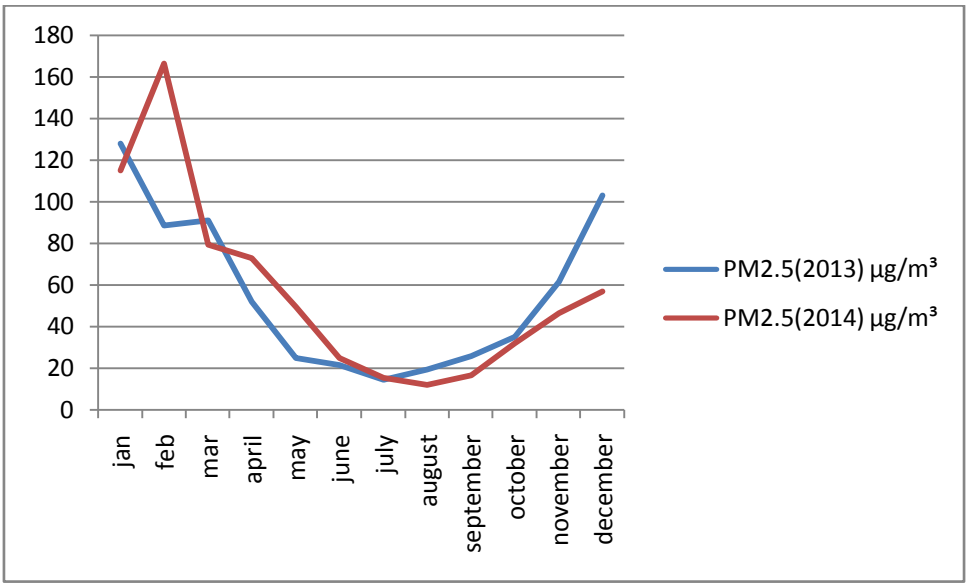


Figure 1: Monthly Variation of PM2.5 of 2013 and 2014

Figure 2: Image of Suspended particulate matter

Table3 .Monthly Variation of PM10From January to December (2013 & 2014) (Gauhati university area)

SPM	PM10(2013)	PM10(2014)
Months	µg/m³	µg/m³
jan	203	173.5
feb	177.5	149.5
mar	148.5	159
april	128.5	166.5
may	63.5	64.5
june	43	9
july	28.5	31
august	25.5	26
september	45	32
october	56	60
november	92	90
december	170	121.5

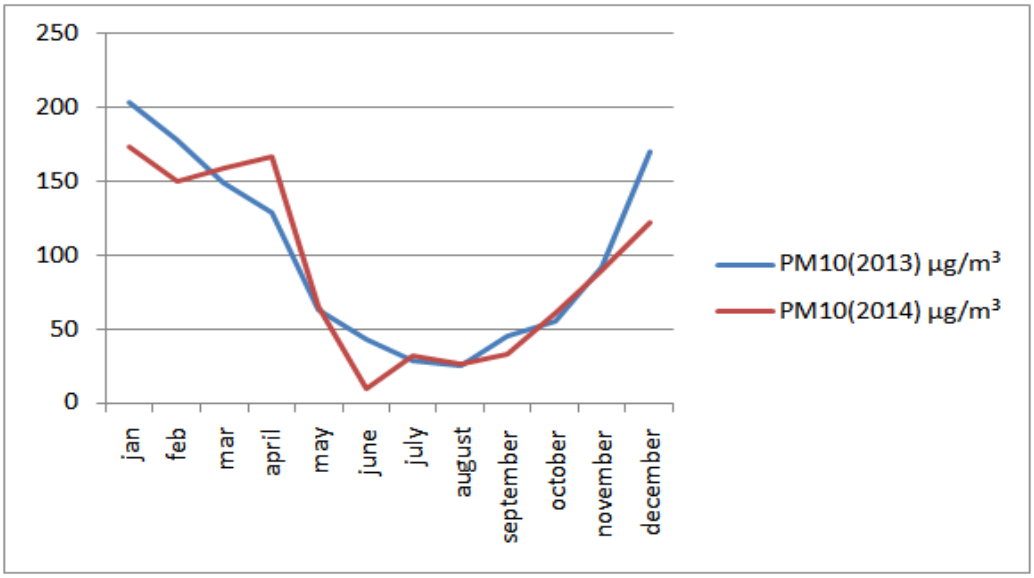
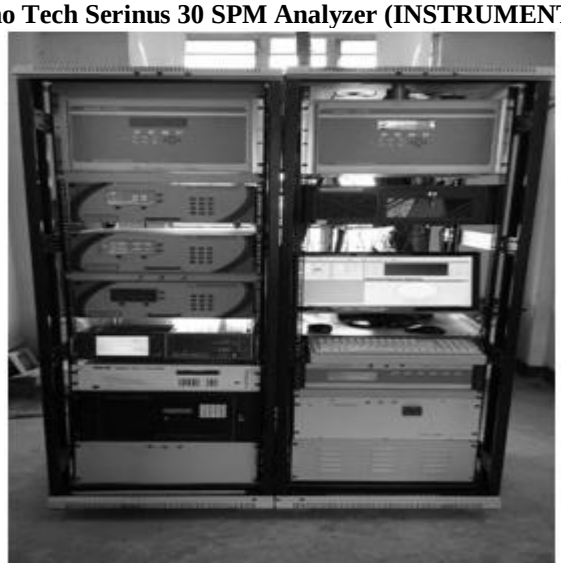


Figure 3: Monthly Variation of PM10of 2013 and 2014

Echo Tech Serinus 30 SPM Analyzer (INSTRUMENT): pollutants Detector, pm 2.5 & pm 10



Effects On Human Health

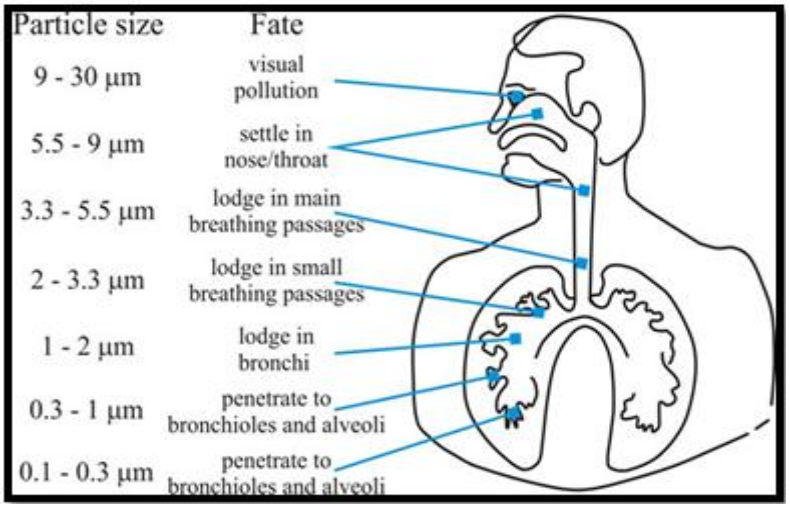


Figure 3: particle size &related health problems

When we talk about air pollution, generally Carbon mono-oxide,Sulpher-dioxide, Nitrogen-oxide etc. comes to our mind. These polluted gases can cause much harm to both plants and animals. Along with these gases in polluted air we can find other vital factor i.e. micro particles (atoms). Actually these are solid and liquid atomic particles. These particles enter human body while breathing and causes many harm to it. The particles are known as suspended particulate matter or in short PM. Atomic particles are calculated in micron or micrometer. 1 micrometer is equal to10 ¯6miter. The structure of a hair is almost 60-70 micron. In the environment the structure of maximum atomic particles ranges from 0.005-0.1 micrometer. In the name of physicist and meteorologist **Aitken** from Scotland, the structure of the atomic particles is known as **Aitken**particle.

As per reports published in the year 2013, the fifth cause of death in India is air pollution. The main cause behind the premature death in India is high blood pressure,smoking, internal pollution unhealthy food and in the fifth place it is air pollution. In the year 2010 due to air pollution around 6, 20,000 people died in India. From then there is no development in the condition. According to the last reading maximum of the breathing air in India has a small particle whose structure is smaller than 2.5 micrometer.

The minimum level structure of the particle available in the environment has been decided by World Health Organization. According tothe International Agency for Research on Cancer (IARC) in 2013, the atomic particles present in the polluted air are the main reason behind the first stage cancer. Beside cancer these particles are responsible for heart diseases. According to the reports in 2010, due to the floating particles in air many people died in India. The percentage of people died due to these diseases is as follows –Ischemic disease (stroke), 25.8%, obstructive pulmonary disease - 17.32%, lower respiratory injection 6.4%, trachea bronchus and lung injection – 2.02%. The second main reason behind the death of a person in the world is stroke. Around million people in the world die due to pressure stroke. The third reason behind a person becoming physically handicapped in stroke.Sometime earlier, it has been calceolate that the main reason behind stroke is smoking, high bloodpressure.

But very recently it has been said that another reason behind stroke is air pollution.

In the British Medical Journal 2015, there was discussion on air pollution in different countries and the percentage of people died in pressure stroke.

II. Conclusions

In the present global environmental scenario, PM is a widespread air pollutant especially in the urban industrial areas which is increasing at a very rapid rate. As a result health problems caused by PM are also growing at an alarming rate. The health effects of PM10and PM2.5 are well documented. As per the data collected from the **Echo Tech Serinus 30 SPM Analyzer (Instrument)** under MAPAN project was installed in the Department of Environmental Science, GU. It is clear that the level of PM is growing in the Jalukbari area owing various reasons such as vehicle emission, industrial activities, construction works etc. The level of PM in atmosphere in Jalukbari area is seen high especially in the winter seasondue to wet weather and condense

atmosphere. So some immediate steps should be undertaken to minimize the effects of PM as there is evidence that decreased levels of particulate in air result in health benefits for the population. In this regards, I would like to put forward a few suggestionsto monitor the effects of PM on human health and others.

Suggestions

1. Since even at relatively low concentrations the burden of air pollution on health is significant, so effective management of air quality aiming to achieve WHO AQG levels is necessary to minimize the health risks.
2. Monitoring of PM10 and PM2.5needs to be improved in alarming areas such as Jalukbari area to assess population exposure and to assist local authorities in figuring out plans for improving air quality.
3. As level of PM concentrations in air leads to some of the serious diseases as mentioned above. Such diseasescan be reduced by using mask especially in the alarming areas, installing high chimneys by industries, construction sites should be covered well from all sides.
4. Regulatory measures such as stricter air quality standards, limits for emissions from various sources should be implemented.
5. Some structural changes such as energy consumption should be reduced as far as possible especially which are based on combustion sources, modes of transport should be changed, land use pattern should be adopted by proper planning.
6. PM can be monitored by using proper and modern technologies.
7. Above all some behavioral changes by individuals for example, using cleaner modes of transport or household energy sources should be done.

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