Vol 6 Issue 11 May 2017 ISSN No :2231-5063

International Multidisciplinary Research Journal

Golden Research Thoughts

Welcome to GRT

RNI MAHMUL/2011/38595 **ISSN No.2231-5063**

Golden Research Thoughts Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial board.Readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

Address:-Ashok Yakkaldevi 258/34, Raviwar Peth, Solapur - 413 005 Maharashtra, India
Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.aygrt.isrj.org

ISSN: 2231-5063 IMPACT FACTOR : 4.6052(UIF) VOLUME - 6 | ISSUE - 11 | MAY - 2017

GRT GOLDEN RESEARCH THOUGHTS

IMPACT OF PARTICULATE MATTER ON OUR BRAIN.

Dr. Ramesh Sandhu
Associate Professor , C. R. College of Education, Hisar .

ABSTRACT

Research has shown that air pollution have a damaging effect on our brain also. High level of air pollution may cause adverse effect on the cognitive abilities of children. It may increase the risk of cognitive decline and may lead to depression. The researcher revealed that long term exposure to high levels of pollution significantly worsened the women's cognitive skills. It was found that smaller particulate matter can penetrate our body's defences and cross onto blood and reach the brain. These pollutants damage the nerve cells and lead to memory loss or depression. Air pollutions contribute to cognitive decline and onset of dementia. It was found that kids exposed to greater levels of black carbon scored worse on tests of memory and verbal and non- verbal IQ. Children who were exposed to higher levels of urban air pollutants experience attention problems, symptoms of anxiety and depression. Air-pollution can cause damage to many central nervous systems. It can cause Alzheimer's and Parkinson's disease. A study by Portuguese researchers explored the relationship between psychological health and living on industrial areas. They found that people living in highly polluted area scored higher on tests of anxiety and depression.

KEYWORDS: *Air pollution, mental health.*

INTRODUCTION

Air pollution is causing a great loss to the eco-system of this planet. It is damaging the health of all living beings. The dark line of smog over the sky is not just a stain but leaves a mark on your mind. Researchers have indicated since the 1970s that high level of air pollution can harm both cardiovascular and respiratory health. It may cause early death due to heart and liver disorder. The effect of air pollution on cognition and mental well-being has received little attention of researchers. However, new researchers show that air pollution damages our brain also. It has been found that high level of air pollution may cause adverse effect on the cognitive abilities of children. Air pollution may increase the risk of cognitive decline and may lead to depression. "This should be taken seriously," says Paul Mohai, Ph.D., a professor in the University of Michigan's School of Natural Resources and the Environment who has studied the link between air pollution and academic performance in children. "I do it think the issue has got the visibility it deserve". (American Psychological Association, 2012). A fine particulate matter has got much attention of most of the researchers. These fine particles (1/30th of the width of human hair) are

generated by power plants, factories and vehicles. This fine particulate matter causes cardiovascular diseases. Particulate matter is one of six principal pollutants for which the Environmental Protection Agency (EPA) has established air quality standard (American Psychological Association, 2012).

It has been established that particulate matter damages other organs of our body beyond cardiovascular disease. Jennifer Weuve at Rush medical college found that older women who had been exposed to high levels of pollutants experienced greater cognitive decline compared with other women their age (Archives of Internal Medicine, 2012). The researchers revealed that long term exposure to high levels of pollution significantly worsened the women's cognitive decline, as measured by tests of cognitive skill. Weuve and her colleagues narrated as "The conventional wisdom is that coarse particles are not as important as fine particles". When it comes to human health, Weuve says, Research studies have shown that the smaller particles can easily penetrate our body's defences." They can cross from the lung to the blood and, in some cases, travel up the axon of the olfactory nerve into the brain "She stays, she found that exposure to both fine and coarse particulate was associated with cognitive decline. This study has been supported by Power and colleagues. They found that men exposed to high levels of black carbon had reduced cognitive performance; equivalent to aging by two years, as compared to men who would had less black carbon exposure (Power et al., 2011). Power says "The problem is there are a lot of other things associated with traffic-noise, gases -- so we can not say from this study that it's particulate part of the air pollution that matters." Still, the cumulative results of these studies suggest that air pollution deserves closer scrutiny as a risk factor for cognitive impairment and perhaps the dementia.

Many dementias are often preceded by a long period of cognitive decline. But we don't know very much about how to prevent or delay dementia," Wouve says. If it turns out air pollution does contribute to cognitive decline and the onset of dementia, the findings could offer a tantalising a new way to think about preventing disease. "Air pollution is something that we can intervene on as a society at large, through technology, regulation and policy," she says. Shuglia (2008) found that kids exposed to greater levels of black carbon scored worse on tests of memory and verbal and non-verbal 1.Q. Perera (2012) discovered that children who had been exposed to higher levels of urban air pollutants known as polycyclic aromatic hydrocarbons while in utero were more likely to experience attention problems and symptoms of anxiety and depression. These widespread chemicals are a bye-product of burning fossil fuels.

Mohai (2011) at the University of Michigan, found that Michigan Public Schools located in areas with the highest industrial pollution levels had the lowest attendance rates and the greatest percentage of students who failed to meet state testing standards, even after controlling for socioeconomic differences and other confounding factors.

In early investigations, Calderon-- Garciduenas (2003) dissected the brains of dogs that has been exposed to air pollution of Maxico city and compared them with the brains of dogs from a less-polluted city. She found the Maxico city dogs' brains showed increased inflammation and pathology including amyloid plaques and neuro- fibrillary tangles, clumps of proteins that serve as a primary marker for Alzheimer's disease in humans. In follow up research, Calderon-Garceduenas (2008) conducted a study on 55 kids from Mexico city and 18 from the less polluted city of Polotitlan. Magnetic Resonance Imaging (MRI) scans revealed that the children exposed to urban pollution were significantly more likely to have brain inflammation and damaged tissue in the prefrontal cortex. Neuro inflammation, Calderon-Garciduenas explains, disrupts the blood-brain barrier and is a key factor in many central nervous system disorders, including Alzheimer's disease and Parkinson's disease. The Mexico City children scored lower on tests of memory, cognition and intelligence.

Nelson (2011) found that mice exposed to the polluted air scored higher on tests of depressive-like responses. A study by Portuguese researchers explored the relationship between psychological health and living in industrial areas. They found that people who lived in areas associated with greater levels of air pollution scored higher on tests of anxiety and depression.

CONCLUSION

The dark line of smog is not just a stain but leaves a mark on your mind. Researchers have indicated since the 1970s that high level of air pollution can harm both cardiovascular and respiratory health. It has been found

that on pollution can affect your brain also and can lower the cognitive and mental abilities of a person. Some particulate materials which are 1/30th of the width of human hair reach lungs through breathing and damage the respiratory system. These fine particles penetrate the body defence mechanism and get dissolved in our blood. When the blood reaches brain, the fine particulate matter damages the central nervous system and increases the risk of depression, dementia, Alzheimer's and Parkinson's diseases. Children living in industrial area have attention problems, symptoms of anxiety and depression. Researchers also discovered physical changes to the nerve cells in the mouse hippocampus, a region known to play a role in spatial memory. Exposed mice had fewer spines on the tips of the neurons in this brain region. Those (spines) form the connections to other cells," Nelson says. ''so, you have less dendritic complexity, and that is usually correlated with a poorer memory. The changes are alarming and surprising, he says. "I never thought we had actually see changes in brain structure." Some Portuguese researchers have explored the relationship between psychological health and living in industrial areas. They found that people who lived in areas associated with greater levels of air pollution scored higher on tests of anxiety and depression. Fine particulate matter which includes smoke, car exhaust and pollens, can interact directly with the brain. Coarse particulate matter, however, is more of a mystery that researchers are only beginning to study.

REFERENCES

1.Lilian Calderon-Garciduenas. R. et al. (2003). DNA damage in nasal and brain tissues of canines exposed to air pollutant is associated with evidence of chronic brain inflammation and neurodegeneration. Toxicologic pathology.
2.Lilian Calderon-Garciduenas. R. et. al. (2008). Air pollution, cognitive deficits and brain abnormalities: A pilot study with children and dogs. Brain and Cognition, pp 117-127.
3.Mohai, P. et al. (2011). Air pollution around schools is linked to poorer student health and academic performance. Health Affairs.
4.Nelson R. J. (2011). Inhalation of fine particulate alters hippocompal neuronal morphology. Molecular Psychiatry.
5.Perera, P. F. et al. (2012) Prenatal polycyclic aromatic hydrocarbon (PAH) exposure and child behaviour at 6-7 years. Environmental Health Perspectives. 120(6): 921-926.
6.Power, M. et al. (2011). Silver nanoparticles compromise neurodevelopment in PC 12 cells: Critical contribution of silver ion particle size, coating and composition. Environmental Health Perspective.
7.Sugila et al.(2008). Association of black carbon with cognition among children in a prospective birth cohort study. American Journal of Epidemiology, Vol. 167, Issue 3.
8.Weir, K. (2012). Smog in our brain. Monitor on Psychology. Published by American Psychological Association, Vol. 43, No. 7.
9.Weuve, J. (2012). Air pollution ups risk of stroke, impaired memory. Archives of Internal Medicine.