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# A Fuzzy Model to Evaluate the Effect of Air Pollutants on Respiratory Diseases

• **Jaya Kamari** • **Anjali Raj** • **Puja Kumari**
• **Seema Mishra**

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**Corresponding Author : Seema Mishra**

**Abstract:** *Air is a basic need of all living beings but, the quality of air is deteriorating and the main impact of polluted air on human is related to severe health hazards. The present study is to determine the risk of respiratory problems due to various air pollutants such as $PM_{2.5}$ (Particulate matter), CO (Carbon Monoxide), $NO_2$ (Nitrogen dioxide) and $O_3$ (Ozone). In this paper, we have constructed a fuzzy model to analyze the risk of respiratory diseases in three different stations, Patna, Gaya, and Muzaffarpur of Bihar due to the concentrations of $PM_{2.5}$, CO, $NO_2$ and $O_3$ in these areas. It has been shown that the risk of respiratory diseases is highest in the months of November, January, February and March and moderate in May, June, December and October in the year 2018. Obtained results are compatible with the present scenario of respiratory diseases in these areas.*

***Keywords:*** Fuzzy model, Air pollutant, Respiratory disease, Linguistic variable, Membership function.

**Jaya Kamari**
B.Sc. III year, Mathematics (Hons.),
Session : 2017-2020, Patna Women's College,
Patna University, Patna, Bihar, India

**Anjali Raj**
B.Sc. III year, Mathematics (Hons.),
Session : 2017-2020, Patna Women's College,
Patna University, Patna, Bihar, India

**Puja Kumari**
B.Sc. III year, Mathematics (Hons.),
Session : 2017-2020, Patna Women's College,
Patna University, Patna, Bihar, India

**Seema Mishra**
Assistant Professor, Department of Mathematics,
Patna Women's College, Bailey Road,
Patna – 800 001, Bihar, India.
E-mail : seema.math@patnawomenscollege.in

## Introduction:

Air is important for all life on planet earth. Unfortunately, the quality of air has been degrading and the impact of polluted air on human health is very severe. This is a burning problem to the developing countries like India. Urbanization and rapid development in countries like India are the main reasons for air pollution.

We realize that natural air is the most significant component of healthy life. At the point when this air gets contaminated by means of dust, toxic gases, smoke, motor vehicle, mills and factories etc. called air pollution. Agents that spoil air quality are called air pollutants (Türk and Kavraz, 2011). Air pollution can also be defined as the presence of pollutants such as CO (Carbon