Air pollution and Covid-19: experience from India

M.P. ROY

Public Health Specialist, Ministry of Health and Family Welfare, New Delhi, India

Abstract. – Since the onset of the pandemic caused by Covid-19, air pollution has been repeatedly implicated for a possible role in determining the magnitude of the outbreak. The present paper aims to find out whether such an association exists between air pollution and Covid-19. For examining such a relationship in India, data on air quality parameters (SO_2, NO_2, $PM_{2.5}$, and PM_{10}) and Covid-19 from 30 states were considered. The extent of air pollution was seen to influence the pandemic only in certain locations. Future research may consider it as a potential area for quantifying the threshold. The mitigation of the pandemic should incorporate a particular focus on air pollution.

Key Words:
Air pollution, Covid-19, India.

Introduction

India has lost more than 156,000 precious lives to Covid-19 till 17th February 2021. The role of air pollution, although debated globally, has not been examined here adequately[1-3].

Therefore, considering State as the unit for analysis, the details about air pollution were retrieved from the government website[4]. Annual averages of SO_2, NO_2, $PM_{2.5}$, and PM_{10} (four parameters frequently used for air pollution) were taken in $\mu g/m^3$. An arithmetic mean of all readings recorded in a particular state for 2018 was taken into account. Confirmed Covid cases per million were considered till 17th February, 2021[5]. The correlation coefficient was calculated to assess the relationship between air pollution and the burden of Covid-19.

Out of 30 states, Goa, Delhi, and Kerala recorded the maximum caseload in terms of cases per million. These three states conducted more tests for Covid-19 than most of the other states. The concentrations of NO_2, $PM_{2.5}$, and PM_{10} were highest in Delhi. The caseload was positively associated with the annual average concentration of NO_2 (r = 0.227) but not with other parameters (r = −0.202, −0.121, and −0.102 for SO_2, $PM_{2.5}$, and PM_{10}, respectively). The states with high PM_{10} levels were plotted with their case burden (Figure 1). The case burden did not depend on air pollution.

The possible role of air pollution in rendering people more vulnerable to Covid-19 infection and resultant mortality has been highlighted earlier[2]. A positive association between $PM_{2.5}$ and PM_{10} with Covid-19 pandemic has been reported from China[3]. The role of pollution in increasing the expression of Angiotensin Converting Enzyme – 2 on human airways has earlier been linked to higher infectivity of Covid-19[6]. The positive relationship between respiratory viruses like influenza and high $PM_{2.5}$ level has been discussed in detail by another paper[7]. Exposure to air pollution has also been thought to alter host immunity to respiratory infections[8]. A study from India found a variable relationship between air pollution and Covid-19, depending on study locations[9]. It is apparent from the present study that such air pollution may not have a direct relation with the burden of Covid-19.

It was noted that the case burden does not always depend on the extent of air pollution. Probably the number of tests conducted played the role of confounder here. A better in-depth understanding of the relationship would help scientifically improvise the existing strategy for mitigation of the impact of the pandemic.

Conflict of Interest

The Authors declare that they have no conflict of interests.

Corresponding Author: Manas Pratim Roy, MD; e-mail: manas_proy@yahoo.co.in
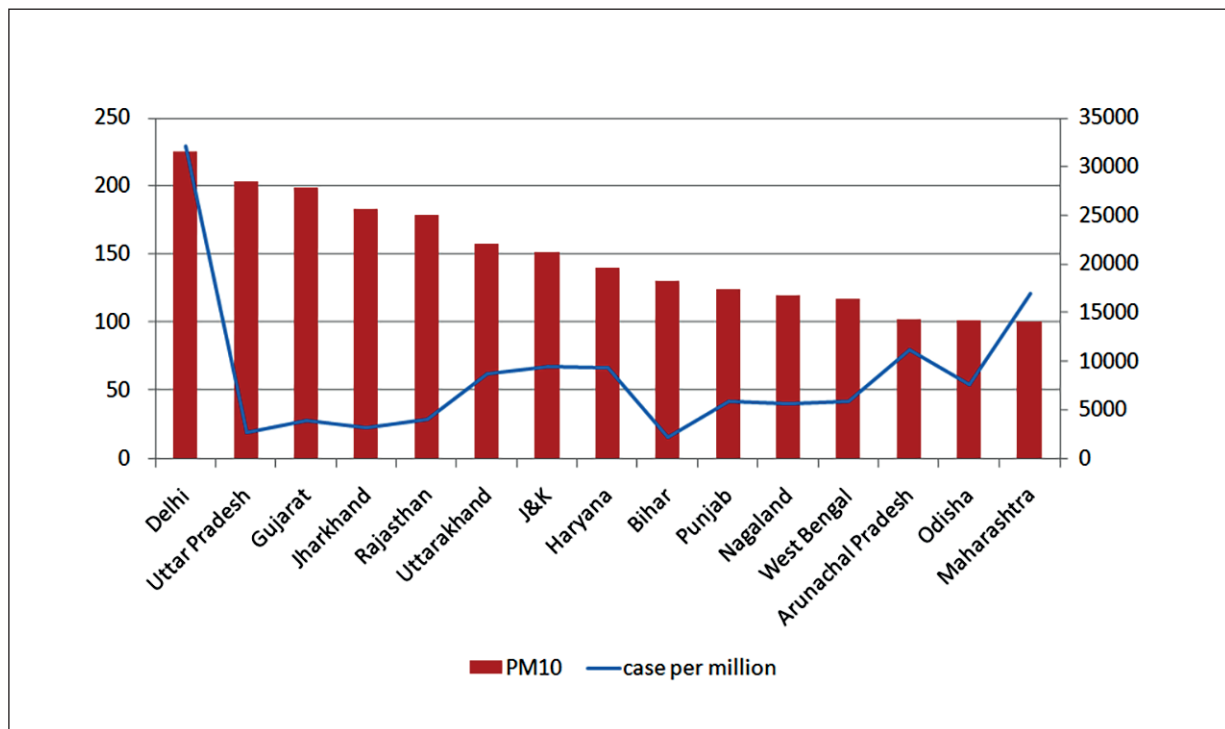
Figure 1. Relationship between PM_{10} and Covid-19 cases per million in selected states.

CRediT Authorship Contribution Statement

MPR reviewed the paper and wrote the manuscript.

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