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COVID19 and air pollution and Lucknow City ,India

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Abstract-

Health today is one particular area, which has engaged the attention not of only medical professionals, which is but natural for them, but also of social scientists, including anthropologists, sociologists, policy makers and administrators, development specialist and human welfare activist(Das,2005).Man is both creature and moulder of his environment (RajGopal;1987). At present time air pollution is a major problem facing all nations of the world(Elsom,1992) but now the air pollution due to vehicular emissions in most metropolitan cities in India is taking serious dimensions and worsening the peoples quality of life and breathing in polluted air is general source of discomfort. The air quality of Lucknow city has been deteriorated due to increasing traffic ,motorization, construction enhanced domestic activities due to increased city population. Although the role of air pollution and in exacerbating existing illness has been well established, but today many researches have established to find out the relation between exposure to air pollution and likelihood of dying from COVID19.This paper will discuss the air quality of Lucknow City and its relation with COVID 19.

Key words-Air Pollution,COVID19,Lucknow,India

Introduction-

Concepts of health and disease are part of every culture ,in one sense understanding of disease means understanding of its causes which concentrates more on biology of health (Das,2005).In the field of environmental health, we are dealing with quite literally, with man's future the society which he has created for himself(Terray,1966). The relationship between human health and his environment is two way process. To improve our living conditions and increase our comforts but alterations to the environment may be harmful to health (Kumar;1987). The air pollution due to vehicular emissions in most metropolitan cities in India is taking serious dimensions and worsening the peoples quality of life.. Today COVID19 is a serious threat and stressing everyone all over the world. At present time India recorded 76,472 cases in the last 24 hours ,the number of Corona infects exceeded 34,63,973 and now reached at second position ,while US is at number one spot in terms of both cases and death .The corona virus continues to be grim in Uttar Pradesh's capital Lucknow now currently has 24,664cases on 29 August 2020. According to Villeneuve,2020 many countries have been struggling and fighting with COVID19 but now at present time scientist have been also wondered that air pollution could increase death rates among those with diseases. The health consequences of city air pollution in developing countries are far worse than that of developed countries as urbanization has a strong bearing on the travel demands in the country(Bhattacharya,2002) and today metropolitan cities are facing main problems due to growing vehicular population and air pollution caused by vehicular emissions in the atmosphere. It is predicted that vehicle emissions in 2030 will be worse than they are now(Olmo,Saldiva et al,2011) At present time Lucknow city has been served by metro system but due to rapid growth of population concentration and their activities and demand for goods and services in Lucknow. Vehicular traffic has been found to be the main source of particulate air pollution in Lucknow city(I.I.T.R,2020).As the city has denser areas, where congestions of traffic increases the vehicle emissions therefore the polluted air not only effecting older people and children but also younger generation. Overall subsequent health impacts can be seen on whole population. As per the report of I.I.T.R(Indian Institute of Toxicological Research);2020,the number of registered with RTO(Regional Transport Office) in Lucknow is 24,07,190 as on 31.03.2020 which is 9.7% higher over last year 2019(21,94,261).The air quality of Lucknow city was in severe category i.e.382 on 1 November 2019 and that can lead serious respiratory issues(TOI,Nov,2019). According to expert, the worst air quality is due to unchecked vehicle and poor maintenance of road. With the rise in the population of motor vehicles, air pollution is bound to accelerate not only because of rise in the level of vehicular smoke and consequent carbon emission but also due to receding green cover as more and more of land is brought under use for the residential and other purposes(Bhatt,2008).It is not just COVID that affects hsources;uman lungs, but many respiratory diseases are associated with air pollution. According to Jerrett (Los Angeles Times,2000) "lungs are already expanding energy to fight air pollution, if another invader comes in, their defense is already diminished". Therefore my aim of this discussion is to find out the relation between COVID19 and air pollution in Lucknow City.

Pollution level during and after lock down in India:-

At the present time, Corona virus(COVID19) is dominating on the lives of human life.COVID19 was first detected in Wuhan, China.Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases. Novel coronavirus (nCoV) is a new strain that has not been previously identified in humans. The new virus was subsequently named the “COVID-19 virus(WHO,2020) and caused by Severe Acute Respiratory Syndrome(SARS-COV-2). Total number of confirmed cases in India breaching the 100,000 on 19 May, 200,000 on 3 June, and 1,000,000 confirmed cases on 17 July 2020(Wikipedia,2020).Due to pandemic Government of India under Prime Minister ordered national wide lock down from 24 March to 31May2020 to control the spread of corona virus outbreak in India. All services entertainment ,business. schools ,transportation system have shut down. Due to forced restrictions, air pollution dropped significantly during 74 days of lockdown period(Indian Express,july2020).After lock down period we can understand the effect of anthropogenic emissions on our life. In Lucknow city pollution level from 2016 to 2019,during the same period, more than 50% of days recorded poor or very poor quality(TOI;May,2020)but during lockdown, the average air quality in Lucknow and other major cities of the state in April hovered around 100(As per Data of Central Pollution Control Board),this level was considered satisfactory with minimal adverse impact on human health. The RSPM (PM10) levels were found to be below the prescribed national standards during the first three consecutive lockdowns and exceeded marginally during the fourth lockdown period. The range of RSPM (PM10) for the four consecutive lockdowns are 43.2 to 98.7, 50.6 to 115.5, 62.9 to 129.8 and 52.6 to 162.8 $\mu\text{g}/\text{m}^3$ respectively. Concentration of RSPM (PM10) during the four lockdowns in Lucknow whereas according to report of the PM2.5 levels were found to be below the prescribed national standards during the first three consecutive lockdowns and exceeded marginally during the fourth lockdown period. The range of PM2.5 for the four consecutive lockdowns are 21.7 to 69.7, 37.1 to 75.5, 29.1 to 74.5 and 42.3 to 95.9 $\mu\text{g}/\text{m}^3$ respectively. Most of the environmental hazards that affect human health are due to human actions or human interactions(Dalal and Ray,2005).COVID19 tends to have a greater effect on the elderly, and those with underlying health conditions now proved threat to people of all ages including those who are otherwise healthy(IGES,2020). The increased risk of severe illness and death in areas with high levels of air pollution is not just associated with,COVID19,but also emerged during the Severe Acute Respiratory Syndrome(SARS) outbreak in 2002-2004 and the 1918 Spanish flu pandemic(CREA,2020). A finding published in Environmental Research Journal by M.G.Manoj et al; in Hindu(August,2020) focused on infection rate due to air quality in Kerala and other COVID hotspots ,including China, Italy and the U.S .As the study claims that “one of the potential modes of COVID 19 is through ambient air which carry the virus .Dust particles exposed to humid environment have been contaminated with a water film on it. There is possibility of the mix of saliva droplets and the dust coated with the water film becoming more airborne and spreading the infection”.

Who is at the risk due to pollution:-

Around the world, nine out of 10 people breathe unhealthy air(EDF,2020) and unhealthy polluted air contributes to a number of serious medical conditions including respiratory health problems, asthma, bronchitis. Children and the elderly people with existing diseases are more vulnerable to adverse health impact of air pollution. Different studies have shown an association between acute respiratory illness (ARI)and air pollution. Another epidemiological evidences has shown adverse effects of ambient air pollution on human health which include headache, nausea and lung function changes where as in some cross sectional and cohort studies found detrimental effects in terms of lung function(Bhadran,Thomas;2017).

The particulate matter(PM10) is considered as the significant impairment in respiratory functions leading to respiratory diseases such as reduced lung function, increase in asthma the onset attack, use of bronchodilators and hospital admissions. PM with particle sizes less than 10 microns, which are known as respirable suspended particulates or PM10, can get deep into the lungs and cause a broad range of health effects, in particular, respiratory and cardiovascular illnesses. A report on Austria, France and Switzerland(combined population of about 75 million) is that some 40,000 deaths per year can be attributed to particulate matter. High number of respiratory and cardiovascular hospital admissions, bronchitis episodes and restricted activities have also estimated(Green facts on health and environment,2003).Another study that particulate matter may cause mild to severe illness depending upon the exposure of pollutants and pollutants entered in the body through airways therefore “Respiratory system is in the first line of battle in the onset and progressive disease resulted from air pollution”(Azam2016).In a study of Salvi,2009 stated that 25-45%of patients of COPD (Chronic Obstructive Pulmonary Diseases) have never smoked ,now the number of non-smoker COPD is much higher than previous record. Particulate Matter causes not only respiratory symptoms, more frequent medication use, decreased function, recurrent health care utilization but also have a small but significant adverse effect on cardiovascular, respiratory diseases(Anderson;2012).A report of NDTV on July,2020 released says that people in Delhi stand to lose over 9.4 years because of particulate pollution, the highest of the states, but on comparison of cities the worst-hit is Lucknow. It has the highest level of pollution in the country,11times more than the WHO guideline. Report also says that the average life expectancy lost per person due to air pollution is 1.9 years. On 20 October,2019 Lucknow was the fourth most polluted city in country when air quality index(AQI)was 272 due to increase in superfine particles PM2.5(ToI,Oct,2019).Small particles less than 10 micrometres in diameter pose the greatest problems, because they can get deep into your lungs, and some may even get into your bloodstream(EPA,2017)a study conducted by c (aged>65years). Now air pollution is convincingly associated with many signs of asthma aggravation ,increased medication use and also associated with inflammatory changes as principal component of pollution, PM also functions as an adjuvant inducing lung inflammation to allergens or respiratory virus(Jang,2011).

Lucknow city ,Pollution and COVID 19- A study titled ‘Know What You Breathe’ conducted by the Centre of Environment and Energy Development (CEED) in collaboration with IIT ,Delhi analysed air quality from 2000 to 2016 and collated it with the deaths caused due to respiratory diseases. The findings also suggested that an estimated 4,127 deaths took place annually in the Lucknow city due to diseases like chronic obstructive pulmonary disease, Ischemic heart disease, lung cancer and acute lower respiratory infection The analysis of city also reveals that air quality was satisfactory for only 17 of days in November,2017 (AQI 51-100),whereas the air quality in the state capital had been of very poor and severe quality for 76% days of the year that effects even healthy people and impacts those with existing disease(CEED,2018).

COVID 19 is getting deadlier in Lucknow city has crossed 21,152 cases of COVID19 .It is estimated that total 273 people were died within 21 days in the month of August(from 1-22August,2020)and the cause of 90%death was diagnosed as lung failure in Lucknow city. The scientists explained that when the virus attacks blood vessel cells inflammation increases and blood begins to form clots, big or small. These blood clots travels all over the body and wreak havoc on organs perpetuating a vicious cycle of inflammation(Economic Times, July 2020),as the people who already exposed from long term of air pollution their lungs also suffered from inflammation. The main cause of respiratory diseases and chronic exposure of PM2.5 is Inflammation(Hu,2018) Older people are at a greater risk of dying from COVID 19 because of their lower immunity level and also vulnerable to certain health related problems .According to Chambers(1989) “Vulnerability means not only exposure to risks, but also lack of means to overcome these risks”. The people are most vulnerable to the environmental hazards, are those who are least able to avoid them and /or least able to cope with illness or injury they cause (Dalal&Ray,2005). According to experts 10 to 20% people were negative in COVID 19 test but still having shortness of breath and low level of oxygen(Amar Ujala,2020).Some patients are also diagnosed with the lung fibrosis (Dr.Ajay Verma,KGMU,Amar Ujala;12 August2020). Fibrosis is condition that causes lung scarring and stiffness, this makes it difficult to breath. According to the Calma.J, (March,2020)since COVID 19 affects the lungs thus people who are living in places with more air pollution could be more vulnerable. Hannah Chinn (March,2020) used a term “Immunocompromised” which refers to anyone with immune system that does not function(the way doctor think it should).It may make a person not only susceptible to acquiring disease but also develops severe symptoms. According to the news 9,294 cases have emerged in 16 days of august (TOI,17August,2020) as only 8,178 were reported during lockdown of pandemic now at present time ,total number reached upto23,1113 till 26August 2020, data revealed that maximum number of positive patients are from age group 21 to 40years (ie-11,091 in which 7,346 males and 3,746 are females) as they are engaged in daily outdoor activities ,whereas the 853 patients from 0-10years(455males and 398 females),1,758(1099 males and 659 females) from 11-20yrs,7,169(4,941 males and 2,228 females) from 41-60yrs and 2,143(1,402males and 741 females) patients from above 60yrs have been reported(26 august2020 news in Amar Ujala).A study of the US found that even a small increase in PM2.5 concentrations of 1 microgram per cubic metre is associated with an 8% increase COVID death rate(Cole,2020).In city148 Covid 19cases were recorded in commercial(cum residence) area during 1August to 7 August ,2020 ,still recorded active cases in that area till date ,where PM2.5 was recorded maximum in 2019 during the pre-monsoon i.e.130.7µg/m3 (IITR,Lko,2019).Dominici(2000) stated that if a person is getting COVID ,and also breathing polluted air, its putting gasoline on a fire. In other study Chrobak,2020 stated that both the virus and air pollution can injure the lungs in essentially the same way .Scientists who studied the SARS corona virus outbreak in 2003 found that infected patients from high polluted region were 84% more likely to die in comparison to less polluted region(Barboza,2000).Bhattacharya and Banerjee,(2002) stated in his study that lungs and respiratory system is design to deal with substances that may enter in the delicate organs of life supporting system and get rid them as fast as possible. To that extent body possesses a particularly useful and ingenious faculty to deal with urban pollution but problem arises when the body is unable to deal with such large quantities of pollutants, or is no longer to capable of clean up. To the extent the lung supply ,with clean nutritious oxygen for our brain, otherwise efficient exchange. Now body functions suffer becomes much more inefficient. The rest of the body functions suffer as well as, and the chain reactions effects the general wellbeing of a system .Once a person breath polluted air into lungs ,the particulates matter can be absorbed into blood stream .According to the Dr.Suryakant (H.O.D,Department of Respiratory Medicine and Pulmonary of K.G.MU,Convenor of Doctors for Clean air)said, Lucknow is one of the most polluted cities in the World as per WHO and there has been increase in the number of patients visiting hospitals with the complaints of respiratory problem in the last three month (NDTV,2019).A report was also published in Asian News International,January,2019, where an artificial lung was installed in Uttar Pradesh’s capital Lucknow as part of awareness campaign by climate agenda and doctors for clean air ,turned colour within 24 hours and black within five days due to high levels of air pollution in the city, while same experiment in Delhi took three days for the lungs turn black and 18 days in Bengaluru.



(Source: SwachhIndia,NDTV,2019)

Therefore this has been cleared from above discussion that people who have been exposed to polluted air, they may aggravate the health impacts of COVID 19 and increased the risk of death by suppressing immunity.

At present time Uttar Pradesh has become the fifth worst hit state in India with 2,25,632 cases on 30 august,2020.Lucknow has been a major spike ,now till 30th August 2020 total number of COVID 19 cases reached up to 26,035.Although the recovery rate is one of the best in India but still its time to take precautions for our environment ,for our health and for future generations as a good citizen.

Conclusion-

My paper is problem based descriptive review in which I have tried to explain current situation of health status due to COVID 19 in relation to air pollution .For this purpose a secondary data obtained from different sources: information obtained through newspaper, internet searches, libraries and pollution control agencies IITR,lucknow

As many studies have already worked on air pollution and respiratory health and this is also mentioned that air pollution not only making respiratory system weak but also responsible for mortality and morbidity. The condition of metropolitan cities is worst due to pollution and have great impact on health .Wu(2020) stated that a small increase in long term to PM2.5 leads to large increase in COVID19 death rate.

Even without pandemic many people were wearing mask to protect them from bad air in Lucknow (India Today,2019) as air quality of city was in unhealthy and hazardous category. It was also found the increase in number of patients suffering from respiratory problems in the OPD during November,2019 now this has been cleared from above discussion that air pollution is hidden killer and we all are breathing bad air and making our lungs weak and susceptible for complex diseases ,however many government agencies have been taking initiative to reduce air pollution but still needs attention.

Every pandemic has left its mark in history,COVID19 will pass eventually(EPN,2020) and we all have experienced temporary phase of clean and healthy air during lock down now after pandemic, protection of the environment should be everybody's business-a most noble enterprise in which our profits are healthier world for ourselves and for all generations to follow(Luther.R.Terry,1972).

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