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Research Article

Epidemiology and Management of Dust Mite Induced Bronchitis in Urban India

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Abstract

Bronchitis is an inflammation of the airways leading into our lungs. When our trachea and bronchi get irritated, they swell up and fill with mucus, causing people to cough. Cough is the main symptom of bronchitis lasting days to a couple of weeks. While Viruses are the most common cause of acute bronchitis, in the months from October 2023 Indian cities are saddled with Bronchitis cases mainly due to dust, Smoke, smog, and other irritants in the environment.

Air pollution is a significant worldwide health concern due to its impact on respiratory health. Air pollution caused by various pollutants in the air including PM, NO2, SO2, O3, CO, and VOCs. These pollutants harm the respiratory system by causing irritation, inflammation, damage to airways and lung tissues. They can also trigger asthma attacks and worsen existing respiratory conditions. In the last decade these dust allergic cases don't get triggered in specific seasons but are seen round the year.

AQI from 0 to 50 is considered good, from 51 to 100 as moderate, from 101 to 150 as unhealthy for sensitive groups, from 151 to 200 as unhealthy for all groups, from 201 to 300 very unhealthy, from 301 to 400 severe and from 401 to 500 as hazardous for human health.

The air quality index (AQI) in most cities including Mumbai, Bengaluru, Kolkata, Lucknow, Ahmedabad, and Patna were in the "moderate" to Severe category. Despite deteriorating air quality, in many cities, these have been overlooked amid soaring pollution levels in Delhi, a situation upsetting the urbanites in India. Among the top 10 cities with high air pollution India has 7 of them, China, Nepal, Pakistan contributing one each. While 4 of them have dangerous AQI (2 in India), rest are declared as severely polluted.

India logged 636 new cases of Covid-19, while the number of active cases of the infection has increased to 4394 as on 31 December 2023. The number of daily cases were in double-digits till December 5, 2023, but going up after the emergence of a new variant and cold weather conditions. The actual number of Covid-19 cases is much higher as not many people are getting the tests done as symptoms are mild and self-limiting." Omicron and its sub-variants remain the primary cause of transmission, it is milder compared to Delta.

Revealing mix of viral infections including influenza, H1N1, H3N2, Dengue, Typhoid, Leptospirosis, and even multiple infections are bothering urban Indians and daily Covid-19 cases have tripled in last one month,

During the acute stage of Bronchitis, the patient develops small airway obstruction that leads to symptoms of respiratory distress. The physical exam will reveal crackles, wheezing, and rhonchi. The severity of respiratory distress may vary from person to person. Acute asthma exacerbation with around one-third of patients presenting with acute cough is being misdiagnosed as acute bronchitis.

Bronchitis affects the bronchi, or the larger airways, whereas Bronchiolitis affects bronchioles- smaller airways. Management of Acute Bronchitis includes i) Avoid lung irritants, ii) Stop smoking, iii) Use a humidifier. Warm, moist air helps relieve coughs and loosens mucus in your airways iv) Frequent steam inhalation, especially before going to bed relieve sleep interrupting coughs by loosening mucus in the airways and v) Use a face mask outside. Antibiotics are not indicated unless there is secondary infection, but Azithromycin, Ampicillin, Amoxicillin, Hetacillin and Cephalosporins are used.

Primary care Physicians are challenged to differentiate Bronchitis from asthma, COPD, pneumonia, congestive heart failure, tuberculosis, pertussis, and much rarer conditions like foreign body aspiration, pulmonary embolism, diffuse idiopathic neuroendocrine cell hyperplasia, and Harman-Rich syndrome.

This article is a review of the current environment, Dust induced Bronchitis cases and their management.

Materials &Methods: Direct observations of Bronchitis cases in Bengaluru and talking to practing friends in other cities and review of press reports and literature review.

Keywords: brain; cough; bronchitis, bronchiolitis; br asthma; air pollution; dust; fumes; construction sites; vehicular traffic; bad roads; and poor maintenance of vehicles

Introduction

Bronchitis is an inflammation of the airways leading into our lungs. When our trachea and bronchi get irritated, they swell up and fill with mucus, causing people to cough. Cough can last days to a couple of weeks. It's the main symptom of bronchitis. Viruses are the most common cause of acute bronchitis, However, of late environmental dusts, irritants, smoke smog, etc. are causing acute and chronic bronchitis [1].

For example, giving the worst situation in the national capital of Delhi, which had recorded 13 straight dense fog hours between 8.30pm and 9.30am on 31st December 2023 and 1 January 2024 making it the longest dense fog spell of the season. A thick blanket of fog enveloped Delhi for the fifth consecutive day, with the India Meteorological Department (IMD) recording the lowest visibility of 50m at Palam in Delhi between 5.30am and 7.30am on 31st of December 2023. The IMD classifies fog as 'shallow' when visibility is between 500m and 1,000m, as 'moderate' when it is between 200m and 500m, as 'dense' when it is between 50m and 200m and 'very dense' when it is lower than 50m.

New Delhi's AQI trend in last 24 between last day of 2023 and first day of 2024recorded an AQI of **343,** PM 10= **177**$_{\mu g/m3,}$ PM 2.5= **176** $_{\mu g/m3,}$ Temp.=**16^{0}Celcius,** Humidity= **46 [1]**

The IMD, had issued a 'red alert' in the national capital for 31st, has downgraded this to a 'yellow alert', for the next two days. Delhi's minimum temperature was recorded at 10.7°C on 31st morning, four degrees above normal, making for a warmer than usual night. It was 8.4°C a day earlier. Meanwhile, the city air continued to remain 'very poor', with the average air quality index (AQI) at 365 around 9 am. Forecasts state that Delhi's air quality is likely to remain 'very poor' till end of first week of January 2024.

The minimum temperature was 21.4°C on 12/31/2023, lowest so far in 2023 at the base station for Delhi weather [2].

India has the dubious distinction of having 7 of the top 10 cities with severe or dangerous air pollution worldwide, China, Nepal, Pakistan contributing one each. While 4 of them have dangerous AQI (2 in India), rest are declared as severely polluted [3].

Come winter months of November to February every year Family physicians, Pulmonologist's clinics are flooded with respiratory tract Infection cases and half of them are secondary to dust mite allergy. Most of such cases come from households living near the roads with high traffic volume and high concentration of dust particles in the air and other from households living near construction sites. Primary symptoms include incessant sneezing, blocked nose, rhinitis, a bad dry cough without infections and signs include acute exacerbation of non-obstructive chronic Bronchitis due to dust irritation. About 75-80% of the allergic cases are attributed to dust mites. The capital cities of most provinces like Delhi, Ahmedabad, Bengaluru Mumbai, Pune, Lucknow, Patna, Bhopal are affected the worst [4]. These allergic cases don't get triggered in specific seasons but are seen round the year.

A comprehensive particulate matter Road dust emission inventory for 2022, using the vehicle registration data from 1352 Road Transport Offices in India, released recently indicated that 5 states of Rajasthan, UP, Maharashtra, Karnataka and Gujrat accounted for 60% of annual emissions. In winter months Indian environment exceeds the WHO PM 10 and PM 2.5 guidelines of 5micrgram per cubic meter concentrations at 75% of grids arising from the road dust alone [4].

Emissions Kilo tonnes per year in Indian States per year

Sl. No	State/City	PM10	PM2.5
1.	Rajasthan	193	46
2.	UP	172	41
3.	Maharashtra	166	40
4.	Karnataka	155	37
5.	Gujarat	135	32
6.	Kerala	76	18
7.	Tamil Nadu	71	17
8.	Punjab	69	16
9.	MP	54	13

Source India Meteorological Department (IMD) 30 December 2023 [2]

As of 1 December 2023, Top ten cities with high Air pollution were [3]:

S. No	City	Air Quality	Index Value	Prominent Pollutant
1	Delhi	Very Poor	398	PM2.5
2	Faridabad	Very Poor	393	PM2.5, PM10
3	Begusarai	Very Poor	389	PM2.5
4	Bahadurgarh	Very Poor	388	PM2.5
5	Bhiwadi	Very Poor	366	PM2.5
6	Bikaner	Very Poor	363	PM2.5
7	Noida	Very Poor	358	PM2.5
8	Dholpur	Very Poor	356	PM2.5
9	Hanumangarh	Very Poor	353	PM2.5
10	Greater Noida	Very Poor	352	PM2.5, PM10

The factors responsible for high dust particulate matters are road conditions, geological and climate conditions, and the number of vehicles and the efforts of local body organizations like City Corporations, Municipalities and Road traffic management. It is estimated road dust causes about 10,000 death each year.

City level Case reports:

1. **Delhi**: The worsening air quality in Delhi during the winter season is causing a surge in respiratory discomfort cases. Patients are reporting acute asthma and chronic obstructive pulmonary disease (COPD) symptoms such as wheezing, breathlessness, and severe cough. Inhalers and nebulization provide partial relief, but antibiotics are usually ineffective. Experts recommend systemic corticosteroids for relief. Doctors advise vulnerable individuals, such as those with chronic bronchitis, asthma, cardiac conditions, and diabetes, to be cautious and use inhalers and nebulizers. The elderly and vulnerable groups should also get vaccinated against the flu and pneumonia. Bronchitis risk increasing with air pollution getting severe in Delhi NCR reported India.com as early as 6 November 2023 [5,6]. As Delhi-NCR grapples with severe air pollution, cases of Bronchitis have been on the rise in the national capital and neighbouring cities. The air quality has plummeted to 'very poor' and 'severe' amid adverse weather conditions, stubble burning and post-Diwali pollution. This has taken a toll on resident's health.

A survey conducted by a community social media platform finds that 4 in 5 families in Delhi and adjoining areas have at least one member facing pollution related ailments. As air pollution continues to wreak havoc on citizens' health, staying indoors, avoiding early morning walks, getting vaccinated for flu and pneumonia, wearing N-95 mask while venturing out could help reduce adverse effects of air pollution [4,5].

According to Head of the Department of Pulmonology at AIIMS, there has been a 10-15% increase in the number of patients with worsening symptoms over what is normally the case this year. In the last few days, there has been an exponential rise in patients with acute attacks of Bronchitis, asthma and chronic obstructive pulmonary disease (COPD) at PSRI Institute of Pulmonary, Critical care and Sleep Medicine.

Patients who had been otherwise stable for some time, now complain of severe cough, wheezing, breathlessness, and sleeplessness, but usually no fever. There is only partial response to inhalers and nebulisation. The markers for an advanced test called fraction of exhaled nitric oxide (FENO), a measure of airway inflammation, are remarkably raised. Antibiotics do not help, and quite often systemic corticosteroids are used to give relief to these patients.

INDIA METEOROLOGICAL DEPARTMENT
METEOROLOGICAL OFFICE I.G.I. AIRPORT
NEW DELHI

FOG FORECAST OF DELHI REGION

HOME

DATE : 30-12-2023 TIME OF ISSUE 30/1200 UTC 30/1730 IST

VALIDITY	VALID FROM DATE/TIME 30/1230 UTC 30/1800 IST VALID UPTO DATE/TIME 30/1830 UTC 30/2400	FROM DATE/TIME 30/1830 UTC 31/0000 IST TO 30/0630 UTC 31/1200 IST
STATION	FORECAST	OUTLOOK FOR NEXT SUBSEQUENT 12 HOURS
(VIDP) I.G.I. AIRPORT, DELHI	VISIBILITY LIKELY REDUCE TO 0600M IN SHALLOW FOG FROM 30/1800 UTC.	VISIBILITY LIKELY REDUCE TO 0400M IN MODERATE FOG FROM 31/0100 UTC. AND IT MAY IMPROVE TO 0800M IN SHALLOW FOG FROM 31/0500 UTC.
(VILK) LUCKNOW AIRPORT	VISIBILITY LIKELY TO REDUCE TO 0700 IN SHALLOW FOG BETWEEN 30/1230 AND 30/1430 UTC. IT IS FURTHER LIKELY TO REDUCE TO 0300M BETWEEN 30/1800 UTC AND 30/1800 UTC	VISIBILITY IS LIKELY TO REDUCE TO 0100M IN DENSE FOG BETWEEN 30/2300 AND 31/0100 UTC. IT IS LIKELY TO IMPROVE TO 0500M IN SHALLOW FOG BETWEEN 31/0400 UTC AND 31/0600 UTC.
(VIJP) JAIPUR AIRPORT	VISIBILITY LIKELY REDUCE TO 0800M IN SHALLOW FOG FROM 30/0000 UTC.	VISIBILITY LIKELY TO REDUCE TO 0600M IN SHALLOW FOG FROM 31/0000 UTC THERE AFTER MAY BE IMPROVE AT 31/0400UTC TO 1500M.
(VIAR) AMRITSAR AIRPORT	VISIBILITY LIKELY REDUCE TO 0650M IN VERY DENSE FOG FROM 30/1800 UTC.	VISIBILITY REMAINS BELOW 0650M IN VERY DENSE FOG DURING THE PERIOD.
(VEBN) BABATPUR AIRPORT	VISIBILITY LIKELY TO REDUCE TO 0400 IN MODERATE FOG BETWEEN 30/1230 AND 30/1430 UTC. IT IS FURTHER LIKELY TO REDUCE TO 0850M BETWEEN 30/1800 UTC AND 30/1800 UTC	VISIBILITY IS LIKELY TO REDUCE TO LESS THAN 0050M IN DENSE FOG BETWEEN 30/1900 AND 30/2100 UTC. IT IS LIKELY TO IMPROVE TO 0500M IN SHALLOW FOG BETWEEN 31/0500 UTC AND 31/0700 UTC.

Mumbai Mahem:

Barnali Mukherjee, 54, started coughing at the end of the second week of October 2023. She tried all home remedies, but the persistent cough remained. She was advised to stop her morning walks and avoid stepping out when the air quality is poor. Her husband and 15-year-old son too have been suffering from prolonged cough. Her doctor put her on mild steroids and Tab. Deriphyllin a bronchodilator tablets twice a day after her cough refused to go for two weeks and she recovered over a weeks' time.

Many residents in Mumbai are suffering from prolonged coughs due to exposure to poor air quality. Respiratory medicine experts are concerned about the rise in respiratory ailments, including among healthy individuals. Doctors are recommending the use of high-quality masks and avoiding congested areas during periods of poor air quality. Many Mumbaiites are suffering from bouts of prolonged cough, attributed to exposure to 'very poor' quality air. Public health experts and pulmonologists are concerned over the unprecedented rise in respiratory ailments in the city including among healthy individuals with no underlying lung conditions since early October 2023. Most Pulmonologists report having not witnessed air quality as poor as it is in 2023. Most of the patients are suffering from prolonged cough and severe wheezing, with some still coughing persistently even after receiving treatment. Most general practitioners report that nearly 60- 80% of the patients they see every day are having problems triggered by air pollution, even before winter has set in. Cases went further up during Diwali, caused by the bursting of firecrackers, followed by winter due to pollution [5].

A consultant pulmonologist and epidemiologist at PD Hinduja Hospital in Mahim, Mumbai said while Mumbai's air quality tends to deteriorate during the winter months every year, this year's situation is exceptionally worse beginning as early as October 2023. Even individuals with previously healthy lungs are experiencing Bronchitis symptoms for the first time in their lives. He further emphasised that 50% of his outdoor patients were suffering from non-infective respiratory problems. "Most of these prolonged coughs do not appear to be viral or bacterial infections; but they are more likely due to allergies or irritants.

Paediatricians are also witnessing a surge in respiratory issues among children. Over 95% of OPD cases since mid-October 23 have been children with cough and cold, primarily caused by the deteriorating air quality, as pollution is a clear irritant. Paediatricians are seeing patients with persistent coughs, and those who are asthmatic are getting affected if they don't use inhalers. They are also seeing children with allergic rhinitis and conjunctivitis. While their history, reveals that all of them are exposed to construction sites or along roadside residences due to air pollution [7].

Most doctors are advising patients to follow home remedies such as steam inhalation to humidify the airways and relieve symptoms, rather than relying on over-the-counter medications. People who are highly susceptible to air

pollution-triggered infections are advised to refrain from going out when air quality is poor, especially early morning walking and outdoor exercise when it is cold. They also recommend using good-quality masks and avoiding congested areas. In last one month resurgence of Covid 19 across the country is complicating the issue further.

Kolkata Air Quality 2023:

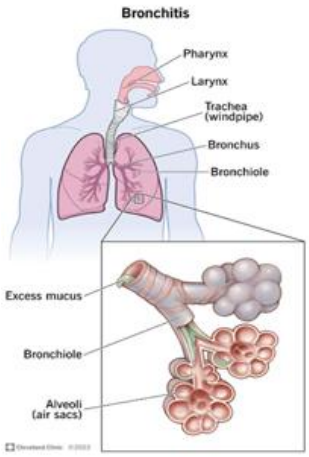
The real-time air quality in West Bengal is around 230-239 (POOR) AQI for the last 1 week. The current concentration of PM2.5 in West Bengal is 121 (µg/m³), as against World Health Organisation (WHO) recommendation of 15 µg/m³ as the threshold concentration for 24 hrs mean. Currently, the concentration is 4.84 times the recommended limit. Generally, the air quality at West Bengal starts deteriorating in late October. The winters are the worst-hit season in terms of air pollution. The primary causes of outdoor air pollution are solid, liquid particles called aerosols & gases from vehicles emissions, construction activities, factories, burning stubble & fossil fuels and wildfire, etc. Main causes of indoor air pollution are harmful gases from cooking fuels (such as wood, crop wastes, charcoal, coal, and dung), damp, mould smoke, chemicals from cleaning materials, etc. On the eve of National Pollution Prevention Day, a coalition of prominent medical professionals stressed the urgent need for awareness and immediate steps to combat the detrimental effects of air pollution on vital organs and entire lifespan [8].

Lucknow, UP: The city is experiencing a 25% rise in the number of patients visiting OPDs of city hospitals with respiratory problems due to constant spike in air pollution. According to doctors, the condition of those already suffering from respiratory ailments has worsened due to the rise in air pollution during winter. pulmonary medicine department of KGMU Lucknow is observing a 25% rise in the frequency of upper respiratory infections cross all age groups from the 50 cases recorded daily in October 2023. They attribute the surge to the rise in PM2.5 and PM10 particulate matter levels in atmosphere following a recent dip in temperature. These particles can penetrate deep into the lungs, triggering inflammation and disrupting respiratory function, potentially leading to chronic respiratory issues mainly dust induced irritant Bronchitis. Similarly, medical superintendent at Lok Bandhu Hospital, noted an increase in respiratory infection patients from 40 to 70 per day, with throat infections reaching 10 to 20 per day and around 20 eye infection cases daily. ENT specialists are saying that pollutants, including particulate matter and irritant gases, are associated with increased cough and wheeze. Inhaling smog can lead to sore throat, cough, tiredness, eye, and nose irritation, and wheezing due to toxins settling in the lungs and throat. So, everyone should avoid exposure to air pollution either by staying at home or wearing masks [9].

Patna, Bihar: With the temperature dipping in Bihar, people in the major cities of Bihar are dealing with the challenges of rising air pollution. The Air Quality Index (AQI) of cities like Patna went into the severe zone as the Bihar State Pollution Control Board registered 350- 416 AQI since early November 2023. Alarmingly, the PM 2.5 is 167 but PM 10 has reached 392 per cubic metre. The construction of the Patna metro, flyovers, buildings, and transportation of sand and clay are responsible for the deterioration of AQI in the city. The transportation of sand on the streets and heavy traffic of petrol and diesel vehicles is generating toxic gases in the air in Patna.

Patna Municipal Corporation has arranged vehicles for sprinkling water on the road and has also directed the construction companies and agencies to sprinkle water on the roads in a bid to minimize fine particles mixing with the air. The Patna Municipal Corporation has 12 mobile anti-smog guns and 13 water sprinkling guns operating which can be hired by private companies. “With the AQI index having breached the 350 marks, it is extremely dangerous for heart, bronchitis, and asthmatic patients [10].

1.Face Mask 2. Air Purifier 3 Air Quality Monitors



As per the AQI bulletin of CPCB on December 23, two cities -Begusarai and Siwan recorded severe AQI of 450 and 407.Nine other cities recorded very poor AQI —Patna (374), Arrah (308), Samastipur (386), Bettiah (373), Bhagalpur (368), Bihar Sharif (317), Chapra (399), Darbhanga (375), and Hajipur (326).

Patna-based All India Institute of Medical Sciences, Patna (AIIMS Patna), Indira Gandhi Institute of Medical Sciences (IGIMS), Patna Medical College

and Hospital PMCH, and Nalanda Medical College and Hospital (NMCH) admitted that increasing air pollution affects the lungs, causing chest infection, breathlessness, allergy, coughing, wheezing, and infections.

Bhopal Madhya Pradesh: With the increase in air pollution level in the state capital Bhopal there has been an increase in footfall of patients with respiratory problems at the OPDs of major hospitals. As of now the there is no genuine problem, but more concerning is the fact that this situation could have a long-term impact of three-four months on respiratory health of the people, which is already being reported in the last 2 weeks as roughly the footfall at pulmonary OPD has seen an increase of 20%.

Discussions:

Whenever people or primary health care providers mention about bronchitis, it usually refers to acute bronchitis, a temporary condition that makes the individual to cough. It is described in two forms: i) Acute bronchitis: Acute bronchitis is usually caused by a viral infection and goes away on its own in a few weeks. Most people don't need treatment for acute bronchitis. ii) Chronic bronchitis: If an individual has a cough with mucus most days of the month for three months out of the year it is called chronic bronchitis and person suffers for at least two years.

Chronic bronchitis, you lead to chronic obstructive pulmonary disease (COPD).

Epidemiology of Bronchitis: Bronchitis refers to an inflammation of the lining of the bronchial tubes that transport air to and from our lungs. Bronchitis is the result of infections by virus, bacteria, or irritant particles that trigger an inflammation of the bronchial tubes. Anyone can get bronchitis, but some people are at higher risk if S/he: i) Smoke or are around someone who does (secondary smoking) ii) Have asthma, COPD, or other breathing conditions iii) Have GERD (chronic acid reflux), iv) Have an autoimmune disorder or other illness that causes inflammation v) Are around air pollutants (like dust, smoke, smog, fumes, or chemicals). Bronchitis is caused by anything that irritates airways Trachea and Bronchi. Infectious and non-infectious causes of bronchitis include *Viruses.* Viruses like influenza (the flu), respiratory syncytial virus (RSV), adenovirus, rhinovirus (the common cold) and coronavirus are the commonest cause *Bacteria.* Bacteria that cause bronchitis include Bordetella pertussis, Mycoplasma pneumonia and Chlamydia pneumonia.

Pollution: Dust, Smoke, smog, Smoking cigarettes, or marijuana especially in winter months.

Acute bronchitis, characterized by inflammation in the bronchi lining, is a frequent condition in emergency departments major hospitals, Pulmonologist, and primary care doctors in India. Acute bronchitis ranks among the top 10 most common outpatient illnesses. The estimated pooled prevalence of chronic bronchitis is around 5.0% in India.

Pathology: The pathology of bronchitis and bronchiolitis involves oedema of the airway wall rather than bronchoconstriction seen in cases of Asthma. Bronchitis is inflammation of the mucous membranes that line the bronchi, the airways that carry air to and from the lungs. Pneumonia is inflammation of lung tissue caused by a bacterial, viral, or fungal infection in one or both lungs accompanied by infiltration and inflammation of the alveoli. The differential diagnosis for respiratory failure is broad and includes, acute respiratory distress syndrome, Aspiration pneumonia and Aspiration pneumonitis. During the acute stage of Bronchitis, the patient develops small airway obstruction that leads to symptoms of respiratory distress. The physical exam will reveal crackles, wheezing, and rhonchi. The severity of respiratory distress may vary from person to person. Acute asthma exacerbation can be frequently misdiagnosed as acute bronchitis, with around one-third of patients presenting with acute cough. Acute or chronic sinusitis and Bronchiolitis can also simulate symptoms. Bronchiolitis and bronchitis are two conditions that both sound similar and have similar symptoms. A virus causes both conditions, which target the airways in the lungs. Bronchitis affects the bronchi, or the larger airways. Bronchiolitis affects bronchioles- smaller airways.

Most people get bronchitis when their airways swell up and fill with mucus. One can get the viruses and bacteria that cause bronchitis from close contact (shaking hands, hugging, touching the same surfaces) with someone who has them. An individual can pass on a virus or bacteria to someone else without suffering to others who ends up with bronchitis if susceptible. Other irritants, like tobacco or air pollutants, in the air we breathe are the main cause of bronchitis in winter months in India.

Bronchitis an inflammation of airways is not contagious, but the viruses and bacteria that can cause it are. For instance, If, a person is sick with the flu, he might get bronchitis too. But when his friends get the flu from him, their airways may not get inflamed *like his airways did.*

Bronchitis & COVID-19?

One can get bronchitis with almost any virus, including SARS-CoV2, the virus that causes COVID-19. The symptoms of bronchitis can be like COVID-19, so getting tested to know is important. COVID-19 is not more likely to cause bronchitis than other viral illnesses.

Primary care Physicians are challenged differentiate Bronchitis from asthma, COPD, pneumonia, Gastroesophageal Reflux Disease (GERD), congestive heart failure, tuberculosis, pertussis, and much rarer conditions like foreign body aspiration, pulmonary embolism, diffuse idiopathic neuroendocrine cell hyperplasia, and Harman-Rich syndrome.

Air pollution increasing the risk of bronchitis: "Smog can inflame breathing passages, decreasing the lung's working capacity and causing shortness of breath, pain while inhaling deeply, wheezing and coughing. It can dry out the protective membranes of the nose and throat and interfere with the body's ability to fight infection, increasing susceptibility.

A persistent cough that produces thick, discoloured mucus begins with Dry cough, wheezing, chest pain, low grade fever, loss of appetite, body aches, chest discomfort, fatigue, and shortness of breath. People who smoke, are obese, have asthma, GERD (gastroesophageal reflux disease), chronic obstructive pulmonary disease (COPD) or other respiratory conditions, history of recurrent respiratory infections in childhood, have autoimmune disorder or other illnesses that cause airway inflammation are more susceptible to an attack of bronchitis like symptoms. People who have had severe covid-19 pneumonia in past have susceptible lungs and are prone to bronchitis like symptoms after a respiratory infection or exposure to air pollution.

Diagnosis: Though most cases diagnosis is made on clinical symptoms, exposure to dust and typical findings on clinical examination of airway restriction without evident signs of infections using pulmonary function tests, A chest X-ray to detect pneumonia, Sputum tests to determine the signs of allergies or infection, pulmonary function tests, to identify signs of asthma or COOD and a Nasal swab test for viruses, like Covid-19 or flu may be done.

Management of BRONCHITIS:

The management of acute Bronchitis includes i) Identifying the key clinical features of acute bronchitis for accurate diagnosis to distinguish it from other respiratory conditions and differentiate between viral and bacterial causes, ii) Evaluate patients presenting with acute bronchitis for underlying risk factors, such as COPD, asthma, or immunosuppression, to tailor management plans, iii) Implement evidence-based guidelines and treatment options for acute bronchitis, emphasizing nonpharmacological and pharmacological interventions as needed iv) Communicate effectively with patients providing education on acute bronchitis, treatment expectations, and preventive measures.

Milder cases of acute bronchitis get better usually on its own within a couple of weeks.

Cough suppressants help with a nagging cough.

Persons suffering from COPD or asthma, are given mucolytics or breathing treatments, or inhaled bronchodilator or steroids. Antibiotics may be required if there is a bacterial infection like community acquired pneumonia.

Bronchitis due to flu can be treated with antiviral medication such as Tamiflu, anti-inflammatory medications like corticosteroids and other medications.

Cases not responding to aforesaid treatment or disease specific treatment need to be referred to a specialist pulmonologist's consultation.

Severe cases may require admission, oxygen therapy or ICU stay.

Patients may be advised BiPAP/NIV therapy and in critical situations mechanical ventilation may be needed.

Reckless Antibiotics and other drugs prescription:

Data from Pharma rack shows a 20% rise in sales in October 2023 and almost 40% increase in December 2023 compared to the same months of 2022. Antibiotics and medicines like cough syrups, antihistamines, broncho-dilators, cortisones are given to most patients by general practitioners and even Pulmonology practitioners to treat the symptoms. Reckless consumption of antibiotics and antihistamines without prescriptions is also contributing to the rise in drug sales and deterioration of general health of the people particularly elderly and children.

Prevention- Family physicians need to advise their clients to minimise the risk of bronchitis by:

a. Staying indoors, keep doors and windows closed.
b. Maintaining good hydration.
c. Avoiding early morning and late evening walks, as during these cold hours air is very dense as suspended particles settle down.
d. Wearing of well-fitted N95 mask is helpful in case of venturing out of the house.
e. Avoid or limit smoking.
f. Those on inhaled medications for COPD or bronchial asthma to take their medications regularly.
g. Keep away from fumes, air pollution, or second-hand smoke.
h. Washing hands as often as possible.
i. Get vaccinated for Covid-19, flu, and pneumonia (pneumococcal vaccine).

Community members and Municipal Authorities to minimize Air pollution by:

1.The use of LPG: It is important for every household to abstain from using crop residue, coal, cow dung, or wood for cooking purposes. Instead, households should be using Liquified Petroleum Gas (LPG), that would lower the LPG levels of PM 2.5, and PM 10.

2.Covering the construction materials at demolition and construction sites: Simple measures like covering the construction and demolition sites vertically and the use of windbreakers so that the raw materials do not fly away is expected to enhance the air quality by 50%.

3.Encouraging the use of BS-VI vehicles: On average, vehicles can contribute up to 25% to the PM 2.5 levels. Making use of DPF can reduce the emissions from diesel vehicles. The use of more hybrid, electric, BS-VI vehicles will add-value the cause.

4.Vapor recovery systems in petrol pumps: There exist volatile organic compounds in petrol that dissipate into the air when petrol/diesel get unloaded to the storage tanks. Such petrol vapours lead to the formation of smog. Vapor recovery systems help in collecting VOCs at the time of the unloading process.

5.Handling fly ash: At the time of summer, fly ash contributes to pollution. Windbreakers and water spraying techniques can minimize the pollution.

6.Limiting the use of coal in restaurants and hotels: As per a report, there are around 9,000 restaurants and hotels in Delhi alone that use of coal. Most city hotels follow the system. This high use of coal leads to huge PM emissions. Therefore, the use of coals must be banned or limited in hotels.

7. Ceasing the burning of municipal solid waste (MSW): There exists MSW in everyday items that we use and dump. Burning of such wastes is still prevalent though in smaller scale, that leads to polluting emissions. A strict monitoring and education people for refraining will go a long way in minimizing local air pollution.

8. Making use of a telescopic chute and windbreaker at the time of concrete batching: Concrete batching is the process of mixing materials to make concrete, that leads to fly ash emissions. Use of telescopic chutes and windbreakers minimizes the pollution.

9. *De-SOxing systems at the power plants*: huge refineries and power plants lead to the emissions of pollutants such as nitrogen oxides and Sulphur dioxide. Installing De-NOx-ing systems and De-SOx-ing systems are recommended.

10. Limiting the burning of biomass: The burning of the residue of crops especially in Punjab Rajasthan, UP and Haryana around Dehi is a leading contributor to pollution, the practice must be checked and limited.

Summary:

Revealing mix of viral infections including influenza, H1N1, H3N2, Dengue, Typhoid, Leptospirosis, and even multiple infections are bothering urban Indians and daily Covid-19 cases have tripled in last one month adding to Bronchitis problem.

Deteriorating air pollution in most of the cities in India is adding fire to fuel. Bronchitis and other ARI conditions were known to be high in winter months, but last few years they are becoming common during all months due to air pollution.

Most of Bronchitis cases come from households living near the roads with high traffic volume and high concentration of dust particles in the air and other from households living near construction sites.

Primary symptoms include incessant sneezing, blocked nose, rhinitis, a bad dry cough without infections and signs include acute exacerbation of non-obstructive chronic Bronchitis due to dust irritation, about 75-80% of these cases are attributed to dust mites.

While most cases can be managed by i) Avoid lung irritants, ii) Stopping smoking, iii) Use of a humidifier, iv) Frequent steam inhalation, especially before going to bed relieve sleep interrupting coughs by loosening mucus in the airways and v) Use a face mask outside when in people gatherings or groups.

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