

A REVIEW ON CHRONIC RESPIRATORY DISEASES AND RAPIDLY EVOLVING COVID-19 SITUATION

Monika Sultana¹

¹ Lecturer, Department of Microbiology, Primeasia University

ABSTRACT

Chronic respiratory diseases (CRDs), affecting the airways and other structures of the lungs, constitute a serious public health problem in all countries throughout the world, mainly in developing countries or deprived populations. Globally, they affect 1 billion people and 4.2 million deaths. Some of the most common are tuberculosis (TB), chronic obstructive pulmonary disease (COPD), asthma, occupational lung diseases and pulmonary hypertension etc. These respiratory diseases make up five of the 30 most common causes of death: COPD is third; lower respiratory tract infection is fourth; tracheal, bronchial and lung cancer is sixth; TB is twelfth; and asthma is twenty-eighth. Unfortunately, these pulmonary diseases have received proportionately less public attention and less research funding than other disease entities. Coronavirus Disease 2019 (COVID-19) has become a major health problem causing severe acute respiratory illness in humans. To date, the COVID-19 pandemic has affected over five million individuals worldwide and killed thousands of individuals of all ages and ethnicities. Recent studies showed that people with poor immune function such as diabetes, cardiovascular disease, chronic respiratory disease, cancer, renal and hepatic dysfunction are at higher risk for severe COVID-19.

Keyword: - CRDs, COPD, COVID-19

1. INTRODUCTION

The term chronic respiratory diseases (CRDs) describe a range of diseases of the airways and the other structures of the lungs. It is a long-term (chronic) condition defined by persistent infection despite appropriate and aggressive treatment. This non-reversible infection causes irreversible changes in the lungs and nasal passages [1]. It includes asthma and respiratory allergies, TB, chronic obstructive pulmonary disease (COPD), occupational lung diseases, sleep apnea syndrome and pulmonary hypertension. Altogether, more than 1 billion people suffer from either acute or chronic respiratory conditions [2]. Infants and young children are particularly susceptible. The World Health Organization (WHO) declared the novel coronavirus disease (COVID-19) outbreak a pandemic on March 11, 2020 which is caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), demanding effective national and global mitigation measures, strong public health response and coordination. People with more severe COVID-19 outcomes, including admission to hospital or death, are usually older and have pre-existing comorbidities [3]. Severe outcomes are often a result of lung complications, such as acute respiratory distress syndrome and respiratory failure. Fortunately, most respiratory diseases are preventable by improving the quality of the air. In developing nations, the leading cause of death due to air pollution revolves around the fact that access to proper diagnosis and subsequent treatment are limited. Besides the outrageous rate of fatality, victims of air pollution are subjected to these respiratory diseases for an extended period of time [4]. Therefore, to better inform prevention, screening, treatment, and research efforts dedicated to chronic respiratory diseases, it is crucial to understand their prevalence, morbidity, and mortality, both on global and regional scales.

1.1 Tuberculosis

Tuberculosis (TB) remains one of the top 10 causes of death worldwide. According to the World Health Organization, 10.4 million contracted TB and 1.7 million died in 2016, though it is a preventable and curable disease. *Mycobacterium tuberculosis* is the etiological agent and currently more than one-third of the world population is suffering from this disease. For the treatment of TB, administration of multiple antibiotics such as isoniazid, rifampicin, pyrazinamide and ethambutol is required for a long period of time. However, multidrug-resistant tuberculosis (MDR-TB) has become a global public health crisis, threatening the achievement of “Ending the global TB epidemics” in 2035 [5]. The death rate reported by WHO was 15% among patients with multidrug-resistant tuberculosis (MDR-TB) and 26% among patients with extensively drug-resistant tuberculosis (XDR-TB). According to WHO Global TB report [6], there were an estimated 500 000 new cases having MDR/rifampicin-resistant (RR)-TB in 2018, with an annual increase of over 20% between 2009 and 2016. To fight MDR-TB, globally five priority actions have been proposed, i.e., providing high-quality treatment of drug-susceptible TB, scaling up rapid testing and detection of MDR/RR-TB, ensuring prompt access to effective treatment and proper care, minimizing the risk of disease transmission by quickly enrolling diagnosed patients on effective treatment and increasing political commitment to ensure necessary financing [7].

1.2 Chronic Obstructive Pulmonary Disease (COPD)

COPD is a major and increasing global health problem, which is predicted to become the third commonest cause of death and the fifth commonest cause of disability in the world by 2020 [8]. It is a chronic respiratory disease characterized by a decline in lung function over time and accompanied by respiratory symptoms, primarily dyspnea, cough and sputum production. Some significant extrapulmonary effects also occur which may contribute to the severity in individual patient. Consequently, COPD is associated with a significant economic burden, including hospitalization, work absence and disability. In addition to generating high healthcare costs [9], it imposes a significant burden in terms of impaired quality of life [10]. Unlike many leading causes of death and disability, COPD is projected to increase in much of the world as smoking frequencies rise and the population ages [11, 12]. Cigarette smoking is the most commonly encountered risk factor for COPD, although in many countries, air pollution resulting from the burning of wood and other biomass fuels has also been identified as a COPD risk factor. It has been suggested that emotional disturbances such as depression and anxiety are common among patients with COPD. It is not a curable disease. The availability of diagnostic and treatment options for COPD differs across varying resource settings. WHO has released a guideline with specific recommendations for COPD management in primary health care in resource constrained settings [13]. Despite its enormous global importance, there has been relatively little research into COPD and it is the most underfunded disease in relation to the global burden of disease [14].

1.3 Asthma

Asthma is a serious global health problem with an estimated 300 million affected individuals [15, 16] and 250 000 annual deaths worldwide. This chronic inflammatory disorder of the airways is associated with airway hyperresponsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night or in early morning [17, 18]. For the past 40 years, the prevalence of asthma has increased in all countries in parallel with that of allergy as communities adopt modern lifestyles and become urbanized [19]. With a projected increase in the proportion of the world's population living in urban areas, there is likely to be a marked increase in the number of people with asthma worldwide over the next two decades. It is estimated that there may be an additional 100 million people with asthma by 2025 [20]. People of all ages are affected by this illness can place severe limits on daily life and is sometimes fatal when uncontrolled [21]. Factors that influence the risk of asthma include host factors (which are primarily genetic) and environmental factors [22, 23, 24]. Clinical manifestations of asthma can be controlled with appropriate treatment. In many countries, deaths due to asthma have declined recently as a result of better asthma management.

1.4 Lung Cancer

Lung cancer remains one of the leading causes of the overall cancer burden worldwide. It is the third most common cancer after breast and prostate, but has the largest proportion of all cancer-related deaths (22%). About 1.6 million people die of lung cancer each year and the overall 5-year survival rate is only 15%. On average, lung cancer accounts for 12.3% of all new cancer cases. The main cause of lung cancer is exposure to tobacco for a long period which causes most cases of lung cancer by damaging DNA and mutating protective genes [25]. Lung cancer risks correlate with the amount and duration of smoking. Other risk factors include passive exposure to biomass fuel, diesel exhaust, radon, asbestos, and other environmental and workplace carcinogens. The diagnosis and treatment

became a hot spot of research due to the disease's increased morbidity and mortality in recent years. Therefore, more and more novel diagnosis methods for early-stage lung cancer and plenty of clinical trials have been conducted [26].

1.5 Pulmonary Hypertension

Pulmonary hypertension is a major cause of disability and mortality in patients with sickle cell disease and thalassaemia, causing a substantial burden in people of Africa, Mediterranean countries. It is emerging as the major independent risk factor for death in adult patients with sickle cell disease, although the rise in pulmonary arterial pressure is mild, the associated morbidity and mortality are high [27].

2. CHRONIC RESPIRATORY DISEASES AND COVID-19

COVID-19 is an infectious disease caused by a newly discovered coronavirus [28], which was first reported in late 2019 in Wuhan, China and has since spread extensively worldwide. The outbreak was declared as "a public health emergency of international concern" by the WHO on January 30, 2020 and as a pandemic on March 11, 2020. There were >29 lakh confirmed cases worldwide with >2 lakh confirmed deaths [29] on April 28, 2020. This enveloped RNA virus causes respiratory illness of varying severity from the common cold to fatal pneumonia. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. The most common clinical symptoms are fever and cough, shortness of breath and other breathing difficulties in addition to other nonspecific symptoms, including headache, dyspnea, fatigue and muscle pain [30, 31]. Digestive symptoms such as diarrhea and vomiting were also reported in some patients [32, 33]. Most infected people experience mild to moderate respiratory illness and recover without requiring special treatment [34]. But older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease and cancer are more likely to develop serious illness. The most important cause of death in patients with COVID-19 is respiratory failure owing to pneumonia. Therefore, it can be expected to be more frequent and more serious in people with chronic lung disease. To date, the SARS-CoV-2 pandemic has affected over 5 million individuals worldwide with an overall 7.02% case-fatality ratio [35].

COVID-19 is likely to have catastrophic effects on tuberculosis which has long been the world's leading infectious killer, until on 1 April, 2020 [36]. COVID-19 overtook TB as the infectious disease killing the most people per day. The triple burden of COVID-19, TB and human immunodeficiency virus is one of the major global health challenges of the twenty-first century [37]. The spread of COVID-19 among people living with HIV is a well-founded concern in high burden HIV/TB countries. The fear of catching COVID-19 deters people in need of timely diagnosis and treatment for TB from accessing health services. There is also a danger that the media focus and hastily implemented public health measures to achieve "social distancing" could exacerbate stigma and human rights-related barriers faced by marginalized communities and be detrimental to mental health. Moreover, strict lockdown measures place severe limitations on diagnostic, treatment and prevention services, which is expected to increase the annual number of TB cases and deaths over the next 5 years [38].

The relationship between COVID-19 and asthma has been studied, but currently there is no evidence of increased infection rates in those with asthma. Although the Centers for Disease Control and Prevention stated that patient with moderate-severe asthma could be at greater risk for more severe disease, but there are no published data to support this determination at this time. This appears to be no indication that asthma is a risk factor for developing COVID-19 disease [39].

In pneumonia, breathing difficulties occur when lungs become filled with fluid and inflamed. Most people recover from pneumonia without any lasting lung damage, although the pneumonia associated with COVID-19 may be severe [40]. People with COVID-19 pneumonia experience changes in their lungs, including: inflammation that may be so severe, it damages the lungs' alveoli, fluid accumulation in the lungs, gas exchange difficulties that make it hard to get enough oxygen or expel enough carbon dioxide, fluid leaking out of blood vessels in the lungs. Even after the disease has passed, lung injury may result in breathing difficulties that might take months to improve [41].

COVID-19 patients with lung cancers have been reported by multiple series to have disproportionately increased severity outcomes, including higher rates of hospitalization and death [42]. It is unknown whether lung cancer itself or other pre-existing factors such as age, genetic variation in immunity, smoking history, underlying cardiopulmonary disease, and/or cancer-directed treatments predisposes an individual to significant symptoms of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection [43].

3. CONCLUSIONS

The patients with chronic lung diseases are more affected in the pandemic. Scientific research is growing to develop a coronavirus vaccine and therapeutics for controlling the deadly COVID-19. Moreover, increasing research funding


is essential to develop strategies to detect chronic respiratory diseases at their earliest stage and to accelerate the discovery of novel therapies. Prevention, control and cure of these diseases and promotion of respiratory health must be a top priority in global decision-making in the health sector.

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BIOGRAPHIES (Not Essential)

<p>Author Photo-1</p> 	<p>Monika Sultana Faculty, Dept of Microbiology Primeasia University, Bangladesh MPhil, Microbiology (University of Dhaka) MS, Microbiology (Chittagong University)</p>
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