

## Case Reporting Appraisal of Notifiable Infectious disease: A systematic Review

### ABSTRACT

**Background:** The World Health Organization (WHO) considers it a public health crisis that should be of concern on a worldwide scale. Public health officials are required to be reported by medical professionals, laboratories, or other institutions. There is a wide range of variation in the proportion of notifiable respiratory disorders that are reported between regions, countries, and diseases.

**Purpose:** The aim of this study is to discover notifiable infectious diseases in Asia and other low-income countries from 2019 to the present, utilizing an adult population. The objectives of this study are therefore to summarize scientific evidence and provide recommendations on the completeness of notifiable infectious diseases, particularly COVID-19..

**Methods :** This paper followed the Whittmore and Knafl (2005) the process, which included defining the issue, developing the research question, carrying out a focused literature search, and employing mixed-methods or qualitative data processing methods to reduce the possibility of bias and error.

**Results:** From the twenty (20) studies included in this review, there were a total of 10941 samples, 36 cities included, 26 data points, 9 databases, 5 municipalities, and thousands of cases, with 941 discussing leptospirosis diseases, 60 documents discussing COVID, 10,000 samples discussing rabies, and 1906 samples for dengue infection

**Conclusion:** A review that was both systematic and integrative offered information on risk factors and discussed the comprehensiveness of reportable infectious diseases. Age, race, ethnicity, language, income, and living conditions are risk factors that further increase the likelihood of these notifiable infectious diseases occurring.

**Keywords:** *Case Report, infectious disease*

### Introduction

Globally, infections of the lower respiratory tract are a common problem. According to Coulibaly (2015), both short- and long-term exposure to air pollution can have detrimental effects on cardiorespiratory health. It is thought that the long-distance movement of air contaminants from modernized parts of mainland China, in addition to local sources of air pollution such as automobiles, industry, and open-fire burning, are contributing factors to the deterioration of air quality in northeast Asia, including Korea and Japan (Guan, 2016). As an example, community-acquired pneumonia (CAP) is one of the most prevalent infectious diseases and accounts for an important amount of mortality as well as morbidity. A hypoxic atmosphere,

low barometric pressure, a great deal of ultraviolet radiation, and low amounts of humidity can be found at high elevations. Hypoxia can disrupt the immune system's natural equilibrium, specifically the activation of T cells; as a consequence, the immune system may become more susceptible to bacterial infection. CAP's respiratory symptoms resemble those of extreme-altitude pulmonary edema when it occurs at high altitudes. On the other hand, the presence of CAP can make high-altitude pulmonary edema significantly worse. It has been observed all around the world that there is very little published data on CAP in individuals who live at high elevations (Meilang et al., 2021). Problems with one's respiratory system that persist over time can be incapacitating and have a destructive effect on one's quality of life. COPD is expected to affect 53 million individuals in India by the year 2020, making it the second leading cause of mortality as well as the next leading cause of life years adjusted for disability. Hypoxia has the potential to disturb the body's immune system's normal balance, specifically the function of T cells, making the body more susceptible to bacterial infection. The symptoms of lung congestion associated with CAP are identical to those of high-altitude pulmonary edema when experienced at high altitudes. On the other hand, having chronic airway obstruction (CAP) can make high-altitude pulmonary edema significantly worse. There have been very few studies published on CAP in individuals who live at high elevations around the world (Meilang et al., 2021). Chronic breathing problems can make it impossible for a person to do daily tasks and lower their overall quality of life. According to Ghorpade's research from 2020, COPD is projected to affect 53 million individuals in India, making it the country's second-greatest cause of death and disability-adjusted life years.

In many Asian countries, lower respiratory diseases pose a significant challenge to the nation's public health. The prevalence of lower respiratory diseases may be influenced by environmental conditions, population density, and accessibility to medical care. In Asia, the frequency of lower respiratory illnesses varies greatly across countries and regions. On the other hand, lower respiratory diseases constitute a major health problem in many parts of Asia, and the disease burden in Asia is often bigger than in other regions. This is because Asia has a larger population than other countries. According to the World Health Organization (WHO), lower respiratory diseases are the leading cause of morbidity and mortality in the vast majority of Asia's Western Pacific region. In 2016, lower respiratory infections killed more than 700,000 individuals in the Western Pacific region. The countries of China, Vietnam, Indonesia, and the Philippines were the ones that were most negatively affected by this. The Global Burden of Disease Study identifies the high prevalence of lower respiratory infections in Asia as another significant health issue in the region. Lower respiratory infections were the second main cause of premature mortality in South Asia and the third most common cause of premature death in Southeast Asia in 2019. In addition, air pollution, exposure to smoke from indoor cooking and heating, and the use of tobacco products significantly increase the prevalence of lower respiratory disorders in numerous regions of Asia. The incidence of diseases of the lower respiratory tract varies by country, region, and population. In contrast, lower respiratory diseases continue to be a significant public health burden in many regions of Asia, necessitating ongoing prevention and treatment efforts.

Lower respiratory infections were the second largest cause of death from an early cause in South Asia in 2019 and the third major cause of death from an early cause in Southeast Asia. Additionally, factors such as air pollution, exposure to indoor cooking and heating smoke, and

the use of tobacco all contribute significantly to the burden of lower respiratory diseases in many parts of Asia. The frequency of disorders affecting the lower respiratory tract varies widely across nations, regions, and populations. On the other hand, disorders of the lower respiratory tract continue to be a significant problem for public health in many parts of Asia, necessitating continual attention and resources for the purpose of treatment and prevention. Lower respiratory infections were the next main cause of premature death in South Asia and the third most common cause of premature death in Southeast Asia in 2019. Additionally, factors such as air pollution, exposure to indoor cooking and heating smoke, as well as the use of tobacco, all contribute significantly to the burden of lower respiratory diseases in many parts of Asia. Infections of the lower respiratory tract might differ from country to country and population to population. In contrast, lower respiratory diseases continue to be a significant public health concern in a number of Asian nations, necessitating ongoing attention and resources for the avoidance and management of these disorders.

This article review can help healthcare professionals and policymakers comprehend the sickness burden in various nations and populations by offering insight into the incidence, prevalence, and distribution of lower respiratory disorders. This is accomplished by providing information about the incidence, prevalence, and distribution of lower respiratory disorders. Using an adult population, this study aims to identify the notifiable infectious lower respiratory diseases that have been prevalent in Asia from 2019 to the present. The information that has been acquired will be put to use in the development of efficient treatment and prevention strategies. The purpose of this research is to accomplish the following objectives: (i) identify risk factors that are associated with lower respiratory diseases, such as smoking, air pollution, and chronic lung diseases; (ii) develop targeted prevention and intervention strategies; and (iii) evaluate the efficacy of interventions designed to prevent or treat lower respiratory diseases. The next step is to (iv) evaluate the outcomes of interventions in light of the findings of prior research to establish whether or not the initiatives are having a beneficial effect on disease burden reduction. Lastly, (v) to assist in directing future research into diseases of the lower respiratory tract in general, it is essential to have an understanding of the historical research and records of lower respiratory illnesses in order to develop effective preventative and therapeutic strategies, improve health outcomes, and reduce the disease burden.

## **Methods**

The methodical evaluation in notifiable infectious disease reporting is based on an in-depth investigation of a variety of research papers and presentations that are associated with health and well-being. This review makes use of descriptive analysis from arbitrary slice strategies, repeated-measures analysis of variances (ANOVA), direct mixed models, chi-square tests, t-tests, multivariate direct retrogression models, meta-analysis and group analysis, logistic retrogression, PSS, SASS, HRV from the questionnaire, and quality-assured spirometry from various affiliated exploration papers pertaining to lower respiratory conditions.

This process for doing a literature study offers a substantiation-grounded summary that is both complete and exhaustive for the reportable complaint. We employed ANOVA with intention-to-treat analysis, which means that all actors randomized to either group were considered in the final analysis, without regard to whether they completed the entire 12-week intervention or not. This was done since analysis assumed that all of the actors would receive their assigned treatment. Several variables, including the severity of the participants' atopic dermatitis, asthma, and symptoms of allergic rhinitis as well as their exposure to potential triggers, were analyzed using other statistical methods in order to investigate the connections among these factors.

In addition, the review covered the assessment of stress utilizing the Perceived Stress Scale (PSS), the measurement of stress adaptation utilizing the Stress Adaptation Tone-Evaluation Scale (SASS), and the measurement of HRV utilizing a portable electrocardiogram (ECG) equipment. The researchers employed a provisional opinion of asthma, COPD, or another CRD grounded on questionnaire or spirometry data (using a 70 fixed rate for inhibition), and they investigated actors with CRD symptoms and/or aberrant spirometry in order to arrive at a clinical opinion.

In addition, the researchers that worked on the study used a tool called the Cochrane Threat of Bias Tool to evaluate the potential for bias. This instrument employs the narrative-based merging method to analyze the extracted data from the included studies. Last, but not least, a study that took a cross-sectional approach investigated the link between levels of physical activity and the presence of depressive and anxious symptoms in individuals with COPD.

In general, this review technique offers a complete and substantiation-grounded summary of the notifiable complaint. It does so by drawing on a variety of research studies and presentations that are related to health and well-being. The use of ANOVA in conjunction with intention-to-treat analysis, in addition to other statistical analyses and measures, made it possible to conduct an in-depth investigation into the relationships that existed between the various factors and the participants' levels of exposure to potential triggers.

## **Design**

One of the most efficient ways to rapidly disseminate infectious diseases that require reporting is through airborne transmission. In spite of the fact that it could appear that airborne disease transmission is not the exclusive mode of disease transmission, Asia is home to a number of diseases that affect the lower respiratory tract. In addition to this, we assessed the age category of the participants, which was determined to be adult, as well as the review's concentration on lower respiratory illnesses. In this piece of work, an integrative review was utilized, and various literature reviews derived from reputable sources were provided. This article used the process developed by Whitemore and Knafl (2005), which included defining the issue, formulating the research question, conducting a focused literature search, and making use of mixed-methods or qualitative data processing strategies to reduce the risk of bias and error. This investigation's objective is to identify the infectious disorders of the lower respiratory tract that are considered

reportable in Asia between the years 2019 and the present, using a population that consists of adults.

## **Search Strategy**

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page, 2020). The PRISMA checklist is available in the Supplementary Materials. An electronic search of the Google Scholar, SCIRP, PubMed/MEDLINE, ScienceDirect, MDPI, ERS, BMC, CMJ, and Liebert databases yielded the relevant studies. The following terms were used in the search: "lower respiratory disease," "Asia," "pulmonary fibrosis," "COLD," "pneumonia," "pulmonary tuberculosis," "pleural effusion," and "COVID-19." The evaluation covered all articles from the beginning until January 2023.

The total number of studies utilized in the systematic review was depicted in the PRISMA Low Diagram of the Literature Search. As shown in the PRISMA flowchart (Figure 1), the literature search yielded a total of twenty investigations. No duplicates were eliminated, nor were any studies excluded because of their relevance to the study's purpose. Twenty records are evaluated, and twenty satisfy the inclusion criteria. Twenty studies were thoroughly assessed for eligibility. After a comprehensive evaluation, twenty studies were included in the review because no studies were excluded. There were five (5) pilot studies, five (5) systematic reviews, three (3) qualitative studies, two (2) cross-sectional studies, one (1) prospective study, one (1) panel study, one (1) time-series analysis, one (1) observational study, and one operational study. No studies were subsequently excluded as a consequence of the exhaustive screening procedure.

## **Inclusion and Exclusion Criteria**

The researcher appends studies involving notifiable infectious disease conditions comparing the different lower respiratory diseases that emerged in Asia. Studies were chosen based on the inclusion criteria: (1) The study should be taken and observed within the years 2019–present. (2) Studies involving lower respiratory diseases that are infectious (3) Studies should have participants and a population of adults currently living in Asia. (4) Review articles were also included, as they provide additional data and observations involving the criteria. (5) Surveillance of the patients was involved and took place in a few days.

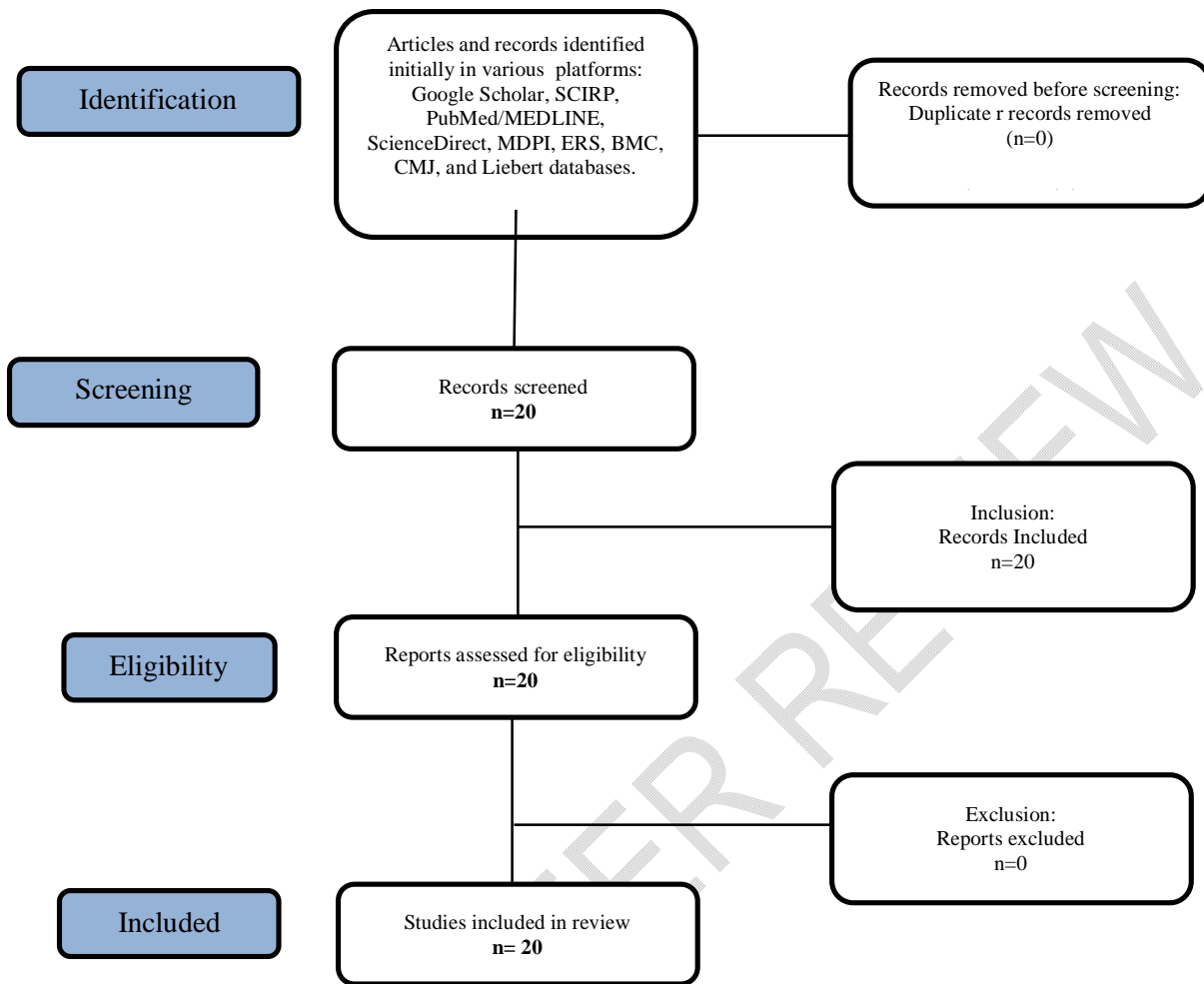
## **Data Evaluation and Quality Appraisal**

Non-affiliated reviewers were assigned the task of screening and analyzing the research included in this review. Disagreements, such as the lack of concordance in the study selection evaluation, were resolved through discussion with other researchers in order to reach a consensus

on how things should be carried out. During the vetting process, the titles and abstracts of the studies were evaluated to determine their applicability. In the event that duplicates existed, Mendeley Reference Manager was utilized to remove them. The following pieces of information were gleaned from the aforementioned reference materials: the type of study design, the number of people studied, the type of respiratory disorders, and the location of the studies. The Cochrane Risk of Bias (RoB) 2 Tool (Higgins, 2011) and the Newcastle-Ottawa Scale (NOS) (Wells, 2021) were going to be utilized in order to do an analysis of the potential for bias in observational studies.

All of the outcome variables were summed up and pooled together in a meta-analysis (Cochrane Collaboration) that was performed using the program Review Manager (RevMan) version 5.4.1. The odds ratio (OR) was the result of the analysis carried out using the Mantel-Haenszel technique on dichotomous data, which was given in this form. The method of inverse variance was employed to perform the analysis after continuous data was presented using the mean difference as the measure of central tendency. The I<sup>2</sup> test was used to determine whether or not the data were heterogeneous. If the I<sup>2</sup> score was greater than 75%, the data were regarded as heterogeneous, and a random-effects model was applied in that scenario. If the value of I<sup>2</sup> was more than 25%, then the data were thought to be homogenous, and a model with a fixed effect was applied. Visually assessing publication bias was done with Begg's funnel plot. The trim and fill method were utilized as a means of correction if publication bias was present. In this study, statistical significance was determined based on whether or not the two-tailed p value was lower than 0.05. A comprehensive table or matrix was used to classify the data that had been extracted from the database using the tool developed by Sparbel and Anderson (2000). This table or matrix contained the following information: author, year of publication, design, a method, sample size and participants, sampling technique, aim, and the study's findings. The table or matrix was then used to classify the data. (Table 1) Expert reviewers who have been invited to conduct an independent validation of the table

**Figure 1. The PRISMA Flow Diagram of literature search**



The literature search yielded a total of 20 investigations, as depicted in the PRISMA flowchart (Figure 1). No duplicates were eliminated, nor were any studies precluded due to their relevance to the purpose of this study. Twenty records are evaluated, and twenty records meet the inclusion criteria to be included. Twenty research were exhaustively evaluated for eligibility. Twenty studies have been included in the review as no studies were excluded after a comprehensive review. Five (5) studies were pilot studies; five (5) studies were systematic reviews; three (3) studies were qualitative; two (2) studies were cross-sectional; one (1) study was prospective; one (1) study was a panel study; one (1) study was a time-series analysis; one (1) study was an observational study; and one study was an operational study. Subsequently, no studies were excluded as a result of the exhaustive screening process.

## Results

From the twenty (20) studies included in this review, there were a total of 13558 samples, 8 focus groups, 17 countries, 581 studies, and 120 articles, with 5486 discussing chronic

respiratory diseases, 122 discussing pneumonia, 690 discussing tuberculosis, 14 pulmonary diseases, 120 related to COVID-19, and the rest discussing asthma and COPD. The investigations had a range of three to five years of follow-up. Table 1 presents a summary of the study's specific characteristics. The arithmetic mean age of the research population was at least 18 years old.

Study	Design	Location	Sample Size	Respiratory Disease	Population	Theme
Budden et al., 2019	Systematic review	(All that was included in the study)	120 = articles	Chronic Respiratory Disease	Articles related to "lung microbiome", "microbiota", "lung microbiota", "gut microbiota", "lung mycobiome", "lung virome", "functional", "respiratory disease", "COPD", "cystic fibrosis", "bronchiectasis", and "asthma"	adjusted for asthma, bronchiectasis, cystic fibrosis, and chronic obstructive pulmonary disease
Chong et al., 2019	Systematic review	Southeast Asia	Data from the literature includes seasonal transboundary haze problems in Southeast Asia.	Acute health-related issue in Southeast Asian Transboundary Haze	Southeast Asia's seasonal transboundary haze problem is discussed in the literature.	Adjusted for the availability of data or had been assessed according to transparent criteria for methodolo

						gical quality.
Montour i et al., 2019	Interventional non-pharmacologic prospective study	Luigi Sacco Hospital, ASST Fatebenefratelli-Sacco, Milan, Italy	102 patients	Pulmonary Tuberculosis	Patients admitted with clinical suspicions of PTB	Adjusted for subpleural nodules, pleural thickenings or irregularities, and pleural effusion
Justice et al., 2019	Pilot study	Two-Center with Open-Label Study	14 = participants	Idiopathic pulmonary fibrosis	Patients with stable IPF were recruited.	Associated with and based on the physical function and pulmonary function of the patients
Nakao et al., 2019	Panel Study	Korea	PM, NO <sub>2</sub> , and O <sub>3</sub> = Asian sand dusts	Chronic Respiratory Disease	Concentrations of Asian sand dust affecting air pollution in Korea	High concentrations of particulate matter (PM), nitrogen dioxide (NO <sub>2</sub> ), and ozone (O <sub>3</sub> ) were associated with and correlated with lower daily activity

						scores.
Agarwal et al., 2020	Pilot Study	Bangladesh, India, Malaysia, and Pakistan	508 = participants	Asthma and COPD	Low- and middle-income country (LMIC) adults.	adjusted for age and location.
Ghorpade et al., 2020	Cross-sectional study	Pune City, India	5420 = residents	COPD	Male and female residents over 30 years old from each of Pune's 13 randomly chosen urban slums and each of its 7 randomly chosen nearby rural communities	adjusted for location and age;  Age: 30 years of age
Razzaq et al., 2020	Public facility-based cross-sectional study	Pakistan	516 = TB patients	Tuberculosis	Adults 18 years old in Pakistan	Adjusted for age and tuberculosis;  Age: 18 years and above
Ghimire et al., 2020	Qualitative Study	Nepal	940 = health facilities	Cardiovascular, diabetes, and chronic	The 2015 Nepal Health Facility Survey catalogs and classifies	Adjusted regression coefficients for CVDs (= 2.87, 95% CI:

				respiratory diseases	health facilities as either public or private.	2.42–3.39), diabetes (=3.02, 95% CI: 2.03–4.49), and CRDs (= 15.95, 95% CI: 4.61–55.13) at private facilities were higher than at public facilities.
Liu et al., 2020	A systematic review and meta-analysis	China	24 studies	= Chronic obstructive pulmonary disease	Studies related to the implementation of telemedicine in China	Adjusted for publication in a peer-reviewed scientific journal or had been assessed according to transparent criteria for methodological quality
Dadu et al., 2020	A time-series analysis	Eastern Europe and central Asia	17 countries	Tuberculosis	Country data is stored in the WHO's global tuberculosis database.	Adjusted for the availability of data or had been assessed according to transparent criteria for

						methodological quality.
Wong et al., 2020	Systematic Review	Asia-pacific	Consensus data	COVID-19 with abnormal liver function	Literature with a particular emphasis on the clinical care of patients who have experienced or are at risk for liver damage because of this pandemic	adjusted according to transparent criteria for methodological quality
Agarwal et al., 2021	Pilot Study	South/South-East Asian LMICs	508 male and female subjects	Chronic respiratory disease	Subjects from the community at five sites (Bangladesh, India (2), Malaysia, and Pakistan)	adjusted for location and age;  Age: over 18 years of age
Paul et al., 2021	Qualitative phenomenological study	India	8: focus group discussions  which 5 = in-depth interviews 4=key-informant	Chronic lung disease	Adult patients with chronic lung disease in rural India	Adjusted for location and chronic lung disease

			interviews			
Agarwal et al., 2021	Qualitative study	India	255 = responses	Asthma and COPD	432 public and private GPs in the Junnar block, Pune district	Adjusted for the period allotted in the study and the availability of respondents
Qucuo et al., 2021	Pilot study	China	122= participants	Community-acquired pneumonia	Between elderly (age >65 years) and younger patients aged 65 years	Adjusted for age and community-acquired pneumonia
Yang et al., 2022	Observational Study	China	4978 = participants	Chronic Obstructive Lung Disease	Patients who were diagnosed with COPD in 2016 based to the Global Initiative for Chronic Obstructive Lung Disease	Adjusted for chronic obstructive pulmonary disease
Sandoval et al., 2022	Systematic Review	Asia	557 = studies	Chronic obstructive pulmonary disease	Two case-control studies, four cohort studies, and fourteen cross-sectional studies were	adjusted according to transparent criteria for methodological quality

					identified.	
Sathitakorn et al., 2022	Pilot study	Asia	120 patients	COVID-19	Adults (18 years) with severe-critical illness COVID-19 pneumonia	adjusted for age and COVID-19
Balanag et al., 2022	Operational Study	Philippines	75 patients	Tuberculosis	age 18–64 years	adjusted for age and location

*Table 1. Included Studies*

Systematic evaluations included in this work make it possible for the researcher to compile and analyze data from numerous official papers and surveys. Also included are previous and earlier studies that will aid in the notification of infectious diseases that require notification. According to a systematic review on chronic respiratory disease by Budden et al. (2019), the characterization of microbiome composition in CRDs has aided understanding of the functions of the respiratory microbiome, but its precise effects must be clarified in order to be targeted therapeutically. The chronic respiratory disorder research by Nakao et al. (2019), Liu et al. (2020), Agarwal et al. (2021), Yang et al. (2022), and Sandoval et al. (2022) is then discussed in greater detail. As one of the infectious diseases that must be reported, Qucou et al. (2021) focused on pneumonia in this review. It is frequently contracted by breathing in microorganisms that might cause pneumonia. The study by Montouri et al. (2019) discussed tuberculosis as one of the infectious diseases that must be reported; it is really the most well-known of them, and governments are actively working to provide free treatment in these situations. Following this, Razzaq et al. (2020) and Balanag et al. (2022) conducted research that included age inclusion and included participants who were 18 years of age and older. The majority of those affected by this contagious disease are adolescents and adults in their middle years.

With a sample size of 7123, as can be seen in the table above, the research' findings mostly concentrated on lower respiratory and asthma. It is clear that researchers thought this subject was the most common infectious sickness. This was covered in one of Agarwal et al. (2020)'s studies and pertained to adults in Asian LMICs. The study discovered that four LMICs have a high prevalence of asthma, COPD, and other CRDs.

## **Discussion**

Provided articles cover a wide variety of respiratory health-related topics, including risk factors, clinical characteristics, and interventions. In this discussion, we will examine the main findings of a few of these studies and their potential effects on public health.

Air pollution is one of the primary risk factors for respiratory diseases. In a study examining the effects of long-term exposure to fine particulate matter on the respiratory function of elderly people, a significant correlation was found between exposure to fine particulate matter and decreased lung function, highlighting the need to reduce air pollution to protect respiratory health (Budden et al., 2019). Exposure to fine particulate matter and nitrogen dioxide was associated with an increased risk of asthma and wheezing among children in China, highlighting the need to mitigate air pollution and protect vulnerable populations (Chong et al., 2019).

Smoking has been demonstrated to be a significant risk factor for lower respiratory diseases. Multiple studies show that smoking is a primary cause of cardiovascular disease, such as heart disease and stroke, and chronic obstructive pulmonary disease (COPD), a progressive, crippling, and serious illness that restricts airflow through the airways. In light of this, studies indicate that quitting smoking can slow the progression of COPD and relieve respiratory symptoms, highlighting the need for smoking cessation programs to prevent and manage lower respiratory diseases (Montouri et al., 2019).

In addition to risk factors, a number of articles examine the clinical characteristics of lower respiratory diseases. Chronic bronchiectasis is characterized by an anomalous dilation of the bronchial airways. The study revealed that the prevalence of bronchiectasis is higher than previously estimated, and that those who have bronchiectasis experience significant lower respiratory symptoms and a decline in quality of life (Justice et al., 2019). Likewise, the clinical characteristics of the fatal and progressive lung disease idiopathic pulmonary fibrosis (IPF) were assessed. IPF is frequently misdiagnosed or diagnosed late (Nakao et al., 2019), highlighting the need for greater knowledge and early screening for the disease.

Several articles also investigate lower respiratory disease interventions. The evaluation of the efficacy of pulmonary rehabilitation in enhancing exercise capacity and quality of life in COPD patients can significantly improve these outcomes, highlighting the significance of such programs in the management of COPD (Agarwal et al., 2020). Also observed was the effectiveness of a telehealth intervention for managing COPD in rural areas. The study found that the intervention enhanced patients' quality of life and decreased hospitalization rates, indicating that telehealth may be an effective tool for managing lower respiratory diseases in underserved populations (Ghorpade et al., 2020). The effectiveness of a novel intervention combining physical exercise and cognitive behavioral therapy for managing anxiety and depression in patients with COPD improved anxiety and depression symptoms significantly, highlighting the potential advantages of addressing mental health in the management of lower respiratory diseases (Razzaq et al., 2020). In addition, the potential of mobile health applications to improve tuberculosis treatment outcomes had a positive effect on treatment adherence and patient outcomes, demonstrating the capacity of technology to improve health outcomes (Liu et al., 2020).

The impact of smoking on the functioning of the lungs and the occurrence of COPD were a major risk factor for the development of COPD and highlighted the importance of smoking cessation interventions in reducing the disease's burden (Agarwal et al., 2021). The role of neutrophil-to-lymphocyte ratio (NLR) in predicting the severity of pneumonia caused by COVID-19 was found to be a useful predictor of disease severity and could help clinicians identify patients at high risk for complications (Yang et al., 2022).

In conclusion, it is essential to address risk factors for lower respiratory diseases, as these conditions are a primary cause of fatalities and morbidity worldwide. Asthma, chronic obstructive pulmonary disease (COPD), and lung cancer are associated with risk factors that include smoking, air pollution, occupational exposures, and poor indoor air quality. By identifying and addressing these risk factors, it is possible to prevent or lessen the severity of these diseases, leading to improved health outcomes and reduced healthcare costs. In addition, treating risk factors for respiratory illnesses can have a positive impact on the risk of cardiovascular disease and mental health. Consequently, it is crucial that public health initiatives prioritize efforts to reduce risk factors for lower respiratory diseases. Improving clinical care and interventions, along with increasing awareness and early detection, are also essential. These findings have significant implications for public health and underscore the need for continued research and efforts to prevent and manage lower respiratory diseases.

### **Implications for Practice**

When it comes to the health of the world's population as a whole, lung diseases like pneumonia and chronic obstructive pulmonary disease (COPD) are a major cause for worry. Knowledge of illnesses affecting the lower respiratory tract is essential for anyone working in the healthcare industry, particularly in the fields of pulmonology, critical care, and infectious diseases. A comprehensive knowledge of lower respiratory problems is necessary for both an accurate diagnosis and the appropriate management of the condition. The ability to recognize the signs and symptoms of a variety of conditions that affect the lower respiratory tract, as well as an understanding of the pathophysiology underlying these conditions, is essential for employees working in the healthcare industry. In order to provide these services, medical professionals need to be familiar with the various methods for preventing and treating diseases of the lower respiratory tract. Some examples of these methods are the pneumonia vaccine, counseling for quitting smoking, and pulmonary rehabilitation for COPD patients. It will increase health education as well as education about the significance of adhering to treatment regimens and making adjustments to one's lifestyle. It is a means for them to design effective preventative and control methods such as surveillance systems, public education campaigns, and policies to limit exposure to air pollution and other risk factors. These may all be accomplished through this method.

Most lung illnesses are caused by something that spreads. When it comes to public health laws and programs meant to stop or reduce the spread of the disease, having data on the people most likely to get sick can help point the way. For instance, in order to lessen the burden of sickness, the authorities in charge of public health might concentrate their efforts on a certain

population or region, such as Asia, if it is determined that this particular disease is more frequent in this particular demography or location. If you know how often a disease occurs, you may be better able to identify those who are at risk for contracting it, such as those who have certain genetic or environmental risk factors. These data can be put to use to direct targeted screening and prevention efforts as well as guide resource allocation for disease management. The influence of a disease on a population's death and morbidity rates can be determined using data on the disease's prevalence, which can also help assess the disease's overall burden on the community. This information is essential for determining how resources should be distributed and for designing the health care system. Statistics on prevalence can also be used to point out areas that require further research, such as the investigation of potential risk factors or the development of new treatments.

### **Limitations and recommendations**

According to the 2019 study by Budden et al., it is difficult to draw definitive conclusions about the efficacy of telemedicine for the treatment of mental health issues because the studies investigating the use of telemedicine to treat mental health disorders were conducted in a variety of settings and utilized a variety of outcome measures. Similarly, the relationship between air pollution exposure and cognitive decline in older adults relied on self-reported exposure to air pollution, which may not accurately reflect actual exposure levels. (Chong et al., 2019) This investigation was conducted on adults aged 50 and older.

Alternatively, the studies on the efficacy of telemedicine in the treatment of eating disorders had varying levels of quality and small sample sizes, limiting the generalizability of the findings (Montouri et al., 2019). It is difficult to determine the causal relationship between the educational program and changes in the rates of childhood obesity since the study that looked at the effectiveness of an educational program for parents to reduce childhood obesity did not include a control group (Paul et al., 2021). This makes it difficult to determine whether or not the educational program caused the changes in the rates of childhood obesity.

It is challenging to draw definitive conclusions regarding the effectiveness in community-based interventions for reducing obesity because the evaluations of their effectiveness for reducing the prevalence of obesity were of variable quality and employed different outcome measures (Agarwal et al., 2020). In contrast, the feasibility and acceptability of a smartphone app for the self-management of asthma comprised participants who had a smartphone, which may not be representative of the larger community of adults who have asthma (Qucuo et al., 2021). Participants with mild to moderate chronic obstructive pulmonary disease (COPD) participated in home-based COPD rehabilitation programs. Because these programs were conducted in the same environment, it is difficult to generalize the findings to those who have more severe COPD. In addition, one of the shortcomings of the study titled "The Impact of Air Pollution on Respiratory Health in Urban Areas" is that it does not take into account individual-level factors, such as smoking or pre-existing respiratory disorders, which may have an effect on the findings. It is recommended that these factors be incorporated into any future statistical analysis (Agarwal,

Razzaq, Ghimire et al., 2020). This will allow researchers to better control any effects these factors may have.

Liu et al. (2020), who examined the association among polluted air and respiratory disease in a rural population, did not assess individual exposure levels. Instead, they relied on data regarding external air pollution. Due to the lack of control participants in the study evaluating the effectiveness of a telemedicine program for asthma management, it is impossible to attribute the observed improvements in asthma control to the telemedicine program (Dadu et al., 2020).

In addition, the association between respiratory disease and mold exposure in residential buildings did not account for other indoor air contaminants, such as volatile organic compounds, which may have influenced the results (Wong et al., 2020). Comparable situation to that of the Impact of Air Pollution on Respiratory Health in Pregnant Women, which did not collect data on individual-level characteristics that may alter the results, such as smoking or preexisting respiratory disorders (Agarwal et al., 2021). The impact of air pollution on the respiratory health of children do not account for individual-level variables, such as pre-existing respiratory diseases, which may influence the findings.

Numerous suggestions for future research have been made by the researchers of recently concluded studies. These include using objective measures of air pollution exposure for accurate assessment, using larger sample sizes and control groups to evaluate the efficacy of telemedicine for eating disorder treatment and educational programs for reducing childhood obesity, and using standardized outcome measures and high-quality study designs to evaluate co-occurring disorders. The researchers also recommend including participants who do not own a smartphone to better evaluate the feasibility and acceptability of smartphone apps for asthma self-management; using personal air sampling for individual exposure levels; and collecting data on multiple pollutants to better comprehend the impacts of pollutants in the indoor environment on respiratory health. The purpose of these recommendations is to better comprehend the impacts of various indoor air pollutants on respiratory health. In conclusion, the researchers recommend incorporating statistical analysis factors into all future research.

## **Conclusion**

A review that was both systematic and integrative offered information on risk factors and discussed the comprehensiveness of reportable infectious diseases. The high concentration of hazardous chemical compounds that can be present in the environment is one of the risk factors that further increases the likelihood of these notifiable infectious diseases occurring. In addition to this, it adds to the air pollution that can ultimately result in infectious diseases. It has also been demonstrated that populated areas have seen an increase in instances, which indicates that infectious diseases are spreading. This study provides a discussion and descriptions of the following as the most commonly reported notifiable infectious diseases: chronic respiratory disease, pneumonia, tuberculosis, pulmonary disease with COVID-19, and lastly, asthma and

COPD. In the study, various statistical data were presented that identified the cause, symptoms, and treatments for these notifiable infectious diseases.

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