



## Covid-19 (Epidemic of the Era): A Review

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### Abstract

The end of 2019 witnessed a severe global healthcare crisis due to the outbreak of the novel coronavirus SARS-CoV-2, the primary cause of COVID-19. This systematic review aims to summarize the current understanding of the disease, its transmission, clinical manifestations, detection methods, treatment plans, and immunization efforts. The reviewed research includes publications up to October 2023.

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### 1. Introduction

The novel coronavirus disease (COVID-19) exhibits a wide range of symptoms, from complete asymptomatic infection to severe pneumonia and organ damage. Initial reports from Wuhan, China, highlighted the highly contagious nature of the disease, leading to its widespread global spread. <sup>[1, 2]</sup> This occurs when entities become infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which produces similar consequences to those caused by the SARS-CoV and Middle East respiratory syndrome coronavirus (MERS-CoV) pandemics. <sup>[3, 4]</sup> Adopting COVID-19 is critical to public health responses and clinical management.

### Methodology

A comprehensive search was conducted in databases such as PubMed and Scopus, the Cochrane Library, utilizing keywords associated with (COVID-19), including transmission, epidemiology, clinical features, treatments, and vaccines. Study selection included peer-reviewed articles published from January 2020 to October 2023. Quality assessment was performed using appropriate tools for observational and clinical studies. [Table 1] shows a summary of what global studies have provided regarding this epidemic. <sup>[5-23]</sup>

### Transmission

SARS-CoV-2 is mainly broadcasted among respiratory droplet and airborne particles, and through surface contamination. <sup>[24, 25]</sup> Studies have shown that asymptomatic individuals can still spread the virus, complicating containment strategies. <sup>[26]</sup> Airborne transmission has been documented in enclosed spaces, prompting guidelines emphasizing ventilation and mask-wearing in high-risk settings. <sup>[27]</sup>

### Clinical Manifestations

Clinical features of (COVID-19) vary widely: <sup>[28-30]</sup>

- **Mild cases:** Often presenting with fever, cough, fatigue, anosmia, and gastrointestinal symptoms.
  - **Severe injuries:** These conditions can cause pneumonia and hypoxemia due to lung dysfunction, commonly referred to as acute respiratory distress syndrome (ARDS). They may also result in multisystem inflammatory syndrome (MIS), leading to organ damage and, in severe cases, death. Addressing these issues necessitates strict health precautions and intensive care
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provided in a hospital setting.

- **Long-term Covid:** It includes accompanying symptoms

that continue after infection or the appearance of new symptoms in infected people.

**Table 1:** Inputs and outputs provided by some previous studies regarding the Corona epidemic

Authors, Reference	Study country	Sample size	Key findings	Intervention	Limitations
Sarda <i>et al.</i> [5]	India	251	The study found that these persistent symptoms led to a notable decline in quality of life among the affected individuals	The importance of health services in addressing Long COVID-19 symptoms in outpatient settings	The study sample is limited, which has an impact on the results of the statistical study, as well as the failure to determine the follow-up period
Polack <i>et al.</i> [6]	USA	40000	mRNA vaccines show 95% efficacy against symptomatic COVID-19	Rapid vaccine rollout is essential	Short follow-up period after vaccinations
deMoraes <i>et al.</i> [7]	Brazil	2159	The study highlights the adverse psychological effects of the Covid-19 pandemic on healthcare providers and emphasizes the importance of offering them psychological support.	The study assessed the prevalence rate and factors associated with it, while at the same time emphasizing the need to develop targeted mental health interventions and support systems for health care workers.	The limited causal relationship between causative factors and mental health outcomes, as well as the limited study that focuses on one person, which prevents the generalization of its results to other population groups.
Boulos <i>et al.</i> [8]	5185	Global	The study indicated that the masks used play a major role in the spread of the virus, and this appears clearly in population centers	- The review supports the continued use of masks as part of a multifaceted approach to managing the pandemic, particularly in high-transmission areas or crowded environments.	- The review focuses primarily on observational and experimental studies, which can limit the strength of causal inferences about mask effectiveness.
Amdal <i>et al.</i> [9]	3342	Global	-HRQOL Assessment -Validation -Development of a new measure -Cross-cultural considerations	-Clinical implementation -Research tool	-sample size and diversity -cross-sectional design -subjectivity of reporting -Focus on specific aspects
Yaksi <i>et al.</i> [10]	133	Turkey	-Prevalence of Long COVID -Common Symptoms -Functional Impact	This was a retrospective cohort study, utilizing medical records to identify and assess post-acute sequelae of COVID-19 in the patient population.	-Retrospective Design -Sample Size -Subjective Reporting -Short Follow-Up Period -Lack of Control Group
Mathias <i>et al.</i> [11]	1947	India	-Mental Health Impact -Risk Factors -Coping Mechanisms: many reported that these were sometimes insufficient to mitigate the mental health burden.	- Type of Intervention: The review did not involve a specific intervention as it was a systematic review. - Methodology: A mixed-methods approach	-Heterogeneity of Studies -Publication Bias -Self-Reported Data -Context-Specific Factors -Temporal Factors
Sebastian <i>et al.</i> [12]	3000	US	It highlights the role of schools and community settings in the transmission of the virus among children.	Recommendations include school-based interventions, vaccination efforts tailored for children, and policies aimed at reducing transmission in community spaces.	- The study may have limitations related to the representativeness of the data and potential biases in reporting cases.
Kucharski <i>et al.</i> [13]	95333	India	It emphasizes the importance of timely interventions, such as social distancing and isolation of infected individuals, to control the outbreak.	- The study uses mathematical modeling to analyze the potential impact of different control measures, such as social distancing and quarantine, on the spread of the virus	- The study's findings are context-specific and may not account for variations in different populations or settings.
Pormohammad <i>et al.</i> [14]	105527	global	The results section will provide a summary of the key findings, and the discussion section may elaborate on the implications of those	Interventions analyzed consist of various COVID-19 vaccines, which were compared against placebo groups in the included randomized clinical trials	- Limitations: - Variability in the design and quality of included trials, - Potential publication bias, - Differences in vaccine types, - Limited long-term data

			findings		
Ali <i>et al.</i> <sup>[15]</sup>	230000	global	- The study discusses the occurrence of breakthrough COVID-19 infections in vaccinated individuals.	COVID-19 vaccination, focusing on various types of vaccines administered to populations and their effectiveness against breakthrough infections	- Variability in the definition of "breakthrough infection" across studies may affect the comparability of results.
Smallwood <i>et al.</i> <sup>[16]</sup>	26174	Australia	The impact of the Covid-19 pandemic on mental health professionals	Interventions regarding initiatives to provide support to workers based on the mental health aspect	The study is limited and not comprehensive due to its adherence to the available literature
Kapoor <i>et al.</i> <sup>[17]</sup>	800	India	Highlighting the challenges of Indian healthcare workers and what they faced in the pandemic	Discuss and evaluate interventions used to reduce the effects of the pandemic in Indian health workers	- Difficulty in generalizing findings due to regional disparities within India.
Idzerda <i>et al.</i> <sup>[18]</sup>	1000	Canada	The review identifies several important pandemic-era findings regarding household food insecurity in Canada	Discuss and evaluate most of the interventions generated as a result of increasing food insecurity	- Limited representation of certain populations, particularly Indigenous communities and rural areas, in the existing studies
Moghadas <i>et al.</i> <sup>[19]</sup>	5780	Global	- The study highlights the need for ongoing vaccination efforts to control transmission, especially in vulnerable populations.	- The primary intervention discussed in the study is the rollout of COVID-19 vaccination programs across the United States	- The reliance on modeling assumptions, which may not fully account for real-world complexities of human behavior and virus transmission dynamics
Tran <i>et al.</i> <sup>[20]</sup>	251	India	The study analyzes COVID-19 through the literature and identifies patterns in research focus, methodologies, and findings.	-Call for Specific Research -Collaboration and Data Sharing	Among the limitations of the study is the limited scope of the sample, which in turn obscures the generalizability of its results
Mathias <i>et al.</i> <sup>[21]</sup>	74	India	-Mental Health Impact -Comparisons of Concerns -Contributing Factors -Need for Support	The study itself does not focus on a specific intervention but reviews existing literature and evidence regarding the impact of the pandemic on workers' mental health	-Heterogeneity of Studies -Quality of Studies -Publication Bias -Cultural Context -Temporal Changes
Pilishvili <i>et al.</i> <sup>[22]</sup>	4931	US	-Vaccine Effectiveness -Durability of Protection -Variants	The study focused on assessing the effectiveness of mRNA COVID-19 vaccines, specifically Pfizer-BioNTech and Moderna, when administered to healthcare workers.	-Observational Study Design -Generalizability -Potential for Underreporting -Sample Bias -Changing Epidemiology
Engelbrecht <i>et al.</i> <sup>[23]</sup>	10466	South Africa	-Prevalence of Vaccine Hesitancy Factors Influencing Hesitancy -Impact of Public Health Campaigns -Demographic Disparities Recommendations	-Community Engagement -Targeted Communication Strategies -Collaborative Efforts -Monitoring and Feedback	-Sample Size and Diversity -Focus on Specific Populations

### Diagnostic Methods

For the purpose of medical diagnosis, many techniques have been used, which are summarized in studies in this regard:

- Real-time reverse transcriptase-polymerase chain reaction (RT-PCR) is considered one of the most sophisticated methodologies for detecting pathogens. <sup>[31]</sup>
- Tests are available without the need for a prescription, have different sensitivity and give fairly rapid results and are known as rapid tests. <sup>[32]</sup>
- Some tests are used to look for antibodies that may bind to pathogens and are part of the immune response and are commonly known in serological tests. <sup>[33]</sup>

### Treatment Strategies

The previous and recent years have witnessed fairly rapid and fruitful therapeutic developments:

- Providing health care to patients using the necessary oxygen, nutrients, and psychological care. These processes are known as supportive care. <sup>[34]</sup>
- Medicines given to infected people in health centers, such as remdesivir, which has proven effective in reducing inflammation and is known as antivirals. <sup>[35]</sup>
- Dexamethasone is used for those affected, as it is an anti-inflammatory and immunosuppressive and works to reduce the incidence of death due to lack of oxygen and falls under the name of corticosteroids. <sup>[36]</sup>

- Bamlanivimab and Casirivimab/Imdevimab, which are known as monoclonal antibodies, have been used in emergency situations to treat cases of populations at risk.<sup>[37]</sup>

### Vaccination Efforts

With the worsening health crisis for the population, the vaccination situation has witnessed tremendous rapid development:

- Most individuals witnessed immunization, prevention, and recovery from serious diseases after using the mRNA vaccines of Pfizer-BioNTech and Moderna.<sup>38</sup>
- It has been licensed for necessity by AstraZeneca and Johnson & Johnson

These are viral vector vaccines, as they are considered a modification and weakening of a virus different from the (Covid-19) virus, as it provides cells with genetic instructions to manufacture a copy of the protein found on the Covid-19 virus, as these two companies participated effectively in global immunization operations against this epidemic.<sup>39, 40</sup>

- Vaccines were delivered to Afghanistan after Sudan and Djibouti in the Middle East, through the COVAX facility, through which vaccines are fairly distributed.<sup>41</sup>

### Conclusion

COVID-19 has called for a comprehensive strategy that includes public health measures, clinical care, and vaccination. Continued investigation is vital to understanding the long-term implications of the virus, emerging developments, and guidance plans. Global cooperation will also be essential to confront current and future pandemics.

### Authors Contribution

This review paper was designed and written by ATH, ASS, collected and reviewed the data by ATH, and the authors read and approved the paper.

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