

## **An Imperative of Flu Vaccination: A Systematic Review of the Clinical Characteristics of Influenza-COVID-19 Co-Infection**

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**Introduction:** Influenza is a respiratory pathogen which results in hundreds of thousands of deaths every year. Since late 2019, the world has dealt with the emergence of another deadly respiratory pathogen: COVID-19. While it is well-recognized that COVID-19 has a higher mortality rate than influenza, the two infections also have a number of similarities. For this reason, it can be very difficult to distinguish between the two pathogens and their respective infections. Furthermore, it is not currently well known if co-infection of these pathogens results in different symptoms and outcomes for patients.

**Objectives:** To systematically review the literature in order to describe the clinical characteristics of influenza-COVID-19 co-infection.

**Methods:** Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, searches were conducted in PubMed, EBSCOhost Academic Source, ScienceDirect, Medrxiv, and WHO COVID-19 database. Original research articles that were in English, included patients infected with both COVID-19 and influenza, and provided a description of clinical characteristics for patients were eligible. For the final articles that were selected, the following data was extracted: type of influenza strain, patient sex, age, comorbidities, symptoms, and clinical outcomes.

**Results:** Searches generated a total of 1787 articles, and of those, a total of 26 studies were eligible for this review. In total, there were 544 co-infected patients. In addition to COVID-19 infection, 85.8% of patients were infected with Influenza A, and 14.2% were infected with Influenza B; a single patient was infected with both strains of influenza. 47.4% of patients were male, and mean patient age was 59.5 years (SD=8.7). 13.8% of patients had at least 1 comorbidity, with the most common comorbidities being hypertension and diabetes. The most frequently reported symptoms for patients were fever, cough, and shortness of breath. There was a total of 92 deaths (16.9%) reported.

**Conclusion:** Co-infection of COVID-19 and influenza has been shown to result in many symptoms that are similar to infection of either one of these pathogens. However, the results of this work also seem to indicate that co-infection may lead to a considerably higher risk for mortality. These findings emphasize how critical it is to ensure that as many people as possible receive the annual influenza vaccination amidst the COVID-19 pandemic.