

# COVID 19 AND FLU (Twindemic)

**Pandey Pratima**

(Research Scholar)

Department of Pharmacy Practice,  
National Institute of Pharmaceutical Education and Research (NIPER), Hajipur,

**Pawan Tiwary**

(Research Scholar)

B.PHARMACY

Sinhgad Institute Of Pharmacy Narhe Pune Maharashtra, 411041

**Sneha Thonnankuzhi**

(Research Scholar)

B.PHARMACY

Sanjivani college Of Pharmaceutical Education And Research kopergaon

## ABSTRACT

Influenza (The flu) and COVID 19 are both contagious respiratory illnesses, meaning they affect lungs and breathing, and can be spread to others. Differentiating between influenza and COVID19 is very important. That's primarily because Influenza symptoms are very similar to COVID 19 symptoms, and both are contagious respiratory diseases caused by viruses. despite a decline in the total COVID19 cases in India, there has been an unfortunate rise in flu cases in the country. Flu much like COVID 19, can prove to be a serious health problem, for those at high risk and must not be taken lightly, this article proposes a model predictive control strategy to manage and get well prepared to fight against a Twindemic (Flu and COVID 19) in upcoming winter.

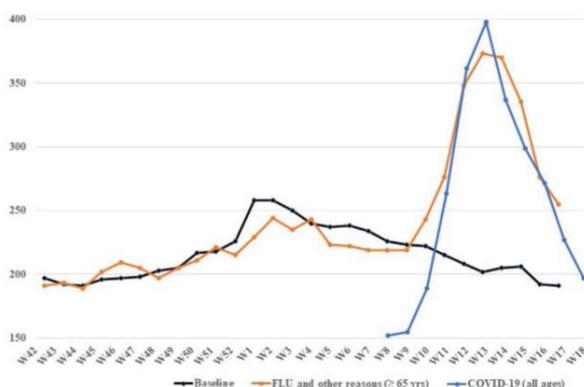
**Keywords:** Influenza, Flu, Twindemic

## INTRODUCTION

The COVID-19 pandemic caused by the SARS-CoV-2 virus has been an ongoing global cause of concern and has claimed almost 5.88 million lives as of 20 February 2022. Intending to deal with the pandemic, the world witnessed the largest global recession.

This winter also noticed a surge in the influenza cases along with the ongoing COVID 19 pandemic mostly in the European countries. Influenza (flu), like COVID 19; also, being a contagious respiratory illness managed to grab the attention of healthcare professionals as it had the potential of aggregating the current critical scenario as the health infrastructure was already crippled due to the ongoing pandemic. Also, serious health outcomes were anticipated by public health officers amidst the circulation of both influenza and SARS CoV- 2 viruses as symptoms of both overlapped up to a greater extent. These two viruses started prevailing together in the same person at the same time due to the outbreak of the so-called Influenza (Flu) and COVID 19 "Twindemic". "Twindemic" refers to the co-occurrence of both flu and COVID 19. This situation leads to spikes in cases of

COVID 19 and simultaneously rough flu season at the same time which can be explained by Fig. 1. The mortality curves associated with Influenza-like illness (and other causes in people aged  $\geq 65$  years) and Covid-19 between October 2019 (week 42) and April 2020 (week 18) in Italy have been constructed based on the data provided by the ISTAT (National Institute of Statistics) and ISS (National Institute of Health). (Fig. 1) Examination of the trend of the curves shows a completely overlapping profile of both the curves at a certain point of time and also the simultaneous prevalence of both the viruses in Italy for a while indirectly indicates that it is not beyond the realms of possibility that some of the excess mortality reported in the Italy group (in those aged  $\geq 65$  years) is attributable to COVID-19 infection. (Capone, 2020)



(Capone\*, 2020)

**Figure 1.:** Average number of deaths per week in the period October 2019-April 2020.

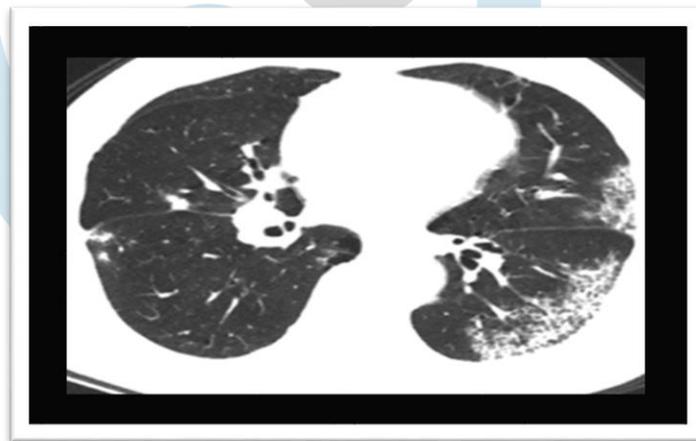
The measurement Scale for COVID-19 is shown on the right of the diagram, for influenza-like illness and other -related reasons on left.

**Reasons for the occurrence of a Twindemic in 2021:**

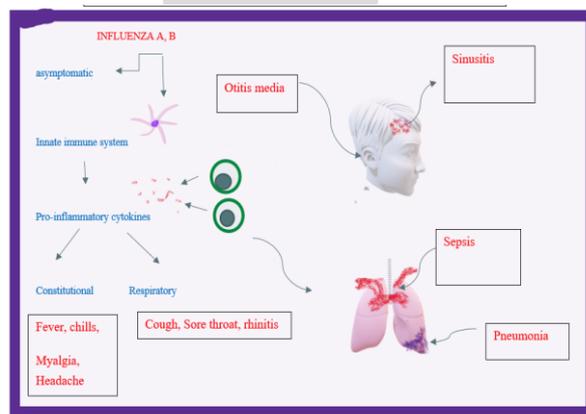
Although the delta proceeds to be profoundly transmissible, facilitating of blending inside population over the world. Consequently, lack of approaches to social removal and mask-wearing is impossible to extend rates of transmission, Moreover, low contaminations in 2020 have brought about diminished resistance for the consequent year, and the generation of useful antibody been difficult. together, increased rates of transmission are anticipated due to expanded presentation to more harmful strains of influenza. to date, there has been an increment in respiratory syncytial virus, regular coronavirus, and rhinovirus diseases that were thought to be related to measures to secure against COVID-19. this forewarning expanded the number of Flu contamination over the 2021 winter and is anticipated to rise in 2022 with the burden of omicron.

**CLINICAL PRESENTATION OF COVID-19:**

The spectrum of illness associated with COVID-19 is pretty high, ranging from asymptomatic to life-threatening respiratory failure. When symptoms are present in the patients, they typically arise approximately four to five days after exposure. But if viral load is severe the symptoms may often arise after second-day exposure also, in the majority of cases symptoms are mild in approximately 80-85% of cases, and they often include fever, fatigue, myalgia’s, headache, dry cough. And approximately in half of cases loss of taste, loss of smell also reported most commonly, approximately in 30-40% of patients’ Gastrointestinal manifestation was identified. Other manifestations like Rhinorrhea that is a running nose and sore throat are less common in the vast majority of cases in the second wave of the pandemic. Life-threatening complications include Dyspnea that is shortness of breath, which affects 20 % of the patients. Dyspnea is commonly seen in patients who got tested positive after five to eight days after the initial onset of symptoms and the progression of disease from Dyspnea to Acute respiratory distress syndrome can be rapid within a couple of days. The onset of Dyspnea is considered to be the most important and alarming sign for hospital evaluation as well as for taking appropriate care and management. Covid associated lung infection: Pneumonia is considered to be the most common manifestation of a severe form of the disease. And acute respiratory distress syndrome develops in a sizeable minority of the symptomatic patients and can be associated with an exuberant inflammatory response which is characterized by fever, progressive hypoxia or hypotension, and markedly elevated inflammatory markers. so acute respiratory distress syndrome is the leading cause of death.



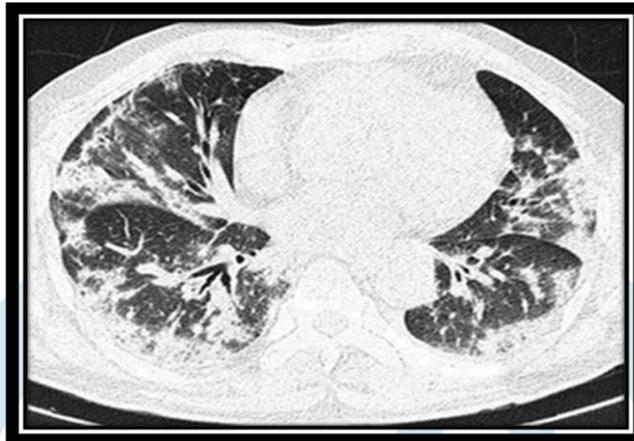
**Figure 3** “Patients with confirmed Coronavirus disease (COVID-19) Pneumonia is illustrated in Figure 2. Axial CT image shows vascular enlargement (arrow) in the right middle lobe in a 67-year-old man who had a fever of 8 days duration.”: (yin, 2020)



**Figure 2: FLOW DIAGRAM OF CLINICAL PRESENTATION OF FLU**

**CLINICALPRESENTATION OF FLU:**

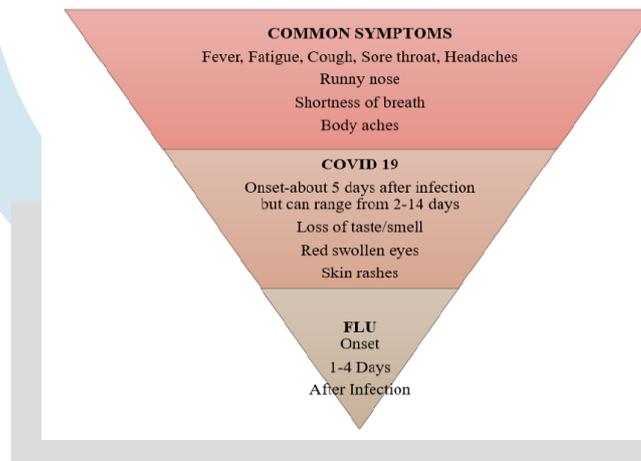
The above flow diagram explains the clinical presentation of flu, Influenza causes symptoms by stimulating the Innate immune system to produce pro-inflammatory Cytokines which accumulate in the lungs. Which causes constitutional symptoms like Fever, chills, myalgia, headache, and respiratory symptoms like cough, sore throat, rhinitis. People with more complicated cases show symptoms like Otitis media, Sinusitis, a sepsis type of syndrome, and even pneumonia.



**Figure 4** “Patients with diagnosed influenza A(H1N1) Pneumonia is illustrated in Figure 3. Axial CT image of a 61-year-old man with fever, cough, expectoration, of, of 5 days duration shows consolidation in both lungs. lesions are mainly peripherally distributed.”(yin, 2020)

**THE DILEMMA SURROUNDING COVID 19 AND FLU**

Even though COVID-19 and Flu show similar symptoms, few additional symptoms are seen in COVID-19 cases.



**Figure 5:** Pyramid illustrates how to identify COVID-19 and Flu by observing symptoms.

**FLORONA:**

Recently, Israel has recorded a rare mixture of two diseases: influenza and Coronavirus. It’s being called “flora “(flu -Corona). According to the Israeli newspaper, the first case was of a pregnant woman who was admitted to a hospital for delivery. the young woman was not vaccinated for both viruses. According to the Israeli Health Ministry, studies are being done to see whether a mixture of two infectious diseases can cause more serious diseases.it is said to be the major breakdown of one’s immunity as both the influenza virus and SARS-Cov-2 enter the body at the same time.(the indian express, 2022)

**METHODS OF DIAGNOSIS OF FLU:**

Methods of Diagnosis include a nasopharyngeal aspirate or swab; a nasal aspirate, wash or Swab; or throat swab can be used. Early detection of flu is better (first 3-4 days of illness). Diagnostic Tests include immunofluorescence test, Direct fluorescence antibody test, this test within 1-4 hours can detect other respiratory viruses. Polymerase chain reaction (PCR) test are considered to be the most sensitive and specific, detect viruses within 1-6 hours, and is used to determine subtype and strain. Hence is considered a new gold standard. Rapid antigen detection test is most rapid and shows results result within 30 minutes, this test shows a wide range in sensitivity (30-70%), false negatives problematic in the influenza season.

## METHODS OF DIAGNOSIS OF COVID-19:

There are two major types of COVID-19 test:(medical information illustrated by alila medical media, 2021)

1. Diagnostic tests for active infection
2. Antibody for past infection

Diagnostic tests for active infection: These diagnostic tests look for components of virus samples taken from the Nasal cavity, throat, and saliva. The sample taken from the Nasopharynx which is located in the upper part of the throat behind the nose is preferred when higher accuracy is required. There are two types of diagnostic tests, which include Molecular tests also known as nucleic acid amplification tests (NAAT) used for the detection of viral RNA, and Antigen tests used in the detection of Viral protein. Different tests are based on different technologies which include (Reverse transcription) and polymerase chain reaction (RT-PCR). Antibody/serology testing to check for further contamination: A blood sample is taken for this test as antibodies take several weeks to spread and can live in the blood for weeks or months even after recovery. A high-quality test result only proves that someone has been exposed to the virus. It no longer implies active infection and should no longer be used to diagnose COVID19 infection.

## MANAGEMENT OF INFLUENZA:

Mild Symptoms: For most patients with mild symptoms disease is self-limiting,so, the goal of nursing care is to increase ventilation, oxygenation and to provide supportive care. first, we have to regularly assess respiratory status,breath sounds and monitor the oxygenation,temperature.they require hydration and rest,encourage them to take a deep breath to improve oxygenation and cough.if patients show worsening cough,altered mental status,dyspnea,diffuse crackles on chest auscultation, and oxygen saturation drops below 94 % you need to notify the health care provider immediately as this is an indication that the disease is worsening. If you have a severe risk of complications, your doctor will prescribe an antiviral drug to treat the flu.these drugs include Oseltamivir, zanamivir, peramivir, baloxavir.these drugs may shorten your illness by a day and help to prevent serious complications. Neuraminidase inhibitor: this class of drug includes oseltamivir, Zanamivir, Laninamavir,peramivir.drug act by reduction of viral release from the infected cells. They show activity on influenza A and B viruses,show good tolerability. results in the emergence of resistant strains without cross-resistance between the drugs.Laninamavir and peramivir are used only in Japan,China,South Korea,and the USA. Adamantane derivatives: this class of drug includes rimantadine,amantadine. they act by preventing the uncoating of the virus protective shells, which are the envelope and capsid of influenza virus,they show limited activity on influenza A virus, poor tolerability,and emergence of resistance.no longer recommended starting from 2004 to 2005.

Baloxavir:The U.S food and drug Administration approved Xofluza on October 24,2018, for the treatment of acute uncomplicated influenza in patients 12 years of age and older who have been symptomatic for no more than 48 hours,this novel drug provides important additional treatment option.(FDA NEWS RELEASE, 2018) FDA Vaccines and Related Biological Products Advisory Committee on March 5,2021, met to select the Influenza viruses for the composition of the influenza vaccine for the 2021 -2022 U.S Influenza season,Influenza virus strains were selected based on Egg-based and Cell or recombinant based.

“The committee recommended that the quadrivalent formulation of egg-based influenza vaccines for the U.S.2020-2022 influenza season contain the following:

- 1.an A/Victoria/2570/2019(H1N1) pdmo9-like virus;
- 2.an A/Cambodia /eo826360/2020(H3N2)-like a virus;
- 3.a B/Washington/02/2019-like virus (B/Victoria lineage);
- 4.a B/Phuket/3073/2013-like virus (B/Yamagata lineage).

The committee recommended that the quadrivalent formulation of cell-or recombinant based influenza vaccines for the U.S.2021-2022 influenza season contains the following:

- 1.an A/Wisconsin /588/2019(H1N1) pdmo9-like virus;
- 2.an A/Cambodia/e0826360/2020(H3N2-like virus);
- 3.a B/Washington/02/2019-like virus (B/Victoria lineage);
- 4.a B/Phuket/3073/2013-like virus (B/Yamagata lineage).”(2021)

The doctor recommended that children should take Flu vaccines annually from 6 months old.the children age group between 6 months-8 years of age may need 2 doses for the best protection.

Centers for Disease Control and Prevention recommend a flu vaccine by the end of October.

Management Of COVID-19:the following are management of COVID-19 on different types of patients suffering from mild,moderate,severe cases of COVID-19,classification is based on saturation of oxygen and respiratory rate.

If saturation of oxygen (SpO2) is more than 94 % and respiratory rate is less than 24 per minute then the patient is a mild case, which can be treated at home and this is classified as no pneumonia.

If saturation of oxygen is 90-94 %, respiratory rate is 24 -30 per minute then the case is moderate, classified as pneumonia (++) .this patient should be hospitalized.

If the saturation of oxygen is less than 90% and the respiratory rate is more than 30 per minute this patient is severe and this patient needs continuous monitoring and treatment in ICU/hospital. And is classified as pneumonia (+++).

Investigation to be advised to any patient with COVID-19: need to perform Complete blood count (especially WBC count),C. Reactive protein,serum ferritin,LDH level,serum IL6 levels.among these Serum IL6 levels and Serum Ferritin is an important key to the diagnosis of COVID-19. Plasma D-dimer level is performed because there are chances that the patient has a clot in the blood,elevated plasma D-Dimer shows a clotting process is going on body. If the patient has Comorbidities (Diabetes, Hypertension, Dyslipidemia, Coronary artery disease) in this type of patient we need to perform additional tests like Serum Troponins levels, ECG, HBA1C, and lipid profile. Treatment Protocol:Mild (no pneumonia):Routine: is tablet Paracetamol 500mg three times daily to control the fever, anti-tussive to control cough,tablet Vitamin C 500 mg twice daily,vitamin C is anti-

oxidant which helps the body to recover from all oxidant damage has been done in the fight between COVID-19 and immune system. tablet zinc 50mg twice a day will boost the immune system. capsule omeprazole 20 mg twice a day is given to prevent stress ulcers, protect the stomach, and adequate hydration (oral). Antibiotics are given to prevent secondary bacterial infection, tablet Azithromycin 500mg once daily for 5 days or tablet Amoxiclav 625 mg twice daily for 5 days or tablet doxycycline 100mg twice a day for 5 days. Anti-coagulation like tablet Eliquis 2.5 mg twice a day for 7 days or tablet Clopidab. Once-daily for 7 days to prevent coagulation. steroids tablet Dexamethasone 8 mg per oral once daily for 5 days or tablet Medrol 16mg per oral for 5 days. In this case Oxygen support is not required. Moderate (pneumonia ++): the routine treatment is the same as in mild patients except hydration will be done with normal saline in IV fluid. tablet Azithromycin 500 mg once a day for 5 days in addition to this injection Ceftriaxone 1 gm IV twice a day is given if secondary bacterial infection is suspected. to prevent coagulation we give injection Enoxaparin 40 mg subcutaneous once daily for 7 days, it is contraindicated in end stage renal disease (avoid in patient with renal disease), in case of patient with End stage renal disease use unfractionated heparin 5000U subcutaneous twice a day. steroids in this case is given like in mild case but if patient is not getting better switch to IV dexamethasone. in this case oxygen support is required and target is to maintain oxygen saturation 92-96%, start with nasal Prongs 4 liter per minute and if patient is not getting better we have to use face mask which gives 5-10 L/min oxygen. If still patient is not getting better then we have to switch to Non-rebreather mask which gives 10-15L/min oxygen, if patient is not getting better by all this then we have to switch to High-Flow Nasal Cannula which gives 10-40 L/min oxygen. Severe (pneumonia +++): routine management will be the same as mild except in this we have to be slightly Conservative with fluids, a reason to be conservative during fluid administration because sometimes it happens that this fluid accumulates in already edematous lungs which can result in respiratory distress. if the patient is suffering from pulmonary edema, we have to stop the fluids. to fight against secondary bacterial infection tablet Azithromycin 500mg once a day for 5 days in addition to the injection of Piptaz 4.5mg/injection Meropenem 500 mg IV three times daily. In this case coagulation is prevented by using an anticoagulation drug that of moderate case. steroid in the severe case starts directly with an injection of Dexamethasone 0.2-0.4mg/kg IV twice a day for 10 days. In this case, we have to target oxygen saturation should be above 90%, in this case, we directly start with non-arebreather mask and if it doesn't work, we have to go for High-flow Cannula, in this case, there are chances that patient can develop respiratory distress syndrome then we have to initiate Acute respiratory distress protocol. Proning (position) is an important technique to improve oxygenation, one important drug used is injection Tocilizumab is an immunosuppressant monoclonal antibody, it binds to IL6 and suppresses the immune system, and protects the body from the damage done due to the immune system. Remdesivir is an important anti-viral drug that is used to treat COVID-19 patients, it inhibits viral proliferation. Several safe and effective vaccines prevent people from getting seriously ill or dying from COVID-19. As of 12 January 2022, WHO has elevated that the following vaccines against COVID-19 have met the necessary criteria for safety and efficacy; AstraZeneca/Oxford vaccine, Johnson and Johnson, Moderna, Pfizer, Sinopharm, Sinovac, Covaxin, Covovax, Nuvaxovid. (2022) Is it safe to get COVID and Flu shots at the same time? "The Centers for Disease Control and Prevention (CDC) has confirmed it's safe to get a flu shot and COVID vaccination in the same setting". (2022)

#### **Role of vaccine hesitancy in the risk of the Twindemic: (Coveney, 2021)**

Counselling bunch of specialists, as a "delay in acknowledgement The World Wellbeing Association, be that as it may, has detailed critical decays within the beneficiary of the COVID-19 vaccine, reflecting vaccine aversion. This can be characterized, by the Key or refusal of immunization despite the accessibility of inoculation services. Across the world, vaccine aversion has expanded with a decrease in inoculation rates which has driven an increment in the flare-up of vaccine-preventable diseases. As such, endeavors are critically required to handle antibody acknowledgement among the population over the world. A few suggestions to approach this incorporate organization of analysts and neighbourhood wellbeing to deliver socially touchy immunization instruction programs, make and convey instruction fabric, the utilize of reality sheets to anticipate deception and handle myths with respect to the COVID-19 and flu vaccines, and endeavors to guarantee that immunizations are similarly available.

#### **Global COVID-19 AND FLU UPDATE: (UK Health Security Agency, 2022)**

"Globally, up to 1 February 2022, a total of 376,524,274 cases of COVID-19 infection have been reported worldwide, including 5,671,610 COVID-19 related deaths. The WHO GISRS laboratories tested more than 317,198 specimens during the period 27 December 2021 to 9 January 2022. A total of 16,862 were positive for influenza viruses, of which 10,744 were typed as influenza A and 6,118 as Influenza B." (2022) Bracing for the storm: As we turn to the colder months and COVID-19 cases proceed to tick upwards, there's certainly a storm brewing, in expansion to proactive outreach to support flu inoculation rates and get at-risk patients back in for conceded care, healing centers, and wellbeing framework ought to too take time to optimize and finalize surge capacity plans, identify overflows, survey Individual Defensive gear and gear supply accessibility and availability, most vitally, they must have a reliable and straightforward communication pan in place. Through a multi-tiered and collaborative approach, clinic pioneers can work to guarantee that the idealize storm doesn't hit us head-on.

#### **Conclusion:**

By keeping up schedule sentinel observation, convenient and schedule announcing, Proceeding with COVID-19 observation methodologies, prioritizing testing, taking after vital COVID-19 avoidance measures like remaining separated, clean hand regularly keeping up a least physical separate off at slightest 1 meter from others, employing a therapeutic /surgical cover and straightforward communication and information emic administration, Exploring This storm will require healthcare pioneers to lock in in shrewd and proactive patients outreach programs, both to moderate the impacts on the Regular flu and to bring patients, particularly those were are most at hazard, back for elective care.

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