ORIGINAL RESEARCH PAPER
Volume - 11 | Issue - 05 | May - 2022 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

INFLUENZA AMIDST THE COVID-19 PANDEMIC : A DECLINING TREND

Microbiology

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ABSTRACT

Background: During the SARS Cov-2 pandemic, a dramatic decrease in seasonal influenza virus cases was noticed all over the world. That might partly because of fewer attendances of patients to a clinic for testing and as experts says, it was also attributable to the effectiveness of policies such as social distancing, hand sanitization, use of facial musk etc during the pandemic period.
Aims: This study was aimed to find out the incidence of Influenza A and B with subsequent sub-typing of Influenza A (H1N1 pdm09 and H3N2) among hospital admitted ILI/SARI cases during COVID-19 pandemic.
Methodology: 200 Nasopharyngeal and Oropharyngeal swabs were collected from hospital admitted ILI/SARI patients in sterile viral transport medium (VTM) and RNA were extracted. Those 200 RNA samples were subjected to real time RT PCR for Influenza A and B virus detection and subsequent subtyping of Influenza A using VIASURE Flu A+B Real Time PCR Detection Kit and VIASURE Flu Typing 1 Real Time PCR Detection Kit.
Results: Out of the 200 NP/OP samples tested, 17 (8.5%) were positive for Influenza virus among which 13 (76.47%) and 4 (23.53%) were positive for Influenza A and Influenza B virus respectively. Most of the cases were detected during monsoon (July-September) with slight male preponderance. **Conclusion:** Dramatic reduction of Influenza cases was noticed during the COVID-19 pandemic. This significant decrease is probably due to public health interventions implemented during the pandemic. Possibilities of viral interference can be another important cause.

KEYWORDS

Influenza, SARS CoV-2, SARI, ILI

INTRODUCTION

SARS Cov-2 and Influenza, both are contagious respiratory pathogens sharing similar modes of transmission and clinical features with exception of loss of taste and smell sensation that is more predominantly noticed in SARS CoV-2 infection. Both the diseases can present as a wide range of illness from asymptomatic and mild to severe life threatening condition, even death. [1] Only diagnostic testing can distinguish between the two infections and help to guide the clinicians regarding the treatment of the patients. Though Covid-19 continues to sweep the world causing infection and death in millions, other causes of respiratory infections like Influenza should also be taken into consideration for patients with acute respiratory illness. Influenza cases are generally monitored through influenza-like illness (ILI) and severe acute respiratory infections (SARI) sentinel surveillance systems. Multiple drugs are being investigated for COVID-19, but none have been approved for treatment till date. [2] On the other hand there are proper anti-viral available for Influenza which can prevent undue complications and subsequent death if started in early stage of disease. Therefore, every attempt should be made to detect Influenza among SARI and ILI cases even during the SARS CoV-2 pandemic so that the patients can be treated effectively in time.

In early 2020, a sharp decline in seasonal influenza cases were noticed in several Asian countries of Northern Hemisphere and the United States. [3,4,5,6] Similarly, countries of Southern Hemisphere like Australia, South Africa, New Zealand and Chile reported similar observations during the influenza season, i.e. from April to September. [7,8,9]

India is a tropical country in Northern Hemisphere and since the 2009 Influenza pandemic, the country has seen a steady number of Influenza cases in both winter and post monsoon season. But the exact scenario of Influenza infection amidst this pandemic situation in India has not been widely reported.

Community mitigation measures like frequent hand washing, use of masks and maintenance of social distance has been implemented in India to control the pandemic of SARS-CoV-2which may have positive impact in controlling the transmission of Influenza virus. [3,7,9]

But further exploration of influenza prevalence and seasonality in the context of SARS-CoV-2 interventions may improve our understanding of how these interventions may impact seasonal influenza transmission.

METHODOLOGY:

Study place and design:

A hospital based retrospective cross-sectional study was conducted at School of Tropical Medicine, Kolkata, West Bengal. Approval of the study was obtained from the Institutional Scientific and Ethical committee.

Study population:

200 Nasopharyngeal and Oropharyngeal NP/OP samples from hospital-admitted patients presenting with ILI (Influenza like symptoms) or SARI (Severe Acute Respiratory Illness) over a period of seven months from April 2020 to October 2020 were included in this study.

METHODS:

Initially (NP/OP) swabs were collected from all ILI/SARI patients admitted in hospital during the afore-said period in sterile viral transport medium (VTM) and transported maintaining cold chain to the Virology Unit, Department of Microbiology, STM, Kolkata. Following manufacturer guidelines, Viral RNA was extracted using QIAamp Viral RNA Mini Kit by QIAGEN and stored at -20 0 C refrigerator for future uses. Thereafter 200 RNA samples were randomly selected and subjected to real time RT PCR for Influenza A and B viruses using VIASURE Flu A+B Real Time PCR Detection Kits (CerTest BIOTEC) . Influenza A positive samples were further subtyped for Influenza A H1N1 and Influenza A H3N2 using

VIASURE Flu Typing 1 Real Time PCR Detection Kit (CerTest BIOTEC).

STATISTICALANALYSIS:

Detailed history regarding clinical feature, complication, duration of hospital stay etc were taken from patients/patients parties (in case of minor and seriously ill patients). All information was collected via telephonic conversation amidst the ongoing SARS CoV-2 pandemic and collected data were analysed and interpreted.

RESULTS:

Among 200 NP/OP samples tested, 17 (8.5%) were positive for Influenza virus [Fig:- 1]. Ten (58.82%) out of the these 17 Influenza positive cases were male and seven (41.18%) were female. Most of the positive cases belonged to the age group above 45 years. Youngest patient was an eight months old boy while the age of oldest patient was 82 years.

Majority of influenza cases in our study were reported during monsoon (July-September). Among those 17 positive samples 13 (76%) were found having Influenza A infection and rest 4 (24%) samples were detected positive for Influenza B.[Fig:- 2] Most common subtype of Influenza A virus was H3N2, detected in 11 (84.62%) patients and rest 2(15.38%) patient was suffering from Influenza A subtype H1N1 [Fig:- 3].

Most common symptom was fever (100%), followed by malaise (94.11%), headache (88.23%), rhinorrhea (82.35%), cough (82.35%), sore throat (64.7%), Shortness of Breath (64.7%) and pain abdomen (5.88%).[Table-1]

Three among the four patients who were detected having Influenza B infection, were young adults (mean age = 34 years). Only one patient aged 73 years, with associated co- morbidities like HTN and COPD, complained of shortness of breath that delayed his recovery.

Most common co-morbid condition was Diabetes Mellitus detected in 4 (23.53%) patients. Other co- morbid conditions were COPD, Hypertension and hypothyroidism seen among three (17.65%), two (11.76%) and one (5.88%) patient respectively.

Mean duration of hospital stay was 7 days (maximum duration of hospital stay was 20 days and minimum duration was 3 days).

All patients were treated with Oseltamivir and supportive management and recovered.

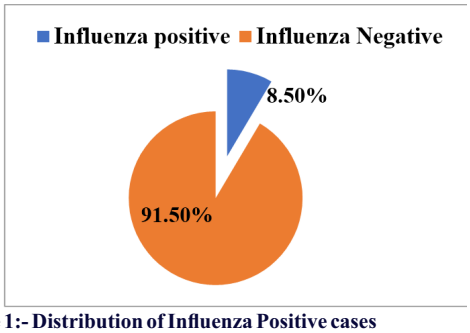

Figure 1:- Distribution of Influenza Positive cases

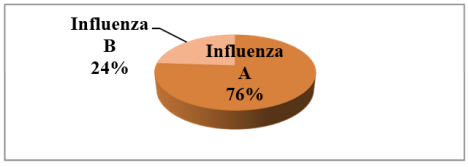

Figure 2:- Distribution of Influenza A+B cases

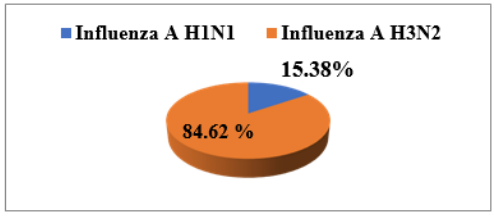

Figure 3:- Distribution of Influenza A Subtypes (H1N1 and H3N2)

Table 1:- Common Clinical Features of Influenza cases

Clinical features	No of patient	Percentage (%)
Fever	17	100
Malaise	16	94.11
Headache	15	88.23
Rhinorrhea	14	82.35
Cough	14	82.35
Sore throat	11	64.7
SOB	11	64.7
GI symptoms	1	5.88

DISCUSSION:

The emergence of SARS CoV-2 infection is an unparalleled global health event resulting in unprecedented simultaneous implementation of a number of Non-Pharmaceutical Interventions (NPI) worldwide. [10] In January 2020, WHO declared SARS CoV-2 as a Public Health Emergency of International Concern (PHEIC). Amidst this pandemic situation, a hospital based retrospective cross-sectional observational study was conducted on 200 patients presenting with ILI /SARI over a period of seven months from April 2020 to October 2020. Main aim of the study was to observe impact of the COVID-19 pandemic on seasonal influenza. Among the 200 NP/OP samples tested for Influenza RNA, only 17 (8.5%) samples were detected positive which is quite low in respect of a similar study conducted by Nagaraja et. al. [11] in Andhra Pradesh during 2017-2018. Such a dramatic decline in Influenza positive cases may be attributed to all those Non Pharmaceutical Interventions including maintenance of social distancing, use of mask and proper hand washing and hand sanitization etc taken during the pandemic. Furthermore, only hospital admitted SARI/ILI patients were included in this present study. Less severe Influenza cases not requiring hospitalization were not included. And it is possible that a change in health seeking behavior or decreased trend of inpatient admission in COVID-19 pandemic scenario have confounded the influenza positivity rates.

In our study, the most common age group affected was (46-60) years and above 60 years which corroborate with the findings of Prasad et. al. [12] , Kshatriya et. al. [13] and Mukherjee et.al. [14] In contrast, younger age group was found to be affected more in the studies conducted by Sardar et.al. [15] and by Nagaraja et al[11]

There was male preponderance (male - 58.82%, female - 40.18 %) in our study which matched with the previous studies [15,16]. Such a finding can be explained by more outdoor exposure of male persons particularly during the partial/ complete lockdown period of SARS CoV-2 pandemic.

Majority of influenza cases in our study were reported during monsoon (July-September) which matches with the findings of the study conducted by Chadha et. al. [17]

Most common symptom was fever (100%), followed by malaise (94.11%), headache (88.23%), rhinorrhea (82.35%), cough (82.35%), sore throat (64.7%), Shortness of Breath (64.7%) and pain abdomen (5.88%) which showed a wide range of variation from time to time and in different studies.

Among 17 Influenza (A+B) positive cases, 4 (23.53%) patients were detected positive for Influenza B. Influenza B infection was more common in our study in comparison to the study by Nagaraja et al [11] where it was only 3.6%.

Influenza B was generally associated with milder symptoms like rhinorrhea, malaise, fever etc Among 13 Influenza A cases; 11(84.62%) patients had H2N3 and 2(15.38%) patients had H1N1infection.Two children aged 8 months and 2 years were infected by H1N1 and presented with high grade fever (≥102ºF) and shortness of breath requiring oxygen therapy. The younger patient had to be shifted to Paediatric Intensive Care Unit (PICU) for further management and the mean hospital stay of these two children was 9.5 days.

Common presenting symptoms among those 11 patients suffering from H3N2 had high grade fever, malaise and cough. Three out of the 11 patients required admission in Critical Care Unit which can be explained by their advanced age (>60 years) and associated co-morbidities like HTN, DM, COPD. Only one patient suffering from Influenza A subtype H3N2 presented with GI symptoms like diarrhea and pain abdomen.

Out of 17 Influenza cases, 4 (23.53%) patients required admission in CCU. All of them belonged to extreme age groups (one was 8 months old child and rest three patient were above 60 years). All three adult patients had history of associated co- morbidities like Diabetes mellitus, COPD and hypertension and were affected by Influenza A, H3N2.

CONCLUSION:

In our study significant reduction of Influenza cases has been noticed which may be due to public health interventions implemented during the COVID-19 pandemic. Though more cases were reported for influenza A H3N2 but circulation of Influenza B in West Bengal was also noticed. Seasonal trend was observed during monsoon (July-September). Young children and adult were the two age groups most affected and disease outcome was directly proportionate with extreme age groups and associated co-morbidities like Diabetes Mellitus, Chronic Lung disease, Hypertension etc.

ACKNOWLEDGEMENT:

The authors acknowledge Prof (Dr) Subhasish Kamal Guha, Director, STM, Prof (Dr) Pratip Kundu Ex - Director, STM and Prof (Dr) Banya Chakraborty and all the staff of Virology Unit, STM for their enormous support.

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