ISSN: 2377-6196
The American Journal of
SCIENCE AND MEDICAL RESEARCH, 2(2), 179-182

Research Article Open Access

Epidemiological and Clinical Assessment of Influenza-Like Illness Patients at Gandhi Hospital from 2009 to 2012

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Abstract

This study investigates the epidemiological and clinical characteristics of influenza-like illness (ILI) patients at Gandhi Hospital from 2009 to 2012, a period that included the H1N1 pandemic. A total of 1,239 patients were admitted with ILI symptoms, of whom 288 were confirmed as H1N1-positive, exhibiting a mortality rate of 10%. The majority of H1N1 cases occurred in individuals aged 30-45, with females comprising 60.1% of patients. Common symptoms included fever (98.2%) and cough (95.3%), while comorbid conditions, primarily COPD/asthma, were noted in 20.48% of cases. In contrast, non-H1N1 patients (951 cases) had a slightly higher mortality rate of 12%, with a greater prevalence of comorbidities (36.17%). The study utilized comprehensive assessments, including clinical, radiological, and laboratory evaluations, to compare outcomes and inform future public health strategies. Results underscore the need for effective management of ILI, particularly in high-risk groups, and highlight the impact of underlying health conditions on patient outcomes, emphasizing the importance of preparedness for future influenza outbreaks.

Key words - *Influenza-like illness (ILI), H1N1 pandemic, Epidemiology, Mortality rate Comorbidities*.

INTRODUCTION

Influenza-like illnesses (ILI) are characterized by a sudden onset of symptoms such as fever, cough, sore throat, and muscle aches. These symptoms can be caused by a variety of respiratory pathogens, including influenza viruses, and often lead to a high rate of morbidity and, in severe cases, mortality. Influenza, in particular, can cause annual seasonal outbreaks and, occasionally, more severe pandemics, which place significant strain on healthcare systems worldwide. Understanding the clinical characteristics (Figure-1) and epidemiology of ILI cases is essential for effective patient management, resource allocation, and public health response.

How to Cite this Article:
Muttineni Radha Krishna, Trilok Chander Bingi (2016). Epidemiological and Clinical Assessment of Influenza-Like Illness Patients at Gandhi Hospital from 2009 to 2012,*2*(2):179-182. Doi: 10.5281/zenodo.14075434 .

Received 25 April, 2016; Accepted 29 May, 2016; Published online 25 June, 2016

The period from 2009 to 2012 was especially significant for influenza surveillance in India, as it included the global H1N1 influenza pandemic that began in 2009. The H1N1 pandemic highlighted the critical need for early detection, timely intervention, and effective management strategies for influenza and other respiratory infections. Gandhi Hospital, a major tertiary care centre, became one of the frontline hospitals in the region for managing suspected and confirmed cases of ILI, providing a unique setting to study the clinical and epidemiological features of these illnesses.

MATERIALS AND METHODS

This retrospective study was conducted at Gandhi Hospital, where patients with suspected influenza-like illness requiring hospitalization were admitted from 2009 to 2012. The study involved a detailed examination of epidemiological, clinical, and radiological data for each patient. Patients included in this study presented with symptoms consistent with influenza-like illness, such as fever, cough, sore throat, and other respiratory or systemic symptoms, which necessitated hospital

admission. A total of 1,239 patients met the inclusion criteria during the study period. Demographic and clinical data were collected from medical records, including age, gender, presenting symptoms, comorbidities, and clinical outcomes. Additional data were gathered on radiological findings, laboratory results, and treatments provided. Laboratory testing was conducted for each patient, starting with throat and nasal swabs collected on admission for molecular testing. Swabs were processed for influenza A virus detection, including specific subtypes such as Swine Influenza A (Sw.Inf A) and Swine Influenza H1 (Sw.Inf H1). Real-time reverse transcriptase polymerase chain reaction (RT-PCR) testing was performed using the TaqMan real-time PCR assay following the CDC protocol, chosen for its high sensitivity and specificity in detecting influenza viruses and subtypes, allowing accurate differentiation between H1N1 and non-H1N1 cases (Wang R et al 2010) Sputum and blood cultures were also performed to assess for bacterial co-infections, common in cases of influenza-like illness, which could influence disease severity and treatment outcomes by identifying cases of bacterial pneumonia and other bacterial infections. Each patient underwent radiological imaging as part of the clinical workup, including chest X-rays, and, in selected cases, chest CT scans. Radiological findings were reviewed to assess the presence and extent of pulmonary involvement, looking for patterns indicative of viral or bacterial pneumonia. All patients received empirical antiviral therapy with oseltamivir, initiated promptly after sample collection, in accordance with treatment guidelines for suspected influenza cases. Additional treatments, including antibiotics, were administered as needed based on clinical and laboratory findings, especially for patients with confirmed bacterial co-infections.

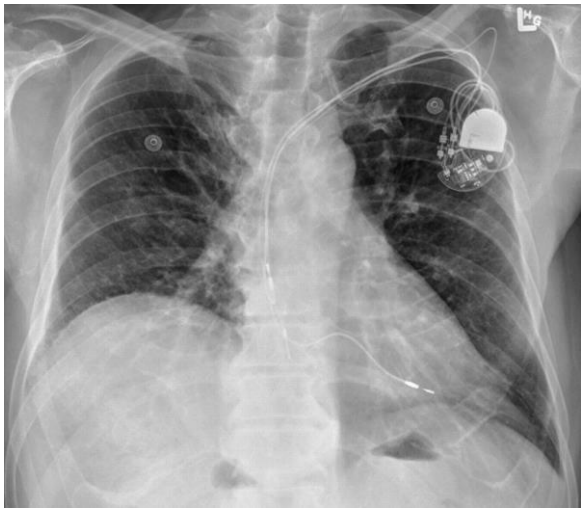

Figure-1. Clinical Characteristics of H1N1
(Source: https://doi.org/10.2214/AJR.09.3625)

RESULTS

During the period 2009-2012, a total of 1,239 patients with influenza-like illness were admitted to Gandhi Hospital. Out of these, 288 cases were confirmed as H1N1-positive, with a mortality rate of 10% (29 deaths), while the remaining 951 cases were non-H1N1, showing a mortality rate of 12% (115 deaths). Among H1N1-positive cases, most patients (39.9%) were in the age group of 30-45 years, and females were more affected than males, accounting for 60.1% of cases. Fever was the most common presenting symptom, occurring in 98.2% of cases, followed by cough, which was observed in 95.3% of cases. A smaller proportion of patients, about 10.06%, presented with diarrhea. Comorbid conditions were noted in 59 patients (20.48%), with COPD/asthma being the most common at 8.7%. Pregnant women with H1N1 had a significantly high mortality rate, with all cases resulting in death. The average hospital stay for H1N1-positive patients was 9 days, and 45 patients required mechanical ventilation. The overall mortality rate for H1N1-positive cases was 10.06%, and the most commonly affected lung region was the lower zone with bilateral involvement.

In non-H1N1 cases, the majority of patients, 72.9%, were in the age group of 20-45 years, with a nearly balanced gender distribution of 55% females and 45% males. Fever was the most common symptom, reported in 96% of cases, and cough was also prevalent at 95.3%. Comorbid conditions were more frequent in non-H1N1 cases, with 344 patients (36.17%) having underlying health issues, primarily COPD/asthma at 13.45%. Pregnancy was not associated with high mortality in non-H1N1 cases, contrasting with the H1N1-positive cases. The average length of stay for non-H1N1 cases was 12 days, and a higher number of patients, 180, required mechanical ventilation. The mortality rate in non-H1N1 cases was 12.09%, slightly higher than in H1N1-positive cases. Similar to H1N1 cases, the lower lung zone with bilateral involvement was the most commonly affected region.

Overall, non-H1N1 cases demonstrated a slightly higher mortality rate of 12% compared to H1N1 cases at 10%. Comorbid conditions, especially COPD/asthma, were more prevalent among non-H1N1 patients. Non-H1N1 cases also had a higher demand for mechanical ventilation compared to H1N1-positive cases. While both categories showed a higher incidence among females, pregnancy in H1N1-positive cases was associated with a particularly high mortality rate, unlike in non-H1N1 cases.

DISCUSSION

The findings of this study contribute to our understanding of influenza-like illness (ILI) presentations and outcomes during the 2009-2012 period, highlighting important differences between H1N1 and non-H1N1 cases. Influenza-like illnesses present significant challenges in clinical settings, particularly during peak influenza seasons when hospitals experience high patient loads. Our analysis of 1,239 ILI cases at Gandhi Hospital provides a comprehensive overview of epidemiological,

clinical, and radiological characteristics, as well as outcomes, with implications for management strategies in future influenza outbreaks.

The observed higher incidence of H1N1 cases among females (60.1%) aligns with other studies that have reported similar gender-related differences in H1N1 infection susceptibility. Possible explanations include hormonal and immune response differences between genders, which may make females more susceptible to respiratory infections (Klein & Flanagan, 2016)finally, the high mortality rate among pregnant women with H1N1 (100% mortality in this study) underscores the particular vulnerability of this population to severe influenza complications. This finding is consistent with prior research, which has shown that pregnancy is associated with increased risks of severe disease and mortality due to immunologic and physiologic changes that occur during pregnancy (Jamieson et al., 2009; Rasmussen et al., 2012) .

The patients affected in both H1N1 and non-H1N1 cases was 20-45 years, with H1N1 cases showing a slightly older demographic, concentrated between 30-45 years. This is noteworthy, as seasonal influenza typically affects the very young and elderly disproportionately, whereas pandemic strains like H1N1 often exhibit a "W-shaped" curve, disproportionately impacting younger adults (Vaillant et al., 2009) . This trend could be attributes lack of pre-existing immunity in younger populations, contrasting with older individuals who may have some immunity due to exposure to similar influenza strains in the past (Hsieh, YH., 2010)

Clinical presentation in both H1N1, Non H1N1 groups was largely similar, with fever and cough being the most common symptoms, observed in over 95% of cases. This aligns with standard ILI symptomatology and confirms the diagnostic challenges faced by clinicians, as symptoms alone may not reliably distinguish between influenza subtypes (Mughini-Gras L 2016). Diarrhoea, observed in 10.06% of H1N1 cases that has been variably reported in other studies of H1N1 but is less common in non-pandemic influenza strains, indicating that gastrointestinal symptoms could offer some diagnostic clues in suspected H1N1 cases (Minodier L 2015).

Comorbidities were more prevalent among non-H1N1 (7%) compared to H1N1 cases (20.48%), with chronic obstructive pulmonary disease (COPD) and asthma being the most common in both groups. Comorbidities like COPD and asthma have been well-documented to increase the risk of severe respiratory infections, as they impair lung function and immune response (O'Donnell & Laveneziana, 2007) .

This underscores the importance of managing chronic respirations proactively, especially during flu seasons, to reduce ILI-related hospitalizations and complications. Radiological findings indicated a high rate of lower-zone, bilateral lung involvement in both H1N1 and non-H1N1 cases, which aligns with findings from other studies of severe influenza pneumonia (Koo et al., 2018). Such findings are indicative of widespread lung involvement, often pneumonias, and can help guide treatment decisions, including the initiation of advanced respiratory support when necessary. In our study, 45 H1N1 cases and 180 non-H1N1 cases required mechanical ventilation, with the higher ventilation requirement in non-H1N1 cases possibly reflecting the higher prevalence of comorbid conditions in this group.

The difference in average hospital stay—9 days for H1N1 cases and 12 days for non-H1N1 cases may be attributed to the relatively higher prevalence of comorbidities among non-H1N1 patients, which could prolong recovery and complicate treatment. However, mortality was slightly higher in non-H1N1 cases (12.09%) compared to H1N1 cases (10.06%). This is in line with some studies that suggest non-pandemic influenza can also lead to significant morbidity and mortality, especially in the presence of comorbid conditions (Thompson et al., 2003) . The data indicate that, while H1N1 is associated with high mortality, particularly pregnant women, non-H1N1 cases are equally challenging to manage, particularly due to the complexity of comorbid conditions.

In conclusion, the findings underscore the need for vigilance and preparedness in managing ILI cases, with special attention to vulnerable groups such as pregnant women and those with chronic respiratory conditions. Rapid testing, timely antiviral therapy, and supportive care are critical to reducing mortality in influenza pandemics and seasonal outbreaks. Future research could further explore the role of gender and comorbidities in influenza outcomes, and policymakers should consider strategies to ensure high-risk groups are prioritized in vaccination and treatment protocols.

Conclusion

The findings underscore the need for vigilance and preparedness in managing ILI cases, with special attention to vulnerable groups such as pregnant women and those with chronic respiratory conditions. Rapid testing, timely antiviral therapy, and supportive care are critical to reducing mortality in influenza pandemics and seasonal outbreaks. Future research could further explore the role of gender and comorbidities in influenza outcomes, and policymakers should consider strategies to ensure high-risk groups are prioritized in vaccination and treatment protocols

Acknowledgement

We extend our heartfelt thanks to the Superintendent of Gandhi Medical College and Hospital for their invaluable support and cooperation in facilitating this work. Their assistance has been instrumental in enabling us to

conduct our research effectively, and we are deeply grateful for their commitment to advancing healthcare and academic collaboration.

Competing interests

The authors have declared that no competing interests exist.

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