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# Human Influenza Virus Infection in Pediatric Population - A Hospital based Study

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## Abstract

**Objective:** To calculate the number and type of influenza affected children who presents with acute respiratory illness and seizures.

**Design:** A prospective study is carried out between the ages of 1 to 12 years who are admitted in pediatrics department of a tertiary hospital. These patients present with acute respiratory illness and/or febrile seizures. Nasopharyngeal and throat swab are collected and sent to the specialized hospital for isolation of the influenza virus.

**Results:** Total 560 suspected samples are collected in this age group, Majority samples are from the age group < 5 years. It is 487 in number. Rest in the age group 5 to 12 years. Influenza is isolated total 47 samples in both the groups. Influenza is most commonly isolated in the age group < 5 years and it is 34 in number. Influenza A is the most commonly observed virus in both the groups. It is found total 34 among these samples. 13 has influenza B in both the groups. May to September is the most vulnerable months in which children are affected by the influenza.

**Conclusion:** In our study influenza is observed most commonly in young children. Influenza A is the main isolates affecting the children. Seasonal variability of the infection is also observed. We must take special care to prevent the children from this infection by personal care, hygiene and also by vaccination particularly against the influenza A.

***Keywords:*** *Influenza Virus; Pediatric Population; Hospital Study*

## Introduction

Influenza is an important cause of morbidity and mortality worldwide [1]. It annually infects 5 - 15% of the global population, resulting in an estimated 250,000 to 500,000 deaths per year [2,3]. 90 million children younger than 5 years of age are infected with influenza globally [4]. Complication of influenza which causes hospitalization are a serious public health concern. Majority of influenza related hospital admission are due to respiratory or neurological complications: pneumonia, febrile seizure, acute respiratory failure, acute respiratory distress syndrome (ARDS) and encephalitis/encephalopathy [5-9]. In Bangladesh ARI is a major cause of death among children aged < 5 years where approximately 50,000 children die annually from pneumonia [10,11]. Influenza is a major cause of acute respiratory illness in children of Bangladesh. Most of the known risk factors for the respiratory illness are malnutrition, low birth weight, poor air quality, lack of exclusive breast feeding and overcrowding [11,12].

We conducted a hospital based study to isolate the influenza virus and to review the clinical scenario of the acute respiratory illness in children caused by the influenza.

## Patients and Methods

Children aged 5 - 12 years were included in this study. The study period was between January 2011 to December 2018. Case definition of severe acute respiratory illness for patients aged 5 to 12 years were hospitalized patients with history of fever or measured fever within 7 days and cough. For the age < 5 years, case was defined as hospitalized patients with cough or difficulty in breathing and chest in drawing or stridor in calm child or history of convulsion or not able to drink or lethargic or unconscious or vomits everything. Once a patients were included they were evaluated each day by the surveillance physician during their entire hospital stay to monitor the clinical scenario and recorded accordingly.

The surveillance physician obtained written informed consent and collected a throat swab and a nasopharyngeal swab specimen (two distinct specimen). The field assistants assisted in sample collection and transported those to the ICDDRB laboratory. After collection the samples were kept in iceboxes in appropriate viral transport medicine (VTM) supplied by ICDDRB. The field assistants stored the samples in dry shippers at or below -70°C temperature within 72 hours and transported to ICDDRB laboratory. Scientist and research officers at ICDDRB virology laboratory tested the collected specimens for the presence of influenza by real time reverse transcriptase polymerase chain reaction (rRT-PCR).

The clinical data and reports were finally analyzed.

## Results

Total 560 cases were included in this study. 487 were below 5 years of age. Rest 73 were within 5 to 12 years of age. Among the age group < 5 years, flu was detected in 34 (7%) and 13 (18%) was in 5 to 12 years of age. Table 1 showed the age distribution of cases to whom the samples were collected.

| Age group | Sample | Percentage (%) |
|---|---|---|
| < 1 year | 349 | 62 |
| 1 - 5 years | 138 | 25 |
| 5 - 10 years | 48 | 9 |
| 10 - 12 years | 25 | 4 |
| Total | 560 | 100 |

***Table 1**: Age group of the sample collected in suspected cases.*

Influenza A, Influenza B was found 27 (79%) and 7 (21%), 7 (54%), 6 (46%) among the children aged < 5 years and 5 to 12 years respectively. Among Influenza A, a (h3) was found in 13 (48%) and a (h1n1) pdm 09 in 14 (52%) in the age group < 5 years. In the age group 5 to 12 years a (h3) was found in 5 (71%) and a (h1n1) pdm 09 in 2 (29%) children. Table 2 depicts the type of influenza detected in the samples.

| Age group | Sample | Flu | Influenza A | Sub type Influenza A | | Influenza B |
|---|---|---|---|---|---|---|
| | | | | a (h3) | a (h1n1)pdm | |
| < 5 years | 487 | 34 (7) | 27 (79) | 13 (48) | 14 (52) | 7 (21) |
| 5 - 12 years | 73 | 13 (18) | 7 (54) | 5 (71) | 2 (29) | 6 (46) |

***Table 2:** Type of influenza isolated in samples.*
*Figure within the parenthesis indicate percentage.*

Common presenting symptom/signs affecting influenza for the age group < 5 years was cough (95%), chest in drawing (84%), difficulty in breathing (83%), fever (82%), Vomiting (47%), unable to drink (20%), and runny nose (19%). For the age group 5 to 12 years presenting symptoms were fever (100%), cough (100%), difficulty in breathing (35%), and runny nose (15%). Table 3 explained the features to whom the samples were collected.

| Age group | Cough | Chest in drawing | Difficulty in breathing | Fever | Vomiting | Unable to drink | Runny nose |
|---|---|---|---|---|---|---|---|
| < 5 years | (95%) | 84 | (83) | (82) | (47) | (20) | (19) |
| 5 - 12 years | (100) | (00) | (35) | (100) | - | - | (15) |

***Table 3:*** *Presenting features of the suspected cases.*
*Figure within the parenthesis indicate percentage.*

Total death among these children was 6 (1%). May to September months were the vulnerable months affecting most children with influenza in this study.

## Discussion

This hospital based study in pediatric age group showed the evidence of Influenza A more than the Influenza B infection. Principi N., *et al*. reported the similar observation among the influenza infections. We found significant isolation of influenza infection at the age group < 5 years. Among these Influenza A was the main isolates like other studies. The other study found Influenza B at the older age group [13]. Fever, cough, and respiratory distress was the marked symptoms in most of the children < 5 years of age but 100% of children between the age 5 to 12 years presented with cough in our study. In other study, fever was the main symptom in influenza infection in all groups. Early peak influenza activity was detected in the month between May to September in our study. Other study had similar peak incidence of influenza activity [14].

The influenza can cause relevant social problem, mussing the school days and significant morbidity among the children. To reduce the influenza sick children, prevalence of hospitalization and to prevent the missing school days of children, influenza vaccination is required particularly against influenza A infection.

## Conclusion

In our study influenza is observed most commonly in young children. Influenza A is the main isolates affecting the children. Seasonal variability of the infection is also observed. We must take special care to prevent the children from this infection by personal care, hygiene and also by vaccination particularly against the influenza A.

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## Conflict of Interest

There is no conflict of interest in this study.

## Bibliography

1. Baumgartner EA., *et al.* "Incidence of influenza-like illness and severe acute respiratory infection during three influenza seasons in Bangladesh, 2008-2010". *Bulletin of the World Health Organization* 90 (2012): 12-19.

2. WHO. Influenza. Fact sheet N (2003): 211.

3. Nicholson KG., *et al.* "Influenza". *Lancet* 362.9397 (2003): 1733-1745.

4. Yokomichi H., *et al.* "Incidence of hospitalization for severe complications of influenza virus infection in Japanese patients between 2012-2016: a cross-sectional study using routinely collected administrative data". *BMJ Open* 9 (2019): e024687.

5. Thompson WW., *et al.* "Influenza-associated hospitalization in the united States". *The Journal of the American Medical Association* 292 (2004): 1333-1340.

6. Newland JG., *et al.* "Neurologic complications in children hospitalized with influenza: Characterstic, incidence, and risk factors". *The Journal of Pediatrics* 150 (2007): 306-310.

7. Sugaya N., *et al.* "Very low pandemic influenza A (H1N1) 2009 mortality associated with early neuroaminidase inhibitor treatment in Japan: analysis of 1000 hospitalized children". *Journal of Infection* 63 (2011): 288-294.

8. Influenza Working Group of the Japan Pediatric Society. Secondary treatment guideline of 2013/2014 influenza infection". Japanese: influenza working group of the Japan Pediatric Society (2014).

9. Cromer D., *et al.* "The burden of influenza in England by age and clinical risk group: a statistical analysis to inform vaccine policy". *Journal of Infection* 68 (2014): 363-371.

10. National Institute of Population Research and training (NIPORT), Mitra and Associate, ORC Macro (2005) Bangladesh Demographic and Health Survey 2004. Dhaka, Bangladesh and Calverton, Maryland (USA): National Institute of Population Research and Training, Mitra and Associates, and ORC Macro (2005).

11. Rudan I., *et al.* "Epidemiology and etiology of childhood pneumonia". *Bulletin of the World Health Organization* 86 (2008): 408-416.

12. National Institute of Population Research and training (NIPORT), Mitra and Associate, ORC Macro (2009) Bangladesh Demographic and Health Survey 2007. Dhaka, Bangladesh and Calverton, Maryland (USA): National Institute of Population Research and Training, Mitra and Associates, and ORC Macro (2009).

13. Principi N., *et al.* "Barden of influenza in healthy children and their households". *Archives of Disease in Childhood* 89.11 (2019): 1002-1007.

14. Siddhartha S., *et al.* "Influenza seasonality and vaccination timing in tropical and subtropical areas of southern and south-eastern Asia". *Bulletin of the World Health Organization* 92 (2014): 318-330.

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