Ref: Ro J Infect Dis. 2024;27(2)
DOI: 10.37897/RJID.2024.2.4

Clinico-epidemiological features of influenza in children in the 2023-2024 season

Gheorghita Jugulete[1,2], Mihaela Safta[2], Elena Gheorghe[2], Bianca Borcos[2], Luminita Bajenaru[1,2], Luciana Zah[2], Delia Negrea[2], Anamaria Popescu[2], Madalina Maria Merisescu[1,2]

[1]University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania
[2]National Institute for Infectious Disease "Prof. Dr. Matei Balș", Bucharest, Romania

ABSTRACT

Seasonal respiratory illnesses are the main cause of morbidity during the cold season of the year both in adults and especially in children due to clinical and epidemiological peculiarities. Influenza is one of the most important seasonal diseases causing numerous illnesses every year among the population at risk (young children, adults with comorbidities, and the elderly).

In this paper we present the clinico-epidemiological features of influenza in children admitted to the National Institute of Infectious Diseases "Prof. Dr. Matei Bals" between October 2023 and March 2024. During the analysed period we registered 739 cases of influenza in children, which represents 23.7% of the total admissions in the same period. Cases of influenza A (68.3 %) predominated, compared to type B (18.8 %) and unspecified (12.8 %). The majority of cases of influenza in children were determined by subtypes AH1 and AH3 in similar proportions. Clinically, the predominant forms of the disease were mild (60.2%) and severe (17.9%), with no critical cases or deaths. Epidemiologically, the peak incidence of childhood influenza was reached in the period December 2023 - January 2024 for type A and March - April 2024 for type B. Compared to the previous season the number of cases of childhood influenza was reduced by about 19.6 %. The most affected age group was 1-6 years (42.4%). The clinical picture of influenza in the children studied was dominated by "classical" general signs (fever and chills, muscle ache and fatigue, headache, altered general condition) associated with respiratory manifestations (nasal obstruction, odynophagia, dysphagia, dry cough) and digestive symptoms (abdominal pain, vomiting, poor appetite).

The majority of children with influenza (97.6%) were unvaccinated, and in those vaccinated the clinical forms of the disease were milder without complications.

Influenza remains an important seasonal infectious disease because of its epidemiological (many cases) and socio-economic (absenteeism, additional costs) but also medical (potential for severe evolution and even death) implications.

Keywords: influenza, child, season 2023-2024

INTRODUCTION

Influenza is an important public health issue due to the large number of cases that occur annually, being one of the seasonal viruses with increased morbidity and mortality in both children and adults with comorbidities. The clinical forms of the disease are varied, ranging from mild to severe forms with life-threatening complications and after-effects. Each year the influenza virus mutates as a result of successive host-to-host transfer, resulting in new types with different virulence and a particular clinical picture. In children, the clinical picture is particular, sometimes polymorphic, associating various clinical manifestations (digestive, neurological, systemic) in addition to the "classical" clinical symptoms [1]. Influenza in children also has epidemiological peculiarities characterised by a large number

Corresponding author:
Gheorghita Jugulete
E-mail: georgejugulete@yahoo.com

Article History:
Received: 6 June 2024
Accepted: 20 June 2024

of cases due to their close contact in communities and the low degree of vaccination [2,3]. Clinical forms of the disease are milder because children have fewer comorbidities compared to adults. However, influenza retains the potential for severe progression with complications and after-effects in young children and the immunosuppressed [4].

The correct and sustained application of both non-specific (community hygiene, avoidance of crowding) and especially specific (vaccination) prophylaxis procedures is the most effective way to reduce the number of influenza cases [5].

MATERIAL AND METHOD

In this paper we aim to identify the clinical and epidemiological features of influenza in children in the 2023-2024 season. We conducted a retrospective clinical study of influenza cases in children admitted to the National Institute of Infectious Diseases "Prof. Dr. Matei Bals" in the period October 2023 - March 2024. In these cases, we analysed the following criteria: age, sex, clinical picture of onset, clinical form of illness and complications of influenza. The diagnosis of influenza was established on epidemiological, clinical, and laboratory criteria (rapid viral antigen identification test, RT-PCR).

RESULTS AND DISCUSSIONS

During the period under review, we recorded 739 cases of influenza in children, which represents 42.6 % of the total number of hospitalized respiratory illnesses and 23.7% of the total number of hospitalizations in children in our institute during the same time frame.

From Figure 1 it can be seen that infections with influenza A viruses accounted for the majority of paediatric influenza cases in the 2023-2024 season (68.3%), compared to influenza B (18.8%). We recorded 12.8% cases in which the diagnosis was established on clinical and epidemiological criteria

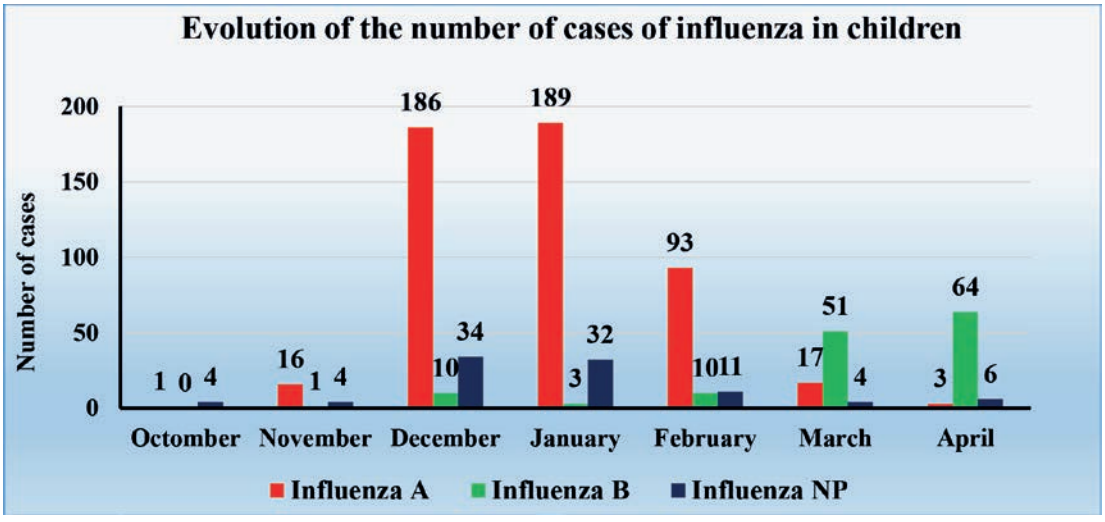

FIGURE 1. Evolution of the number of cases of influenza in children

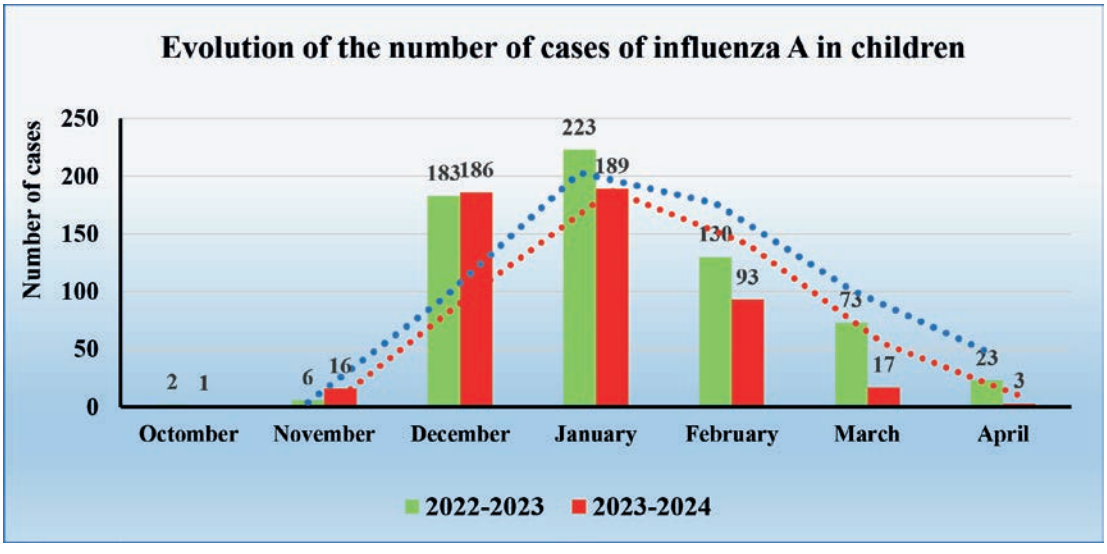

FIGURE 2. Evolution of the number of cases of influenza A in children

because laboratory tests could not establish the type of influenza virus.

It can also be seen that the peak incidence of influenza A in children was reached in January 2024, when we recorded the most cases, compared to influenza B in which the maximum number of cases was recorded in March. The epidemiological data of childhood influenza obtained in our study are similar to those reported by other authors in similar studies [6,7].

Compared to the 2022-2023 season, the number of childhood influenza A cases was lower, maintaining the peak incidence in the same month (Figure 2) [8,9].

The number of cases of childhood influenza B has also decreased compared to the previous season, but epidemiologically the peak incidence was reached in March in the current season versus April in the 2022-2023 season (Figure 3) [8,9]. This is explained by the fact that the current season was shorter compared to the previous one due to weather conditions (the previous cold season was longer than the current one). The same data are also reported by other authors in countries with similar weather conditions [10].

It can be seen from Figure 4 that the number of influenza cases was slightly higher in the female sex compared to the male sex, without statistical significance, and in the previous season the ratio was the opposite.

In regards to the distribution of influenza cases by age group, in the 2023-2024 season they predominated in pre-school children, with the majority of cases in the 0-6 years age group (Figure 5). The data are similar to those of the previous season (59%) and those reported in similar clinical studies [8,9] explained by the low vaccination rate in this age group and the fact that the epidemiological measures taken during the pandemic led to the lack of natural immunization of the population (there were very few cases of influenza in the period 2020-2022).

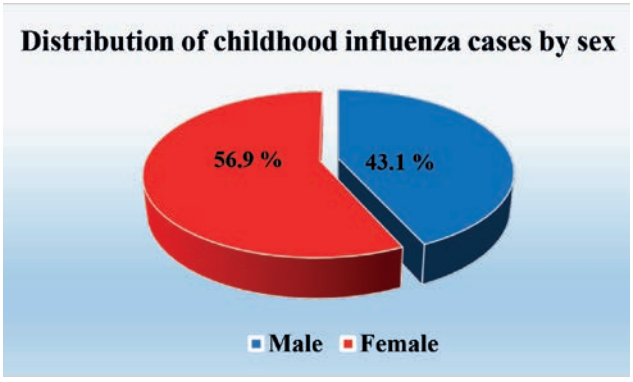

FIGURE 4. Distribution of childhood influenza cases by sex

In our study we did not record any critical clinical cases or deaths, most cases evolved favourably without severe complications, with a complete cure and no after-effects. However, we recorded 17.9% severe cases, with most clinical forms of childhood influenza being mild (Figure 6).

The most common complications recorded were respiratory (77.2%) and digestive (88.3%) along with haematological (61.4%). Respiratory complications of influenza (acute respiratory failure, pneumonia, bronchopneumonia) also generated the most severe clinical forms in children. ENT complications (laryngitis, streptococcal pharyngitis, otitis, sinusitis) and digestive complications (enterocolitis, hepatic cytolysis syndrome, dehydration syndrome) also accounted for a significant proportion of illnesses that led to children being admitted with influenza this season. Cardiac (myocarditis, pericarditis, rhythm disturbances), systemic (sepsis, myositis, exanthema) and CNS (seizures, meningitis, encephalitis) complications were rare but important in their potentially severe, life-threatening nature (Figure 7). The results for influenza complications in children are consistent with those reported in other similar studies [11,12,13].

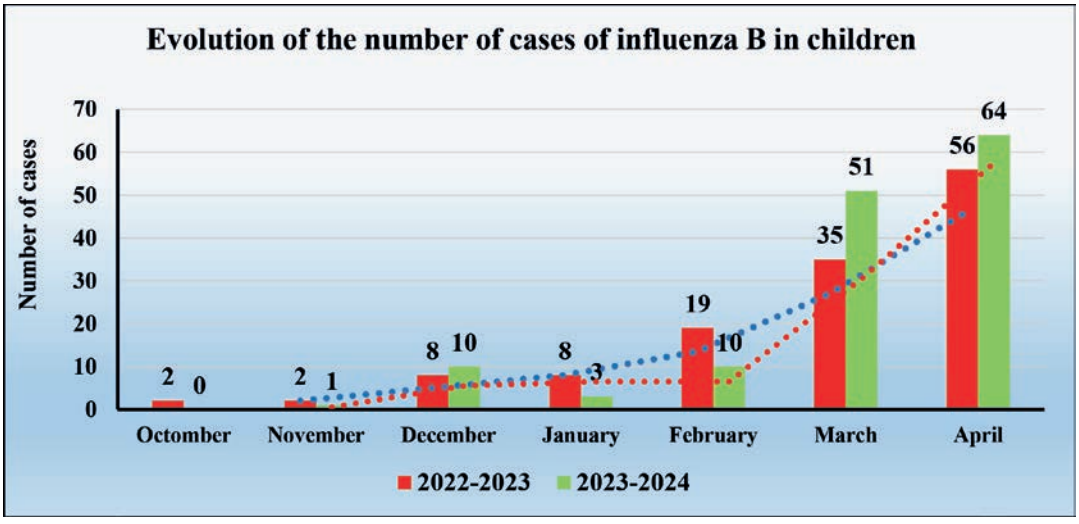

FIGURE 3. Evolution of the number of cases of influenza B in children

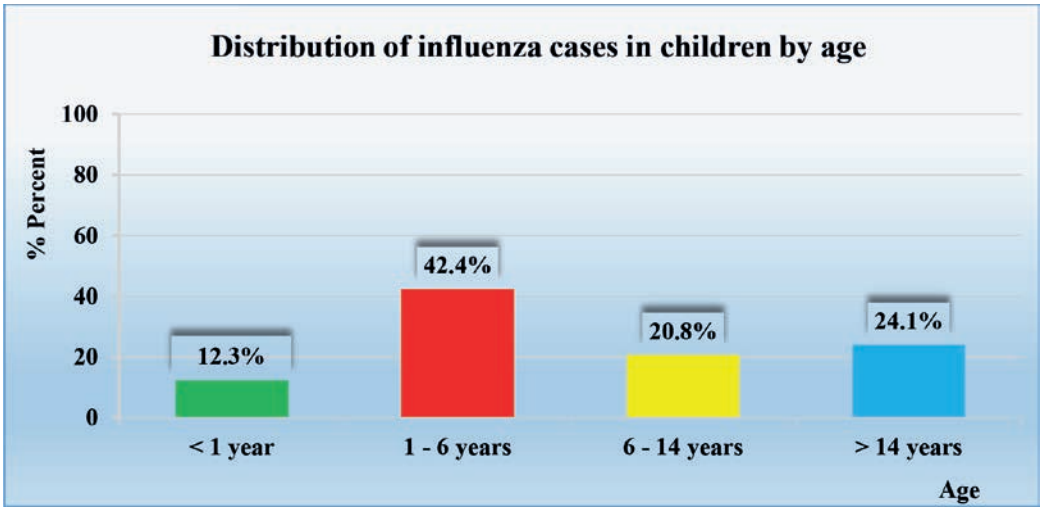

FIGURE 5. Distribution of influenza cases in children by age

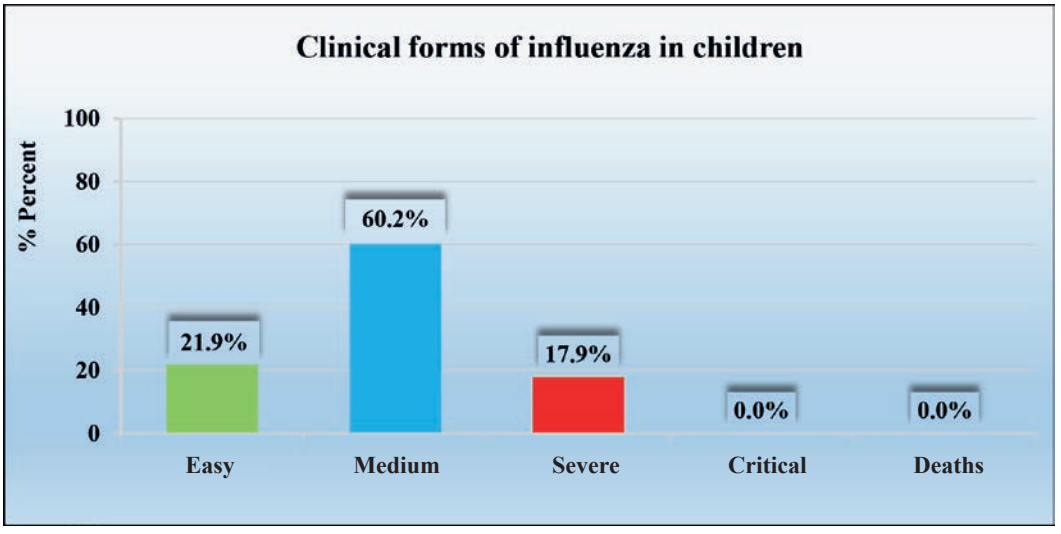

FIGURE 6. Clinical forms of influenza in children

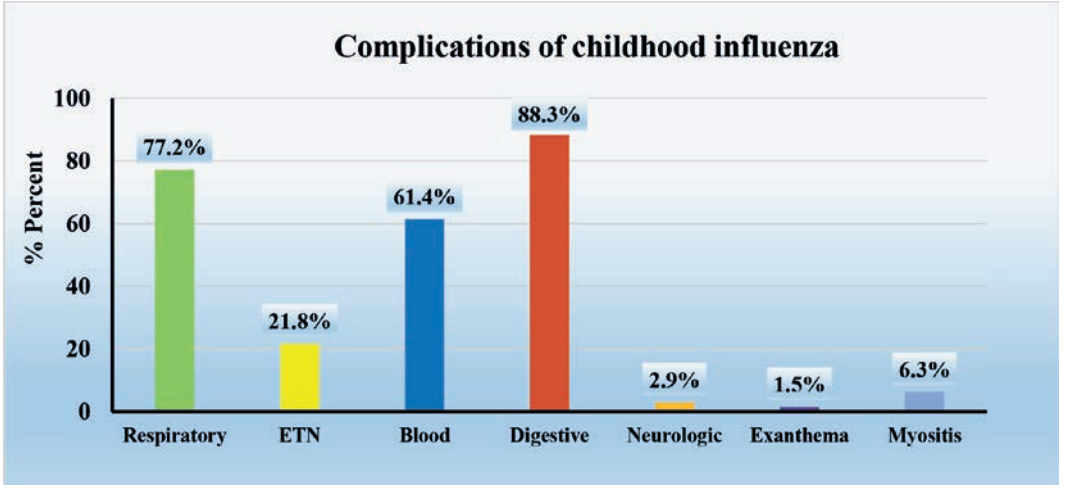

FIGURE 7. Complications of childhood influenza

CONCLUSIONS

Influenza in children in the 2023-2024 season is predominantly caused by serotype A, similar to the previous season, but with a lower number of cases compared to the 2022-2023 season. In the current season we did not record any deaths or critical clinical cases of influenza in children, most were medium clinical forms of the disease, but we recorded

17.9% severe cases with life-threatening complications.

The age group most affected by influenza was 1-6 years, with most cases being female, without statistical significance, similar to the previous season.

Epidemiologically, seasonality is maintained compared to 2022-2023, with the same peak incidence in January for influenza A and March for influenza B, with the mention that the current season was shorter due to higher temperatures.

Influenza in children remains a severe condition with a risk of an unfavourable outcome, and vaccination is the only effective method of prophylaxis and limiting complications and deaths.

Conflict of interest: none declared
Financial support: none declared

REFERENCES

1. Jugulete G, Merisescu M, Schiopu S, Osman E, Florea D, Luminos M. Clinical polymorphism of influenza in children. In: International Proceedings Division, May 2014. p. 39-43. www.medimond.com
2. Boktor SW, Hafner JW – PMID – Influenza, In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan. 2023 Jan 23. Affiliations expand, PMID: 29083802. Bookshelf ID: NBK459363.
3. Jiang S, Li J, Cao J, Ou Y, Duan Y, Gan X – PMID - Clinical Characteristics of 118 Pediatric Patients With Acute Benign Myositis Associated With Influenza A Virus Infection. PMID: 38535510. http://doi.org/10.1097/INF.0000000000004320
4. Teutsch SM, Zurynski YA, Nunez C, Lester-Smith D, Festa M, Booy R, Elliott EJ. Australian Paediatric Surveillance Unit – PMID - Ten Years of National Seasonal Surveillance for Severe Complications of Influenza in Australian Children, Affiliations expand. PMID: 33093432. http://doi.org/10.1097/INF.0000000000002961
5. Zhu S, Quint J, León TM, Sun M, Li NJ, Tenforde MW, et al. PMID - Interim Influenza Vaccine Effectiveness Against Laboratory-Confirmed Influenza - California, October 2023-January 2024. PMID: 38421946 PMCID: PMC10907038. http://doi.org/10.15585/mmwr.mm7308a4
6. European Centre for Disease Prevention and Control Information for the 2023-2024 Flu Season. https://www.cdc.gov/flu/season/faq-flu-season-2023-2024.htm
7. European Centre for Disease Prevention and Control. Surveillance Report - Seasonal influenza 2022–2023. Annual Epidemiological Report for 2023
8. Jugulete G, Panciu AM, Safta M, Borcos B, Gheorghe E, Zah L, et al. RIDJ - Clinico-etiological and epidemiological particularities of respiratory virus diseases in children in the 2022-2023 season. *Ro J Infect Dis.* 2023;26(3). http://doi.org/10.37897/RJID.2023.3.1
9. Merisescu MM, Luminos ML, Pavelescu C, Jugulete G. Clinical Features and Outcomes of the Association of Co-Infections in Children with Laboratory-Confirmed Influenza during the 2022–2023 Season: A Romanian Perspective. *MDPI – Viruses.* 2023;15:2035. http://doi.org/10.3390/ v15102035
10. Chen Z, Liu Y, Yue H, Chen J, Hu X, Zhou L, Liang B, Lin G, Qin P, Feng W, Wang D, Wu D. PMID - The role of meteorological factors on influenza incidence among children in Guangzhou China, 2019-2022. *Front Public Health.* 2024 Jan 8:11:1268073. http://doi.org/10.3389/fpubh.2023.1268073. eCollection 2023.
11. Ampofo A, Gesteland PH, Bender J, Mills M, Daly J, Samore M, et al. PMID - Epidemiology, complications, and cost of hospitalization in children with laboratory-confirmed influenza infection, Affiliations expand, PMID: 17142526. http://doi.org/10.1542/peds.2006-1475
12. Jugulete G, Borcos B, Safta M, Gheorghe E, Bajenaru L, Zah L, et al. RIDJ - Influenza A in children complicated by encephalitis - case study. *Ro J Infect Dis.* 2023;26(4). http://doi.org/10.37897/RJID.2023.4.6
13. Jugulete G, Merișescu MM, Bastian AE, Zurac S, Luminos ML. Severe form of A1H1 influenza in a child - case presentation. *Rom J Leg Med.* 2019;26:387-391. http://doi.org/10.4323/rjlm.2018.387