Predominant clinical symptom of influenza A in pre-school children (3-6 years old)

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Abstrak

Latar Belakang: Sebagian besar kasus Influenza-Like Illness (ILI) dari surveilans ILI yang dilaksanakan pada tahun 2011 adalah anak-anak yang terinfeksi oleh Influenza A. Identifikasi terhadap gejala khas Influenza pada anak dapat menghindarkan anak dari terapi antibiotik yang tidak perlu. Gejala klinis ILI pada anak-anak telah dipelajari secara luas, namun gejala khas ILI pada anak usia 3-6 tahun belum diidentifikasi. Tujuan dari studi ini adalah untuk menentukan gejala klinis dominan Influenza A pada anak prasekolah (3-6 tahun) dengan ILI.

Metode: Kasus berusia 3-6 tahun yang sesuai definisi kasus ILI dilibatkan dalam studi ini. Data yang digunakan meliputi data demografi (jenis kelamin), gejala klinis (demam, batuk, pilek, sakit tenggorokan dan nyeri otot) dan hasil PCR yang diperoleh dari surveilans ILI. Untuk analisis statistik digunakan aplikasi STATA 9. Odd Ratio (OR) ditentukan menggunakan metode maximum likelihood. Gejala klinis dianggap dominan ketika uji bivariat p-value <0,25 dan faktor dominan ini akan dipilih sebagai calon pemodelan multivariat bersama dengan faktor dominan lainnya.

Hasil: Tidak ada perbedaan yang signifikan influenza A pada anak laki-laki dan perempuan. Namun laki-laki memiliki risiko yang lebih besar. Lebih dari 90% anak-anak dengan influenza A mengalami batuk dan pilek namun secara statistik tidak signifikan. Prediktor multivariat terbaik dari influenza A infeksi pada anak prasekolah (3-6 tahun) adalah demam dan nyeri otot dengan p = 0,001 dan p = 0,034.

*Kesimpulan: Gejala dominan influenza A pada anak prasekolah (3-6 tahun) dengan ILI adalah demam dan nyeri otot. Studi lanjut tentang gejala klinis influenza A pada anak diperlukan untuk mempertajam diagnosis klinis influenza pada anak sehingga terapi antibiotik yang tidak perlu dapat dihindari. **(Health Science Journal of Indonesia 2016;7(2):80-3)***

Kata kunci: gejala klinis, Influenza A, anak-anak

Abstract

Background: Most cases visiting public health centers with Influenza-like Illness (ILI) in 2011 were children infected by Influenza A. Defined clinical symptom in Influenza infection can avoid unnecessary antibiotic therapy in children. Clinical features of ILI associated with influenza infection in children have been studied widely. Uunfortunately no typical symptom for preschool children has been identified. The study aim to determine the predominant clinical symptom of Influenza A virus infection among preschool age (3-6 years old) with ILI.

Method: Suspected ILI cases age 3-6 years old were included in this study. For the analyses, demographic data (sex), clinical symptom (fever, cough, runny nose, sore throat and muscle aches) and PCR result obtained from ILI surveillance. Statistical analyses performed using STATA 9 software. Odd Ratio (OR) value waere determined using the maximum likelihood method. Clinical symptoms considered dominant when the bivariate test p-value <0.25 and the next dominant factor will be selected as candidates for multivariate modeling along with other dominant factors.

Result: There was no significant difference between male and female cases with influenza A. However, male had greater risk. Most children with influenza A reported cough (p=0.346) and runny nose (p=0.798). The best multivariate predictor of influenza A infection in preschool children (3-6 years old) were fever with p=0,001 andand muscle aches with p=0,034.

Conclusion: The predominant symptoms of influenza A infection among preschool children (3 - 6 years) with ILI were fever and muscle aches. Accurate identification of influenza in children is becoming very important to avoid unnecessary antibiotic therapy in children. **(Health Science Journal of Indonesia 2016;7(2):80-3)**

Key words: Clinical symptom, Influenza A, children

Influenza was an acute respiratory illness that had a great impact on pediatric population. It caused by influenza virus belongs to the family *Orthomyxoviridae* which had 3 types: type A, B and C. In general, type A was the most common and cause more severe epidemic than type B or C [1,2]

Children had the highest rates of infection by influenza virus while older adults had a highest mortality rate.[3] Earlier study on the spread of influenza viruses indicating the role of children in spreading the viruses in a household which in turn affects the quality of life of the child. Generally, children in pre-school-age were exposed with environment outside their house. Therefore, it would make them have more chance to expose to influenza and other respiratory viruses.[4,5] School was likely an important location for influenza transmission and the timing of children returning to school after holidays has been associated with influenza epidemics.[6]

According to the World Health Organization (WHO), classic seasonal influenza was characterized by several clinical symptoms such as sudden high fever, dry cough, headache, muscle and joint pain, fatigue, sore throat and runny nose.[2] A study in Turkey stated that the prominent clinical symptoms in 1 - 9 years old children were fever, cough, runny nose and shortness of breath.[7] Same study in the United States held on 3-5 years old children showed the same symptoms.[8]

It was quite difficult to diagnose influenza based only on the appearance of clinical symptoms, although it could help the early diagnosis to detect influenza, to provide the accurate therapy and avoid unnecessary laboratory examination.[9] Laboratory confirmation to detect influenza viruses by polymerase chain reaction (PCR) technique, currently is the most sensitive and specific for influenza testing. The results available within 24 hours after specimen submission. RT-PCR showed greater sensitivity than viral culture, and was useful for quick differentiating between influenza types and subtypes.[8]

This study aims to determine the predominant clinical symptoms of Influenza A in pre-school children (3-6 years old) with ILI.

METHODS

The demographic and clinical data for this study were obtained from ILI surveillance data in 2011. ILI surveillance was a survey designed to determine the magnitude of influenza in Indonesia, especially to estimate the prevalence of influenza with laboratory confirmation. Until 2011, there were 24 ILI surveillance sentinel in 29 provinces in Indonesia.[10]

ILI surveillance samples were cases who met the case definition criteria: sudden fever ($\geq 38^0$C, axillary temperature) with a cough and/or sore throat, which was not diagnosed as other diseases.[10] Nasal and throat swabs were collected from all children for influenza A diagnostic test

We defined pre-school children as children age between 3-6 years old. We included data from cases aged 3-6 years old which comprised of demographic data (sex), clinical symptoms (fever, cough, runny nose, sore throat and muscle aches) and the PCR assay result for influenza type A. The demographic and clinical symptoms data derived from interview between doctor (or nurse) with the suspected case (autoanamnese) and or their parents (aloanamnese). If the questions were not understandable, the interviewer would try to find an analog for the question being asked.

First, we limit the data only from cases aged 3-6 years old. From 3744 ILI cases in 2011 we got 948 cases with aged 3-6 years old. There were 5 missing data for Influenza A PCR result. Forty eight cases expressed no fever. From the remaining 895 patients, 7 patients were excluded due to body temperature data was missing. Finally we obtained 888 cases with complete data to be analyzed. Sex was grouped into two categories, male and female. All clinical symptoms were dichotomized including fever variable which was dichotomized to below 38^oC and above (or equal to) 38^oC. The PCR assay result for influenza also divided into two categories.

Bivariate (p <0.25) was performed and selected clinical symptoms were chosen for candidate variables in modeling multivariate (p <0.05). OR value was determined using the maximum likelihood method. Statistical analyzes were performed using STATA software release 9. ILI surveillance had received ethical approval from the National Institute of Health Research and Development Ethics Committee, Ministry of Health, Republic of Indonesia.

RESULTS

During January to December 2011, there were 115 out of 888 (13%) laboratory-confirmed Influenza A

among pre-school children. Of the 115 laboratory-confirmed Influenza A infection, 60 cases was found in male children (52% compared to 48%) children. Table 1 showed that cough and runny nose appeared to be more frequent in influenza A infected pre-school children but not statistically significant. Bivariate regression revealed significant association between fever (≥38°C), muscle aches and sore throat with influenza A infection on pre-school children years old (p<0,25).

Table 2 showed that fever (≥38°C), and muscle aches were predominant clinical symptom for influenza A in pre-school children age 3-6 years old.

Bivariate regression between fever (≥38°C), muscle aches and sore throat with influenza A infection on children age 3-6 years old revealed significant association among each other (p<0,25). These three variables then challenged by using multivariate regression analysis to find the predominant clinical symptoms and revealed fever (≥38°C), and muscle aches as dominant clinical symptoms for influenza A infection in pre-school children (Table 2). Pre-school children infected by influenza A experienced more fever and muscle aches than those who did not. Pre-school children with fever (≥38°C) had 2.42 fold risks for influenza A infection. In relation to muscle pain, pre-school children who suffer from muscle pain had a 58% higher risk for influenza A positive.

Table 1. Bivariate regression of laboratory confirmed influenza A infection versus clinical variable for children age 3-6 years old, ILI Surveillance 2011

Variable	Influenza A				OR	95% Confidence Interval	P
	Negative n=773		Positive n=115				
	N	%	N	%			
Fever							
<38°C	245	92,4	20	7,6	1,00	Reference	
≥38°C	528	84,7	95	15,3	2,20	1,33-3,65	0,002
Muscle aches							
No	453	88,5	59	11,5	1,00	Reference	
Yes	320	85,1	56	14,9	1,34	0,91-1,98	0,140
Cough							
No	45	5,8	4	3,5	1,00	Reference	
Yes	728	94,2	111	96,5	1,71	0,58-4,67	0,346
Runny nose							
No	66	8,5	9	7,8	1,00	Reference	
Yes	707	91,5	106	92,2	1,10	0,53-2,27	0,798
Sore throat							
No	266	34,4	49	42,6	1,00	Reference	
Yes	507	65,6	66	57,4	0,71	0,47-1,05	0,088

Table 2. Multivariate regression of laboratory confirmed influenza A infection versus clinical variable for children age 3-6 years old, ILI Surveillance 2011

Variable	OR (95% CI)	P
Fever		
<38°C	1,00	
≥38°C	2,42(1,45-4,03)	0,001
Muscle aches		
No	1,00	
Yes	1,58(1,03-2,04)	0,034
Sore throat		
No	1,00	
Yes	0,59(0,38-0,90)	0,016

DISCUSSION

Our findingshowed that influenza circulation prevalence of Influenza A was higher in boys. Therefore, boys seemed to have greater risk than girls. In term of respiratory tract infections (RTIs), males were more susceptible than females to most types of RTIs in all age groups (adults and children). The circulating sex hormones could be (at least in part) the underlying mechanism for these differences. But the apparent differences between boys and girls remain without an answer, since the role and the concentration of sex hormones are not so prominent in the early years of life. [11]

Cough and runny nose appeared to be more frequent in influenza A infected children but not statistically significant (Table 1). Outside an influenza epidemic period, influenza was easily ruled out by the absence of cough and fever.[12] During influenza season, cases with fever and cough, especially if the onset was acute, have a high likelihood of influenza.[13] The samples of this study were collected from all year round in 2011 including the peak of influenza cases. Also, it could be happened because the data used was too small, only cover for one year period, it could be one of the study limitations. The other studies indicated that cough was one of the triad predictor of influenza infection in children.[14]

According to WHO, fever and muscle-aches were classic symptoms of influenza infection. This findings are the same from our study. In previous study, muscle-aches were being observed as a clinical symptom of influenza infection on children ≥3 year old.[15] According to the experience of the nurse and doctor in health center, at this age children were able to communicate well. Doctors or nurse would look for an analog question or rephrase it to make them understand. For example they would ask them in their local language or ask their parents to explain to their children. This is could be another recognized limitation of this study since the result really depends on how the interviewer ensured that the children or parents understand the question. Children provide more accurate information when they are freely narrating, rather than being asked direct questions. It allowed them to expand on their ideas and give a better sense of their thinking. Evaluators had to try indirect ways to help the child share important information. Another approach may be needed if a child avoids an issue.[16]

Accurate identification of influenza in children is becoming very important to avoid unnecessary antibiotic therapy in children. Additional data about the accuracy of clinical diagnosis of influenza in children were needed to help the physician make a sharp clinical judgment for influenza in children.

In conclusion, the predominant symptoms of influenza A infection among preschool children (3 – 6 years) with ILI were fever and muscle aches.

Acknowledgments

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