การสอบสวนการระบาดของโรคไข้หวัดใหญ่ โรงเรียนประถมแห่งหนึ่ง จังหวัดลำปาง

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บทคัดย่อ

ภูมิหลัง: เมื่อวันที่ 11 ก.พ. 2559 กลุ่มงานเวชกรรมสังคม รพ.ลำปาง ได้รับแจ้งจากสำนักงานสาธารณสุขจังหวัดลำปาง ว่ามีนักเรียนชั้นประถมศึกษาปีที่ 1 ของโรงเรียนแห่งหนึ่ง มีอาการคล้ายไข้หวัดใหญ่หลายสิบราย จึงร่วมกับทีมเฝ้าระวังสอบสวนเคลื่อนที่เร็วอำเภอเมืองลำปาง ดำเนินการสอบสวนโรคระหว่างวันที่ 12-19 ก.พ. 2559

วัตถุประสงค์: เพื่อยืนยันการระบาดของโรค อธิบายลักษณะทางระบาดวิทยาของการเกิดโรค ค้นหาปัจจัยเสี่ยงและดำเนินมาตรการควบคุมป้องกันการระบาด

วัสดุและวิธีการ: เป็นการสอบสวนการระบาดของโรค ทำการศึกษาเชิงพรรณนา การส่งตรวจทางห้องปฏิบัติการ การศึกษาสภาพแวดล้อม และการศึกษาเชิงวิเคราะห์ (retrospective cohort study) โดยสัมภาษณ์นักเรียนทั้งหมดของชั้นประถมศึกษาปีที่ 1 วิเคราะห์หาปัจจัยเสี่ยงของการเกิดโรค ด้วย multiple logistic regression analysis

ผลการศึกษา: มีนักเรียนป่วยด้วยอาการคล้ายไข้หวัดใหญ่ 107 รายกระจายอยู่ครบทั้ง 11 ห้องจากนักเรียน ป.1 ทั้งหมด 357 คน (ร้อยละ 30) พบผลบวกทางห้องปฏิบัติการเป็นไข้หวัดใหญ่สายพันธุ์เอ 2 รายจากการตรวจ 12 ราย มีครูป่วย 3 ราย จากครูชั้น ป.1 ทั้งหมด 13 ราย (ร้อยละ 23) ห้องที่มีอัตราป่วยมากที่สุดคือห้องภาษาอังกฤษซึ่งเป็นห้องเรียนที่มีเครื่องปรับอากาศ ปัจจัยเสี่ยงของการเกิดโรค คือ การเล่นกับเพื่อนที่ป่วย (adjusted OR=1.73, 95% CI=1.05-2.83) และการนั่งใกล้กับเพื่อนที่ป่วย (adjusted OR=1.34, 95% CI=1.33-3.63) ป้องกันควบคุมการระบาดโดยจัดระบบคัดกรองเด็กป่วยทุกเช้า ไม่ให้มาปะปนกับเด็กปกติ ให้ใช้แก้วน้ำส่วนตัว เตรียมเจลแอลกอฮอล์ในการล้างมือให้กับครูและนักเรียนทุกห้อง หยุดใช้เครื่องปรับอากาศในห้องเรียนและเปิดหน้าต่างให้อากาศถ่ายเท ทำความสะอาดอุปกรณ์ต่าง ๆ ในห้องเรียน ราวบันไดและที่กดตู้น้ำดื่ม ติดตามสถานการณ์โรค 3 สัปดาห์พบว่าจำนวนผู้ป่วยลดลงเรื่อย ๆ และไม่พบผู้ป่วยอีกตั้งแต่ 22 ก.พ.2559

สรุป: การระบาดของของอาการคล้ายไข้หวัดใหญ่ในโรงเรียนน่าจะเกิดจากเชื้อไวรัสไข้หวัดใหญ่ มีปัจจัยเสี่ยงของการระบาดในครั้งนี้คือ การเล่นกับเพื่อนป่วยและการนั่งใกล้กับเพื่อนป่วย มาตรการการควบคุมโรคคือการคัดกรองผู้ป่วย การทำความสะอาดอุปกรณ์ต่าง ๆ ในห้องเรียน รวมถึงเน้นย้ำการป้องกันส่วนบุคคล

คำสำคัญ: การระบาด, ไข้หวัดใหญ่, โรงเรียนประถม, ลำปาง

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Introduction

Influenza is a respiratory illness caused by an influenza virus. Symptoms can be mild to severe. The most common symptoms include a high fever, runny nose, sore throat, muscle pain, headache and coughing. Most people who get influenza will recover in several days but some people will develop complications. Young children, old people and people with underlying disease are at high risk of developing serious complications, possibly requiring hospitalization and sometimes resulting in death.[1]

Influenza is one of the important emerging/ re-emerging diseases because it can cause both endemic and pandemic outbreaks. In 2015 there were more than 77,000 influenza patients in Thailand (120 per 100,000 persons) and 28 deaths (0.04 per 100,000 persons). However in 2016, there were more than 53,000 patients in only half a year. Children younger than 5 years old had the highest rates of attack. The northern region always experiences the highest rate of attack[2]. The influenza vaccine is not part of the Thai national vaccination program, and receiving extra vaccines is the responsibility of individual patients. Sporadic influenza outbreaks still occur in some specific populations such as students and participants in training camps.[2]

On 11 Feb 2016, the Epidemiology Unit of Lampang Hospital was notified by the Provincial Health Office of a cluster of influenza-like illness (ILI) cases among students in grade 1 of a primary school (school A), with a few cases of influenza confirmed by rapid influenza test. The outbreak investigation was conducted from 11-19 Feb 2016 by a team from Lampang Hospital together with the Mueang Lampang Surveillance and Rapid Response Team (SRRT). This study aims to verify an outbreak, describe its characteristics, identify risk factors and implement control measures at this school.

Material and method

This outbreak investigation composed of laboratory investigation, analytic study using retrospective cohort method and environmental study. The study was conducted on students and teachers from all 11 classes of grade 1 whom were interviewed by using structured questionnaires. Demographic data, symptoms, treatment, risk and protective behaviors were recorded. The case definition of an ILI was based on the one used by the European Centre for Prevention and Disease Control.[1] The definition used was a person with sudden onset of symptoms and at least one of the following four systemic symptoms: fever or feverishness, malaise, headache and myalgia; and at least one of the following three respiratory symptoms: cough, sore throat and shortness of breath. A probable case was any student of grade 1 or teacher at school A who met the clinical criteria of ILI during 1-18 Feb 2016. A confirmed case was any probable case with a positive test for influenza by rapid test during 1-18 Feb 2016.

Nasopharyngeal swabs for rapid influenza tests were collected by physicians from a private hospital where the suspect

cases were treated. An environmental study was performed by observing the environment in classrooms, at the water coolers and wash basins. The students' behaviors, such as using masks, were also recorded. Data was analyzed by using descriptive statistics and the rate of attack was calculated by classes. Binary logistic regression was used to identify each risk factor. Multiple logistic regression was used to determine adjusted odds of each factor.

Results

This primary school, with 6 grades, was located in Mueang District, Lampang Province. The influenza outbreak occurred among students of all 11 classes in grade 1. There was no confirmed influenza cases among grade 2-6. These 11 classes consisted of classes 1 to 7 with no air conditioner in the classrooms, and Mathematics, Science and the English Program (2 classes) which did have air conditioners in the classrooms. The author interviewed all of the grade 1 teachers and 357 of 377 students (95%) due to absentees, and found 107 of 357 students (30%) and 3 of 13 teachers (23%) met the probable case definition.

Two of 12 students (17%) who tested positive for influenza A with the rapid test were in class 5 and one of the English Program classes. The numbers of student cases by onset date are shown as a common point source in Figure 1. The number of cases and the attack rate (the proportion of persons who are exposed to the disease during the outbreak who do become ill) by class are shown in Table 1. The highest attack rate was in class 2 of the English Program which was air conditioned

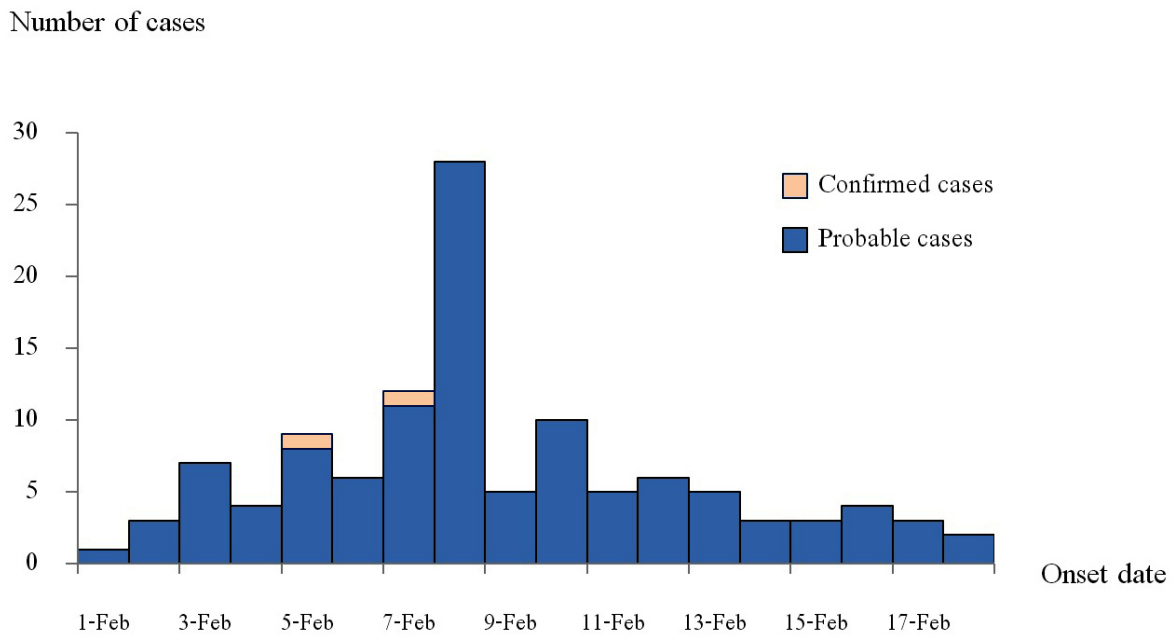

Figure 1. Probable and confirmed influenza A cases among students by onset date, school A, Mueang District, Lampang Province, Thailand, during 1-18 Feb 2016 (n= 107)

Table 1. Number and attack rate by class, among students, school A, Mueang District, Lampang Province, Thailand, February 2016 (n=107)

Class	Number of cases	Total students by class	Attack rate (%)
1	6	33	18
2	5	33	15
3	9	30	30
4	16	34	47
5	17	34	50
6	12	31	39
7	5	31	16
Mathematics class	14	33	42
English Program class 1	3	32	9
English Program class 2	16	30	53
Science class	4	36	11
Total	**107**	**357**	**30**

classroom. Of the 107 sick students, 95 (89%) were treated as outpatients at a private hospital, at the provincial hospital and at private clinics. Twelve (11%) were admitted to the private hospital and they improved in a week without complications or any severe symptoms. The first probable student case had family members who had previously shown ILI symptoms. Thirteen teachers were interviewed, among these three met the probable case definition, and all of them were treated at clinics without a confirmation test. Most of students could not recall their vaccination history, so the vaccine coverage was not determined.

The most common clinical symptoms among probable and confirmed cases were fever (100%), cough (83%) and rhinorrhea (79%) as shown in Figure 2.

The school starts at 8 a.m. and students have 6 subjects per day. They are always in their classrooms except for swimming and physical education subjects. The students always play together in their classes. Mostly, students have individual water glasses and spoons but only a minority of student washed their hands and used face masks regularly (Table 2). At the beginning of the outbreak, there was no wash basin and soap provided for students to wash their hands, no strict quarantine among students and some sick teachers were not absent when they were sick.

From the binary logistic regression, 'played with' or 'sat beside students who had ILI symptoms', or 'took the same school buses with ILI cases', were statistically significant behavioral risk factors (Table 3).

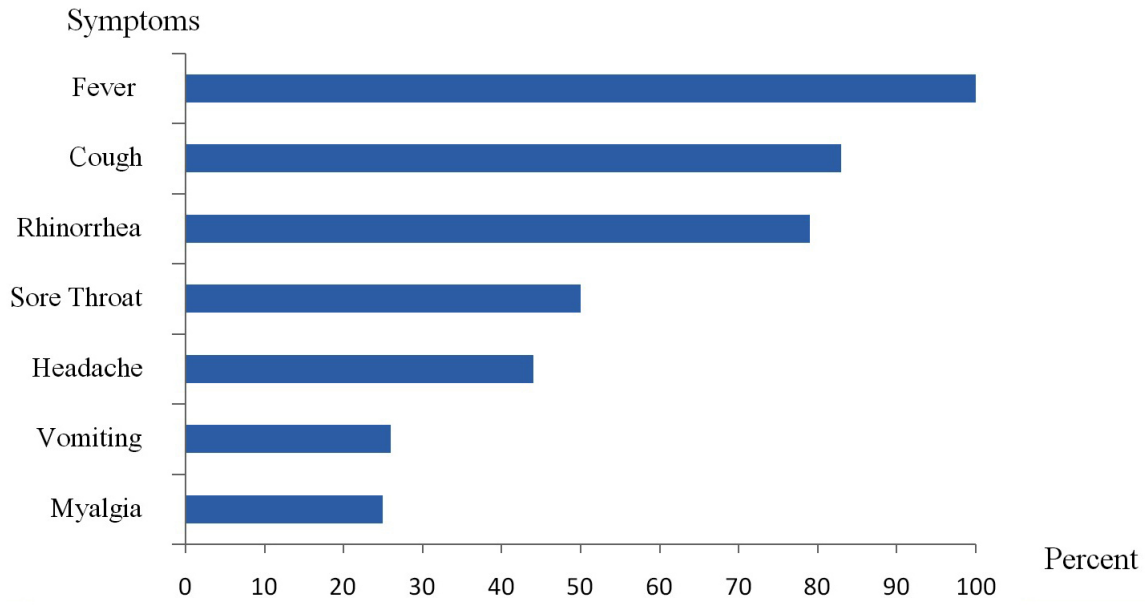

Figure 2. Clinical symptoms of probable and confirmed influenza A cases among students, school A, Mueang District, Lampang Province, Thailand, during 1-18 Feb 2016 (n= 107)

Table 2. Behavioral risk factors in influenza A outbreak among students, school A, Mueang District, Lampang Province, Thailand, February 2016 (n=357)

Behavioral risk factor	Number f expose (%)
Played with students who had ILI symptoms	155 (43%)
Sat beside students who had ILI symptoms	134 (38%)
Shared water glass with students who had ILI symptoms	91 (25%)
Student(s) in same school bus had ILI symptoms	37 (10%)
Family member(s) had ILI symptoms	81 (23%)
Washed hands irregularly	108 (30%)
Used face mask irregularly	49 (14%)

Table 3. Behavioral risk factors and risk ratio in influenza A outbreak among students, school A, Mueang District, Lampang Province, Thailand, February 2016

Risk factor	Risk ratio (95%CI)
Female	1.06 (0.68 – 1.67)
Played with students who had ILI symptoms	2.20 (1.39 – 3.49)
Sat beside students who had ILI symptoms	2.56 (1.61 – 4.08)
Shared water glass with students who had ILI symptoms	1.47 (0.89 – 2.43)
Student(s) in same school bus had ILI symptoms	2.78 (1.40 – 5.55)
Sick class teacher	1.49 (0.95 – 2.35)
Air conditioned classroom	0.88 (0.55 – 1.41)
Family member(s) had ILI symptoms	1.63 (0.97 – 2.75)
Washed hands irregularly	1.11 (0.68 – 1.81)
Used face mask irregularly	1.13 (0.16 – 3.96)

Table 4. Multiple logistic regression of behavioral risk factors and adjusted odds ratio in influenza A outbreak among students, school A, Mueang District, Lampang Province, Thailand, February 2016

Risk factor	Adjusted odds ratio (95%CI)
Playing with students with ILI symptoms	1.73 (1.05-2.83)
Sitting beside students with ILI symptoms	1.34 (1.33-3.63)

Results from multiple logistic regression demonstrated that 'played with students who had ILI symptoms' (adjusted OR=1.73, 95% CI=1.05 - 2.83) and 'sat beside students who had ILI symptoms' (adjusted OR=1.34, 95% CI=1.34 - 3.63) were statistically significant risk factors (Table 4). Surveillance was continued for 3 weeks, but there was no ILI case after 22 Feb 2016.

Discussion

This is the first influenza outbreak at this school in 3 years. The attack rate was 30% which is similar to the influenza outbreaks in other schools that reported attack rates around 15 to 42%. [3-6] The highest attack rate was among students in the English Program (class 2), which has an air conditioned classroom. The statistical analysis found no association between air conditioned classrooms and ILI symptoms.

This result was not consistent with other studies that shown poor air ventilation was a risk factor for airborne infections such as influenza.[7,8] The second highest attack rate was among students in class 5. These two classes with the highest attack rates had confirmed influenza A cases. However there were sick students in all classes because there was no strict quarantine at the beginning of the outbreak: all students played together and sat beside students who had ILI symptoms without using masks, water glasses were shared, no wash basin and soap provided for students, and sick teachers were not absent. All these risk factors might have contributed to the outbreak similarly to those in other influenza outbreaks in schools.[6,9] Some of the students were infected from outside school, for example by taking the same school buses as students with ILI cases or being infected by family members, as in another outbreak. [5]

Only a minority of students reported that they had received an influenza vaccination since the influenza vaccine is not part of the Thailand national vaccination program. Thai vaccination program provides influenza vaccines only for people at high risk of developing influenza related complications such as children younger and 5 years old, adults 65 years of age and older, pregnant women, people who have medical conditions and health care workers. Receiving extra vaccines is the patients' own responsibility even though the influenza vaccine can prevent nearly 60% of infections. [10,11] This study did not recruit the data about influenza vaccination of the students' family members. The herd immunity effect of vaccination provides extra protection for non-immune persons, with the increased immunity among vaccinated persons helping to prevent the circulation of influenza in the community.[11]

The clinical symptoms in this outbreak were similar to other influenza outbreaks in schools. The major symptoms were fever, followed by cough and rhinorrhea [6,8]. Owing to the low specificity of ILI symptom definition, misclassification as the common cold might occur without the confirmation by laboratory test of all ILI cases. However, in this case, the definition of the symptoms was simple and teachers were able to use them in surveillance to screen patient numbers, looking for a trend to help with early detection of the outbreak.

This study has some limitations. Symptoms were self reported and subject to information bias (recall bias). Headache and myalgia are hallmarks in diagnosing influenza. It is difficult to clinically differentiate influenza from other viruses causing common cold as headache is present in only 26 percent and myalgia in 7 percent among children 3 to 13 years of age with influenza. [13] Other viral respiratory tract infections could mimic the influenza infection and lead to overestimation of incidence. Moreover, most of students could not remember whether they had been vaccinated or not. The author recommended that screening students for ILI symptoms each morning and providing control measures early during an outbreak to prevent the spread of influenza. Health behaviors such as good hand hygiene, regular mask use and the use of individual drinking glasses should be promoted and followed by all teachers and students.

Conclusion

There was an influenza-like illness outbreak among primary school. Playing with or sitting beside students with ILI symptoms were risk factors for this influenza A outbreak among students of a primary school in Lampang. The control measures were: screening students for ILI symptoms every morning, using individual water glasses, providing alcohol hand gel in every classroom and permitting sick teachers to stay at home. Surveillance was continued for 3 weeks and no ILI case was found thereafter.

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Outbreak Investigation of Influenza-like illness in a Primary School, Lampang Province, Thailand, 2016

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Abstract

Background: On 11 Feb 2016, the Epidemiology Unit of Lampang Hospital was notified by the Lampang Provincial Health Office of a cluster of influenza-like illness (ILI) cases with a few confirmed cases of influenza among students in grade 1 of a primary school (school A). The outbreak investigation was conducted from 11 to 19 Feb 2016 by a team from Lampang Hospital together with the Mueang Lampang Surveillance and Rapid Response Team.

Objective: To verify an outbreak, describe its characteristics, identify risk factors and provide this school with control measures.

Material and method: This outbreak investigation composed of laboratory investigation, analytic study using retrospective cohort method and environmental study. The study was conducted on students and teachers from all 11 classes of grade 1 whom were interviewed by using structured questionnaires. Demographic data, symptoms, treatment, risk and protective behaviors were recorded. Multiple logistic regression analysis was used to determine adjusted odds ratio of risk factors.

Results: The probable cases were found in 107 of 357 students (30%) and 3 of 13 teachers (23%). Two of 12 students (17%) tested positive for influenza A by using rapid test. Playing with students who had ILI symptoms (adjusted OR=1.73, 95% CI=1.05 - 2.83) and sitting beside students who had ILI symptoms (adjusted OR=1.34, 95% CI=1.33 - 3.63) were statistically significant risk factors. Control measures consisted of screening for students who had ILI symptoms every morning, using individual water glasses, providing alcohol hand gel in every classroom and permitting sick teachers to be absent from school. Surveillance was continued for 3 weeks. There was no ILI case after 22 Feb 2016.

Conclusion: There was an influenza-like illness outbreak among students in grade 1 of a primary school. Playing with or sitting beside students with ILI symptoms were risk factors for this influenza A outbreak.

Keywords: Influenza A, Outbreak, School setting, Lampang