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Brief report

Knowledge, risk perceptions, and preventive precautions among Hong Kong students during the 2009 influenza A (H1N1) pandemic

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This study reports the knowledge, risk perceptions, and preventive precautions among 288 Hong Kong secondary school students during the 2009 influenza A (H1N1) pandemic. Only 28.1% of the students expressed knowledge of all 3 major routes of H1N1 transmission, and 58.1% perceived a high risk of H1N1 infection. Adoption of 4-5 preventive precautions was not prevalent (40.9%) and was significantly associated with female sex, better knowledge of transmission, and higher perceived risk of infection.

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Influenza A (H1N1) infection is associated with significant economic costs and deaths.¹ H1N1 transmits from person to person mainly through coughing, sneezing, and close body contact.² Staying vigilant by adopting appropriate preventive precautions, such as washing hands and wearing masks, is of crucial importance, especially for vulnerable individuals, such as children and elderly adults.³

The first confirmed H1N1 case in Asia was identified on May 1, 2009, in Hong Kong. The first community H1N1 case and first H1N1-related death in Hong Kong were reported on June 12, 2009, and July 10, 2009,⁴ respectively. Perceptions and behaviors related to the 2009 H1N1 pandemic have been investigated in the Hong Kong general population,^{5,6} but data for students are not available. The present study investigated the knowledge, risk perceptions, and preventive precautions of H1N1 in Hong Kong students during the 2009 pandemic.

METHODS

A convenience sample of 288 Hong Kong secondary school students (aged 14-18 years) was surveyed during the 2009 H1N1 pandemic (May 12-22, 2009) with a response rate of 98%. The students reported their demographic information (sex and age)

and knowledge, risk perceptions, and preventive precautions regarding H1N1. All participations were voluntary, and informed consent was obtained from each participant. Ethical approval for the study was granted by the University Ethics Committee.

The students were provided with a symptom checklist (yes/no answers) on which to indicate the presence of influenza symptoms, including headache, muscle pain, cough, difficulty breathing, dizziness, sore throat, chills, and fever, within the previous 14 days. They were also asked about experiencing influenza in the previous 14 days. Specific questions assessing knowledge of the major routes of H1N1 transmission included the following: (1) "Do you think H1N1 could transmit via the airborne route?"; (2) "Do you think H1N1 could transmit via water?"; and (3) "Do you think H1N1 could transmit via body contact?" with responses of "agree/disagree/not sure." An indication variable (1 item/2 items/all 3 items) was created to determine the number of correct answer (agreeing with the statements) regarding knowledge of routes of H1N1 transmission. Risk perception assessment included perceived risks of H1N1 infection, perceived risks of H1N1 infection compared with the 2003 Severe Acute Respiratory Syndrome (SARS) pandemic, and perceived risks of H1N1 infection compared with the 2007 H5N1 pandemic.

Adoption of the following preventive precautions during the H1N1 pandemic was investigated: (1) washing hands with soap or alcohol pad, (2) washing hands immediately after sneezing or coughing, (3) washing hands after contacting contaminated objects, (4) covering mouth when coughing or sneezing, and (5) wearing a mask. The number of preventive precautions reported by the student was then recorded (0-1 item/2-3 items/4-5 items).

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Conflicts of interest: None to report.

Table 1
Prevalence of adoption of 4-5 preventive precautions and the OR for associated knowledge and risk perceptions of H1N1

	n (%)	Crude OR (95% CI)	P	Adjusted OR (95% CI)*	P
Sex					
Boys	27 (27.0)	1		1	
Girls	97 (47.8)	2.47 (1.47-4.16)	0.001	2.63 (1.45-4.79)	0.002
Age group					
<16 years	30 (58.8)	1		1	
≥16 years	68 (39.8)	0.43 (0.23-0.81)	0.009	0.66 (0.34-1.31)	0.24
Number of influenza symptoms in the past 14 days [†]					
None	81 (40.3)	1		1	
One	28 (45.9)	1.26 (0.71-2.24)	0.44	1.11 (0.59-2.08)	0.75
Two or more	15 (36.6)	0.86 (0.43-1.71)	0.66	0.79 (0.37-1.67)	0.53
Influenza in the past 14 days					
No	119 (41.5)	1		1	
Yes	5 (31.3)	0.64 (0.22-1.90)	0.42	0.61 (0.19-1.99)	0.41
Number of correct knowledge items [‡]					
0-2 items	79 (36.2)	1		1	
All 3 items	45 (52.9)	1.98 (1.19-3.29)	0.008	2.41 (1.39-4.17)	0.002
Risk perception					
Risk of H1N1 infection					
Very low/low/don't know	61 (34.7)	1		1	
Very high/high	63 (49.6)	1.86 (1.16-2.96)	0.009	1.81 (1.10-2.98)	0.02
Relative risk of H1N1 to 2003 SARS pandemic					
Similar/lower/don't know	109 (40.1)	1		1	
Higher	15 (48.4)	1.40 (0.67-2.95)	0.37	1.25 (0.51-3.02)	0.63
Relative risk of H1N1 to 2007 H5N1 pandemic					
Similar/lower/don't know	106 (41.6)	1		1	
Higher	18 (37.5)	0.84 (0.45-1.59)	0.60	0.52 (0.24-1.13)	0.10

*Mutually adjusted odd ratios (ORs).

[†]Items included difficulty breathing, cough, headache, muscular pain, dizziness, sore throat, chills, and fever.

[‡]Items included: 1) Do you think H1N1 could transmit via airborne?; 2) Do you think H1N1 could transmit via waterborne?; and 3) Do you think H1N1 could transmit via body contact?

Adopting 4-5 preventive precautions was used as the outcome in the logistic regression models to calculate the odds ratios (OR) for correct knowledge of transmission (all 3 items vs 0-2 items), as well as absolute risk perception of H1N1 infection (very high/high vs very low/low/don't know), and comparative risk perception of H1N1 infection with the 2003 SARS and 2007 H5N1 pandemics (higher vs similar/lower/don't know). Demographic factors and influenza infection or symptoms within the previous 14 days were adjusted in the final models.

RESULTS

Approximately one-third (33.6%) of the students reported experiencing at least one influenza symptom in the previous 14 days. Only 28.1% of the students demonstrated knowledge of all 3 major routes of transmission. Although 58.1% perceived a very high/high risk of H1N1 infection, only 10.2% and 15.8% perceived a greater risk of H1N1 infection compared with the risk during the 2003 SARS and 2007 H5N1 pandemics, respectively. Adoption of 4-5 preventive precautions during the H1N1 pandemic was not prevalent (40.9%).

The regression models revealed that adoption of 4-5 preventive precautions was significantly related to female sex (adjusted OR, 2.63; 95% CI, 1.47-4.16) and correct answers to all questions about knowledge of the major routes of H1N1 transmission (adjusted OR, 2.41; 95% CI, 1.39-4.17) (Table 1). A high absolute perceived risk of H1N1 infection (adjusted OR, 1.81; 95% CI, 1.10-2.98), but not a comparative perceived risk of H1N1 infection, was significantly associated with adoption of most preventive precautions.

DISCUSSION

In general, Hong Kong students have poor knowledge of the major routes of H1N1 transmission. Most students also perceived

a lower risk of H1N1 infection compared with the 2003 SARS and 2007 H5N1 pandemics. The prevalence of mask wearing in these students was lower than that in Hong Kong and Singapore university students during the H1N1 pandemic.⁷ Female students were more likely than male students to adopt preventive precautions, likely related to the higher perceptions of H1N1 risk reported by females.⁸ Furthermore, adoption of H1N1 preventive precautions was associated with better knowledge of transmission and perceived high risks of infection, as found in the Western⁹ and Chinese¹⁰ general populations.

The results of this research should be interpreted with caution. The participating schools might not be representative of the Hong Kong school-age population, and generalizing the results to other countries may not be appropriate. Nevertheless, Hong Kong students represent a unique population that experienced both SARS and H5N1 outbreaks before the 2009 H1N1 pandemic. Thus, our findings are of value to those devising and evaluating strategies to combat future global pandemics. Another limitation of this study is the self-reported nature of the data. However, our internal validity test demonstrated a significant and positive correlation between the number of influenza symptoms and experiencing influenza in the previous 14 days.

In conclusion, our data indicate that most Hong Kong students have insufficient knowledge of H1N1 infection and failed to adopt sufficient preventive precautions during the H1N1 pandemic. Health education programs focusing on prevention of infectious diseases are warranted.

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