Vaccine 33 (2015) 6525–6528

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Brief report

Intention to receive influenza vaccination prior to the summer influenza season in adults of Hong Kong, 2015

Lin Yang[a,*], Benjamin J. Cowling[b], Qiuyan Liao[b]

[a] The Hong Kong Polytechnic University, Hong Kong Special Administrative Region, China
[b] The University of Hong Kong, Hong Kong Special Administrative Region, China

ARTICLE INFO

Article history:
Received 8 May 2015
Received in revised form 23 August 2015
Accepted 6 October 2015
Available online 23 October 2015

Keywords:
Influenza
Vaccine
Chinese adults

ABSTRACT

Following a severe winter epidemic of drifted influenza A(H3N2) during January–March 2015, the Hong Kong government purchased vaccines of southern hemisphere formulation for administration prior to the anticipated summer influenza epidemic. This is the first time that seasonal influenza vaccines will be delivered twice within the same year in Hong Kong. We conducted a household telephone survey to investigate the acceptance of Hong Kong adults to pre-summer influenza vaccination. We found that the proportion of people reporting intention to receive vaccination was 37.8, 24.0, 31.4, and 34.4% in the age groups of 18–39, 40–59, 60–69, and 70 years or above. Only 31.3% of respondents who claimed they were parents or guardians said they would take their children to receive vaccination if the new vaccine was available. These findings suggested that intention to receive pre-summer vaccination was low even among the priority group of older people.

1. Introduction

Influenza in the subtropics is characterized with year-long circulation of viruses; many subtropical regions, including Hong Kong, have more than one epidemic each year [1,2]. There is ongoing discussion on whether the subtropical regions should follow the northern or southern hemisphere seasonal influenza vaccine composition, and when is the best time for vaccination [3,4]. In Hong Kong, an annual influenza vaccination campaign is usually launched every September using the northern hemisphere formulation. In winter season of 2015, Hong Kong experienced a severe influenza A(H3N2) epidemic caused by a drifted A(H3N2) strain A/Switzerland/9715293/2013(H3N2), which was antigenically distinct from the A(H3N2) strain included in the 2014–15 northern hemisphere vaccine and the A(H3N2) viruses that had circulated in Hong Kong in previous years. From 2 January to 23April 2015, a total of 641 severe influenza cases and 495 deaths were reported to the Centre for Health Protection and over 90% of those were caused by A(H3N2). On 20 March 2015, the government of Hong Kong Special Administrative Region announced that 100,000 doses of the southern hemisphere seasonal influenza vaccine (SH SIV), which contains the A/Switzerland/9715293/2013(H3N2) strain, would be purchased for administration prior to an anticipated summer influenza epidemic in June–July 2015. This was the first time that two different seasonal influenza vaccines would be delivered within the period of 12 months in Hong Kong. We conducted a study to investigate the intention of Hong Kong adults to get the pre-summer influenza vaccines.

2. Methods

We conducted a household telephone survey during 23–27 March 2015 by randomly dialing landline telephone numbers. Within each household, one adult aged ≥18 years was selected using the next-birthday method to answer the telephone interview lasting for 5–10 min. The telephone survey questionnaire was slightly modified from reference [5] and the thematic household survey conducted by the Census and Statistics Department in 2010 [6]. The survey collected information on demographic characteristics, education attainment, history of pre-winter vaccination, intention to get pre-summer vaccination, and associated reasons. The validity and comprehensibility of questionnaire was pretested in a small sample of 10 subjects, which were not included in data analysis.

The demographic characteristics of survey respondents were compared to the population data from the Census and Statistics Department of Hong Kong Special Administrative Region (Table 1). The respondents were slightly older, with more women and higher

* Corresponding author. Tel.: +852 2766 6398; fax: +852 2364 9663.
E-mail address: l.yang@polyu.edu.hk (L. Yang).

http://dx.doi.org/10.1016/j.vaccine.2015.10.012
0264-410X/

Table 1
Demographic characteristics of survey respondents ($N = 539$).

	Survey population		Hong Kong population[a]
	No.	%	%
Age group[b]	535		
18–59yrs	353	65.5%	75.4%
≥60yrs	182	33.8%	24.6%
Female	340	63.1%	54.7%
Education [c]	533		
Primary or below	91	16.9%	23.4%
Secondary	263	48.8%	50.5%
College or above	179	33.2%	26.1%

The table is calculated from raw data without weighting.
[a] Percentage of age groups was calculated based on the population size at mid-2014 and the education data from the 2011 population census.
[b] There were four respondents who refused to give age.
[c] Six respondents did not answer education attainment.

education level, compared with the general population of Hong Kong. Hence, the random iterative method that was based on age and sex distribution of the end-2014 Hong Kong population and also on education attainment data of the 2011 census [5,7] was adopted to make the respondents representative of the Hong Kong population. Chi-square tests were conducted to compare the acceptance rates of pre-summer vaccination across different groups. Logistic regression was adopted to estimate the effects of different factors associated with intention to receive pre-summer vaccination. The goodness-of-fit of these models was assessed by Hosmer–Lemeshow test. Statistical analysis was conducted using the package SPSS Statistics version 21.

The ethical approval of this study has been obtained from the Human Subjects Ethics Sub-committee of the Hong Kong Polytechnic University (HSEARS20140224001).

3. Results

A total of 539 adults completed the interview and the response rate was 67.8%. The proportion of people reporting intention to receive vaccination was 37.8, 24.0, 31.4, and 34.4% in the age groups of 18–39, 40–59, 60–69, and 70 years or above. There were 76.9% of surveyed respondents who had heard of the new SH SIV, and 31.3% of all the surveyed respondents would consider being vaccinated if SH SIV was available to them. The elderly who had heard of the new vaccine more likely intended to get vaccination but the opposite was found in younger adults. The intention to get their children vaccinated was not significantly different between parents who had or had not heard of the new SH SIV. Among 539 respondents, 72 (13.4%) had received pre-winter vaccination since September 2014, of whom, 43 (59.7%) indicated intention to get the pre-summer vaccines in 2015. By contrast, only 27.0% (126/467) of those who did not receive pre-winter vaccination indicated the intention to receive pre-summer vaccination. For the respondents aged ≥60 years, 32.8% of them intended to receive pre-summer vaccination. The acceptance rate of respondents aged ≥60 years among those who received pre-winter vaccination and those who did not was 52.0 and 22.4%, respectively (Table 2). The difference between pre-winter vaccine recipients and non-recipients, in terms of acceptance rates of pre-summer vaccination, was statistically significant ($p < 0.05$) in all the age groups. The logistic regression model showed that male, people who had vaccination last year and people having neurological diseases or living with child(ren), were more likely intending to get vaccinated than the others (Table 3).

Among the participants who reported intention to receive vaccination, common reasons given in support of this intention included "Perceived high risk of infection" (55.1%), "Influenza is more severe than past years this winter" (19.2%), "This new influenza vaccine is more effective than the old one" (16.2%), "The new influenza vaccine is safe" (12.2%), "If I get infected with H3N2, I will transmit it to my household members" (12.0%), and "Promotion of the government" (10.7%). Common reasons reported by respondents that did not intend to be vaccinated included "Perceived low risk of infection" (40.4%), "News reported the side effects of influenza vaccine" (27.5%), and "The new influenza vaccine is not effective" (16.4%) (Appendix).

Table 3
Odds ratio (OR) of factors associated with intention to receive pre-summer vaccination in adults.

Factors	OR	(95% CI)
Male	2.0	(1.3,3.1)
Vaccination last year	12.9	(5.5,30.5)
Having heard of pre-summer vaccination	0.5	(0.3,0.8)
Having neurologic diseases	5.1	(1.1,23.4)
Living with child(ren)	1.8	(1.1,2.8)

CI, confidence interval.
The covariates in model were selected by using the backward method. The covariates entered included age, sex, vaccination last year, having heard of pre-summer vaccination, chronic conditions (cardiovascular diseases, cerebrovascular diseases, renal diseases, diabetes mellitus, chronic respiratory diseases, liver diseases, neurologic diseases, hematologic diseases), and living with child(ren).

Table 2
Intention to receive pre-summer influenza vaccination in adults of Hong Kong, 2015.

	All		Aware of pre-summer vaccine		Not aware of pre-summer vaccine		p[a]	Got pre-winter vaccination		No pre-winter vaccination		p[b]
	No.	%	No.	%	No.	%		No.	%	No.	%	
Adults (≥18 years)	539		415		116		<0.001	72		467		<0.001
Intention to get pre-summer vaccine	169	31.4%	126	30.4%	41	35.3%		43	59.7%	126	27.0%	
No intention to get pre-summer vaccine	314	58.3%	256	61.7%	52	44.8%		12	16.7%	302	64.7%	
Not decided yet	56	10.4%	33	8.0%	23	19.8%		17	23.6%	39	8.4%	
Young adults (18–59 years) [c]	401		307		92		0.008	21		380		<0.001
Intention to get pre-summer vaccine	122	30.4%	86	28.0%	37	40.2%		16	76.2%	107	28.2%	
No intention to get pre-summer vaccine	246	61.3%	201	65.5%	44	47.8%		4	19.0%	242	63.7%	
Not decided yet	32	8.0%	20	6.5%	11	12.0%		1	4.8%	31	8.2%	
Older adults (≥60 years)[c,d]	134		106		24		<0.001	50		85		<0.001
Intention to get pre-summer vaccine	44	32.8%	38	35.8%	4	16.7%		26	52.0%	19	22.4%	
No intention to get pre-summer vaccine	66	49.3%	55	51.9%	8	33.3%		8	16.0%	57	67.1%	
Not decided yet	24	17.9%	13	12.3%	12	50.0%		16	32.0%	9	10.6%	

The original raw data were adjusted by the random iterative method based on the age and sex distribution of the end-2014 Hong Kong population and also on the education attainment data of the 2011 census. The numbers of different groups may not add up to the total numbers due to missing values.
[a] p-value of chi-square tests between the groups who were aware of the pre-winter vaccination or not.
[b] p-value of chi-square tests between the groups who got or did not get the pre-winter vaccination.
[c] Four respondents who refused to report their age were excluded from analysis.
[d] Because of weighting, the sum of numbers of people who got pre-winter vaccination and of those who did not is not equal to the total numbers of this age group.