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Factors in association with acceptability of A/H1N1 vaccination during the influenza A/H1N1 pandemic phase in the Hong Kong general population

Joseph T.F. Lau[a,b,*], Nelson C.Y. Yeung[a], K.C. Choi[a], Mabel Y.M. Cheng[a], H.Y. Tsui[a], Sian Griffiths[a]

[a] School of Public Health and Primary Care, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong, SAR, China
[b] Centre for Medical Anthropology and Behavioral Health, Sun Yat-Sen University, Guangzhou, China

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ABSTRACT

A random population-based telephone survey ($n = 301$) was conducted among the Hong Kong general population in July 2009. Past history of seasonal influenza vaccination (OR = 2.59–3.13) was associated with intention to take up A/H1N1 vaccination under three hypothetical scenarios (provided at <HK$100, HK$100–200 and >HK$200). Adjusting background variables, other significant factors were identified by stepwise models: perceived side effects (OR = 0.33), family members' recommendations and friends' acceptability toward the vaccine (OR = 2.80–4.74). In contrast to other studies on seasonal influenza and A/H1N1 vaccination, perceived susceptibility and perceived severity related to influenza A/H1N1 were non-significant. Cultural differences may therefore exist.

1. Introduction

The influenza A/H1N1 pandemic is one of the most widespread pandemics in recent history. As of January 24, 2010, it has caused over 14,711 deaths in 209 countries and territories [1]. There are worries that the virus would mutate and become more virulent [2]. As of January 27, 2010, there are at least 34,174 confirmed influenza A/H1N1 cases reported in Hong Kong, resulting in 242 severe cases and 64 deaths [3,4].

Vaccination is an important means to control the influenza A/H1N1 pandemic. Many governments announced large-scale A/H1N1 vaccination plans [5–8]; most of which provides the vaccine to some prioritized high risk groups such as elderly people, young children and health workers [6,8]. A number of countries including the U.K., Germany, the U.S. and mainland China began rolling out A/H1N1 vaccination programs from October to December 2009 [9–13]. The Hong Kong government purchased 3 million shots of A/H1N1 vaccines for several high risk groups (health care workers, pregnant women, people of age >65 years old and children of 6 months to 6 years old and others with some health conditions) and for 500,000 people in the general population, who would voluntarily pay for the vaccination. The local vaccination plan was launched on December 21, 2009.

The acceptability of the A/H1N1 vaccine is however, uncertain. A recent study reported that over half of the health care workers in Hong Kong were unwilling to take up the vaccine, due to the lack of safety and efficacy data. In that study, factors associated with the willingness included past history of seasonal influenza vaccination and perceived risk of contracting influenza A/H1N1 [14]. Another recent study reported that the prevalence of intention to take up A/H1N1 vaccine in the Hong Kong general population would be price sensitive [15]. The concern for the safety of A/H1N1 vaccines has been expressed by the general public of different countries, including those of the U.S. [16], Australia [17], Greece [18] and Germany [19]. Respectively 22.2% and 67% of the general populations in Greek and Australia intended to take up the vaccine [17,18].

As of January 22, 2010, the Vaccine Adverse Event Reporting System (VAERS) operated by the U.S. Centers for Disease Control and Prevention reported that 8755 adverse events following the A/H1N1 vaccination, with 564 cases of serious health events (like major disability, hospitalization, etc.). Among these 564 serious health events, 61 cases of Guillian-Barre Syndrome (GBS) and 42 deaths were reported [20]. As of January 29, 2010 there were at least 152,454 people in Hong Kong, mostly members of the prioritized groups, having taken up the vaccine [21]. Seventeen of those with A/H1N1 vaccination history reported adverse events [22].

During the 2005/2006 flu season, the prevalence of vaccination against seasonal influenza was around 15% in the Hong Kong general adult population [23]. Factors in association with seasonal influenza vaccination have been widely reported. The Health Belief Model (HBM) postulates that constructs such as perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action and self-efficacy are determinants of health behav-

* Corresponding author at: School of Public Health and Primary Care, Centre for Health Behaviours Research, Faculty of Medicine, The Chinese University of Hong Kong, 5/F., Prince of Wales Hospital, Shatin, NT, Hong Kong.
Tel.: +852 2252 8727; fax: +852 2645 3098.
E-mail address: jlau@cuhk.edu.hk (J.T.F. Lau).

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iors [24–26]; these constructs were significantly associated with seasonal influenza vaccination in the general population [27]. The Theory of Planned Behavior (TPB) specifies that positive and negative attitudes, subjective norms and perceived behavioral control of the health-related behavior are key determinants of behavioral intention and hence the actual health-related behavior [28,29]. Such constructs were also associated with seasonal influenza vaccination [30]. Factors related to emerging respiratory infectious diseases such as avian influenza are important determinants of seasonal influenza vaccination [31]. It is shown that severity of the influenza A/H1N1 pandemic [17,18] and history of seasonal influenza vaccination [32] were associated with acceptance of A/H1N1 vaccine. There are only a few studies investigating factors in association with intention to take up the A/H1N1 vaccination.

This study identified factors in association with behavioral intention for A/H1N1 vaccination before such vaccines become available in Hong Kong, under three hypothetical scenarios – that it is available at <HK$100, between HK$100 and 200 (the market rate for seasonal influenza vaccination) and >HK$200. The actual market price is not yet known. It is hypothesized that past history of seasonal influenza vaccination, TPB-based factors (attitudes, subject norms and perceived control related to A/H1N1 vaccination), some of the HBM factors (perceived severity and perceived susceptibility), knowledge related to the mode of transmission of influenza A/H1N1 would be associated with behavioral intention to take up A/H1N1 vaccination in the Hong Kong general population.

2. Methods

2.1. Sampling and data collection

The target population was Chinese Hong Kong adults of age between 18 and 60 years old. The study was conducted during July 2–8, after the WHO announcement on the pandemic status of influenza A/H1N1 on June 11, 2009 [33] and the reporting of the first local community-infected case on June 10, 2009 [34] and before the reporting of first local death case associated with influenza A/H1N1 on July 27, 2009 [35].

The sampling methods were discussed in detail in the paper reporting prevalence of behavioral intention to take up A/H1N1 vaccination [15]. Telephone surveys were conducted by using a structured questionnaire. Similar study methods were used as in a number of local studies related to SARS [36,37], avian influenza [31,38] and influenza A/H1N1 [39]. Random telephone numbers were selected from up-to-date telephone directories. Over 95% of the households in Hong Kong have a fixed-line telephone installed [40]. Interviews were conducted from 6:30 pm to 10 pm to avoid over-representation of non-working people. The eligible member whose birthday was closest to the survey date was selected from each of the contacted households. Verbal consent was obtained from the respondents and the interview lasted for about 20 min. At least three phone calls were made at different hours and weekdays before a non-contact telephone number was considered invalid. The study was granted ethics approval by the Chinese University of Hong Kong. A total of 378 eligible respondents were identified and 301 completed the interview; the response rate was 79.6% (301/378).

2.2. Measures

2.2.1. Background variables

Participants were asked about socio-demographic characteristics and the past history of seasonal influenza vaccination (ever/never).

2.2.2. Behavioral intention to take up A/H1N1 vaccination-dependent variables

Respondents were asked sequentially about behavioral intentions to take up A/H1N1 vaccination under several hypothetical circumstances: it is to be provided (1) at <HK$100, (2) at HK$100–200 and (3) >HK$200 per shot. Response categories included "*unlikely/unsure*" (certainly not, mostly not or unsure) and "*highly likely*" (mostly and definitely).

2.2.3. Indices on knowledge and unconfirmed beliefs about mode of transmission

The Influenza A/H1N1 Knowledge Index was formed by counting the number of correct item responses for the three knowledge questions about modes of transmission (range = 0–3; see footnote of Table 1). The Unconfirmed Belief Index was formed by counting the number of item response indicating unconfirmed beliefs about A/H1N1 modes of transmission (range = 0–4; see footnotes of Table 1).

2.2.4. Perceptions related to the influenza A/H1N1 pandemic

A Perceived Susceptibility Index was formed by summing up the scores obtained from the three questions asking how likely the participant, his/her family members and the general public would contract A/H1N1 in the next 12 months (range = 3–15, Cronbach's alpha = 0.91). A Perceived Severity Index was formed by counting the number of item responses (range = 0–9) indicating perceived severity of the influenza A/H1N1 pandemic (e.g. *it is likely to have a large-scale local influenza A/H1N1 outbreak in the coming year*), out of the nine questions of concern. The question items were listed in the footnotes of Table 1.

2.2.5. Variables related to A/H1N1 vaccination

Questions about perceptions that were derived from the TPB were asked, including positive and negative attitudes related to A/H1N1 vaccination (e.g., *it is necessary for all Hong Kong people to take up the A/H1N1 vaccine*), subjective norms (e.g., *my family members would recommend me or other family members to take up the A/H1N1 vaccine*) and perceived behavioral control (e.g. *my family member and I would be able to take up the A/H1N1 vaccine if desired*). Items were listed in Table 3.

2.3. Data analysis

The associations between the background factors (socio-demographic factors and history of seasonal influenza vaccination) and the 3 dependent variables on behavioral intention to take up A/H1N1 vaccination (provided at HK$100, HK$100–200, >HK$200 per shot; US$1 = HK$7.8) were firstly investigated by using univariate odds ratios (OR) and stepwise logistic regression modeling. Adjusting for such background variables, stepwise multivariate logistic regression models were fit for independent variables concerning perceptions related to the influenza A/H1N1 pandemic and the A/H1N1 vaccine. Odds ratios and respective 95% confidence intervals (CI) were obtained from the stepwise models. SPSS version 16.0 was used to analyze the data and p values lower than 0.05 were considered to be statistically significant.

3. Results

3.1. Background characteristics

Of all respondents, 54.8% were female; 46.5% were below 40 years old; 37.1% received some post-secondary education and 63.2% were currently married and 20.3% self-reported having ever