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Acceptability and uptake of female adolescent HPV vaccination in Hong Kong: A survey of mothers and adolescents

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ABSTRACT

Background: Organized population-based HPV vaccination programs can be effective in reducing the burden of cervical cancer, especially in the absence of a comprehensive cervical screening program (e.g. Hong Kong). Assessment of vaccine acceptability is important when evaluating the feasibility and cost-effectiveness of such vaccination programs.
Methods: To provide a more representative and updated assessment on the acceptability of female adolescent HPV vaccination in Hong Kong, we conducted surveys in 2008 among 1022 mothers with daughters aged ≤18 years through random digit-dialing telephone interviewing and 2167 schoolgirls aged 11–18 years using two-stage stratified cluster sampling. We conducted the maternal survey again in 2012 with an independent group of 1005 mothers.
Results: In 2008, 2.4% (95% confidence interval [CI] = 1.8–3.2%) of the recruited schoolgirls reported having received HPV vaccination. In 2012, the mothers reported that 9.1% (7.0–11.6%) of their daughters who were in the same age range (11–18 years) as the schoolgirls had been vaccinated ($p < 0.01$). Regarding acceptability, 27.5% (24.8–30.4%) and 37.6% (34.5–40.8%) of the mothers were willing to have their daughters vaccinated at market price in 2008 and 2012 ($p < 0.01$), respectively. 27.1% (25.2–29.1%) of the schoolgirls were willing to receive HPV vaccination at market price in 2008. The willingness to pay for full-course vaccination among mothers had a median of US$128/HK$1000 (50% central range = US$64–192/HK$500–1500), i.e. substantially lower than the current market price.
Conclusions: The gap between acceptability and actual uptake of HPV vaccination among adolescent girls suggested that coverage is likely to be low without an organized HPV vaccination program, although the difference might be partially attributed to the possibility that at the time of the interview female adolescents who were willing to be vaccinated had not yet taken action. Policymakers should devise tailored, targeted and efficient vaccination strategies to achieve universal coverage for an effectively organized HPV vaccination program.

1. Introduction

Cervical cancer is the third most prevalent cancer among females worldwide with approximately 530,000 new cases and 275,000 deaths in 2008 [1]. Cervical screening and human papillomavirus (HPV) vaccination have been proposed and used in many countries to reduce cervical cancer burden [2–5]. Although cervical screening can significantly reduce the incidence of cervical cancer [2], its impact is limited in regions that lack a comprehensive population-based screening program. Cervical cancer incidence in Hong Kong is high (around 7–8 per 100,000) compared to other developed countries such as the US, Australia and Finland (around 5 per 100,000) [1,6], possibly due to its low screening coverage. Cervical screening in Hong Kong was opportunistic until an organized screening program was launched in 2004 [7]. However, the program does not proactively recruit eligible but never screened women (aged 25–64). In 2008 only 42% of eligible women in Hong Kong attended screening regularly [7,8], suggesting that the screening coverage in Hong Kong is unlikely to substantially increase in the near future under the *status quo* screening program. An organized HPV vaccination program can therefore potentially be a very effective intervention for reducing the burden of cervical cancer in Hong Kong.

The success of an HPV vaccination program greatly depends on the attitude of local stakeholders towards the vaccine [9–11]. Previous local studies have assessed the acceptability of HPV vaccination by interviewing specific social groups, for example female students who participated in education programs and women who attended

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health clinics [12–18]. These studies were mostly conducted before or within 2 years immediately after the quadrivalent HPV vaccine was introduced in Hong Kong in 2006. Attitude towards vaccination may have been altered by developments that have occurred since then, such as the approval of the bivalent HPV vaccine and further results about the sustained efficacy and protected endpoints of the vaccines from clinical trials [19]. As such, a more representative and updated assessment of HPV vaccine acceptability in Hong Kong would be useful to policymakers for providing guidelines on HPV vaccination (e.g. recommendations on the appropriate age for HPV vaccination [5]) and evaluating the feasibility and cost-effectiveness of organized HPV vaccination programs in Hong Kong.

In this study, our primary objective was to strengthen the evidence base for HPV vaccine acceptability in Hong Kong with representative and updated data. To this end, we conducted large-scale population-based surveys to assess the acceptability of female adolescent HPV vaccination in Hong Kong by focusing on two groups of ethnic Chinese females: (i) mothers with adolescent daughters (the people with the most influence on childhood healthcare decisions that are not mandated by the Department of Health [20–22]) and (ii) adolescent schoolgirls (the primary vaccine target group). Our secondary objective was to elicit the willingness to pay (WTP) and perceived minimum age appropriate for HPV vaccination from these two groups of respondents. Our findings could help inform the necessity and potential benefits of an organized HPV vaccination program in Hong Kong as well as the key barriers that needed to be addressed when designing and implementing such programs.

2. Material and methods

2.1. Data collection and survey design

We conducted survey of mothers in two time periods: (i) between June and November 2008 (Mothers2008) and (ii) between November 2012 and January 2013 (Mothers2012), i.e. 2 and 6 years after the quadrivalent HPV vaccine became available in Hong Kong, respectively. In both surveys, mothers with daughters aged ≤18 years were recruited using random-digit dialing of all land-based residential telephone lines.

For the adolescent schoolgirl survey, schoolgirls in Secondary 1–7 (mostly age 11–18 years with around 3.2% age > 18 [23]) were recruited between December 2008 and February 2009 using a two-stage stratified cluster sampling design [24], with schools as the first stage and grades as the second stage. First, the 494 girls-only and co-educational secondary schools in Hong Kong were stratified in 5 geographical constituency areas (Hong Kong Island, Kowloon West, Kowloon East, New Territories West and New Territories East) [25]. Our aim was to include 2–3 schools from each constituency area. We invited 10 schools every 10 days on average until the number of schools agreed to participate have reached our target. In the second stage, when sampling students within each participating school, we randomly chose a grade (with probabilities proportional to the distribution of the students among Secondary 1–7 in the general population) and invited all students from that grade to complete a self-administered questionnaire. Each participating school received a bookstore coupon (US$64/HK$500) after completion of the study as a token of appreciation for participation. Both recruited mothers and schoolgirls were not incentivized.

2.2. Questionnaire descriptions

When designing the questionnaires, we consulted experts in obstetrics, gynecology and pathology from a large local university hospital on the use of appropriate words, technical terms and logical sequence of questions. Questionnaires were prepared in both English and Chinese. Both sets of questionnaires were back-translated, verified by an independent translator and compared against the original version in the corresponding language. No major discrepancies were found between the original and back-translated copy. In the questionnaires, participants were given a short description of the HPV vaccine and its market price range (US$385–513/HK$3000–4000 in 2008 and US$256–445/HK$2000–3500 in 2012). Acceptability of female adolescent HPV vaccination was assessed by (i) asking the mothers whether they would be willing to have their daughters vaccinated and (ii) asking the schoolgirls whether they had been vaccinated and whether they were willing to be vaccinated if not. The questionnaires used in Mothers2008 and Mothers2012 were identical except that the latter further asked whether any of their daughters had been vaccinated. That is, vaccine uptake among female adolescents was estimated in the schoolgirl and the Mothers2012 surveys but not the Mothers2008 survey. All respondents were asked to provide their opinions on (i) the minimum age appropriate for HPV vaccination and (ii) the amount they would be willing to pay for a full-course (3 doses) of adolescent HPV vaccination if they were not willing to pay the market price.

2.3. Statistical analysis

Representativeness of the participants was examined by comparing their characteristics with local population demographics [26,27]. Comparisons between the two maternal surveys were performed using χ^2 test for categorical variables and Mann–Whitney U test for continuous variables. Vaccine acceptability greatly depends on the amount that the vaccinees need to pay [28]. At the time of this writing, individuals who opt to have HPV vaccination in Hong Kong have to pay the full vaccine price out of their own pockets. Hence, vaccine acceptability at market price was considered as the endpoint for our multivariable logistic regressions. All analyses were performed using R version 2.15.2.

2.4. Ethics approval

Ethics approval was obtained from the Independent Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster. We obtained verbal consent from mothers and written consent from participated schools which acted *in loco parentis* for the schoolgirls.

3. Results

3.1. Data collection

A total of 1022 and 1005 mothers were successfully interviewed among all eligible households contacted (response rates = 39.3% and 50.2%) in 2008 and 2012, respectively. For the schoolgirl survey, 13 secondary schools participated in the study with 2252 students aged 11–21 recruited (response rates = 13.0% and 93.4% among invited schools and schoolgirls, respectively). Overall, 2167 (96.2%) schoolgirls aged 11–18 were included in the analyses. Table 1 shows a comparison of the socio-demographics of the respondents with data from the 2011 Population Census and 2008 Student Enrolment Statistics [26,27]. The relatively small differences suggested that the study respondents were reasonably representative of their respective populations.

3.2. Uptake, acceptability, willingness to pay and perceived minimum age appropriate for vaccination

In 2008, only 2.4% of the schoolgirls reported having received vaccination (Table 2). From the Mothers2012 survey, the mothers