Chinese parental decision making on HPV vaccination for adolescent girls: a longitudinal study

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KEY MESSAGES

1. Descriptive norm beliefs are associated with Chinese parents' intention and planning to vaccinate adolescent daughters against HPV.
2. Anticipation of affective consequences if not vaccinated is a primary motivating factor associated with vaccination intention.
3. A large proportion of Chinese parents hold negative/passive attitudes towards optional vaccines.
4. The government should subsidise HPV vaccination programmes if high coverage is desired.

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Introduction

HPV vaccination has been available in Hong Kong since 2006. Vaccination decisions for adolescent girls generally devolve to parents. By 2012, only 9% of Hong Kong teenage girls had received HPV vaccination.[1] Most empirical studies on HPV vaccination measured parental knowledge, attitudes, and intention to vaccinate daughters, yet most of these studies did not specify a theoretical framework.[2] Although some studies developed their research questions based on theories, none conducted either model analysis or evaluation of the model fit to predict parental HPV vaccination decision-making. In addition, most studies were cross-sectional and thus reverse causality cannot be ruled out. Therefore, longitudinal studies based on theoretical frameworks are needed to determine how factors that influence parental decision making really translate into adolescent HPV vaccination uptake.

We adopted an extended version of the theory of planned behaviour as the theoretical framework (Fig 1). Parental vaccination intention was assumed to be determined by attitudes towards HPV vaccination, social influence, perceived self- efficacy, and anticipated affective consequence. With interest in the role of additional predictors, we hypothesised that (1) parents who anticipate greater affective consequences have higher vaccination intention; (2) descriptive norms are associated with participants' HPV vaccination intention; and (3) parents with more positive attitudes to general optional vaccines have higher vaccination intention, and in turn predict vaccination planning and vaccination uptake.

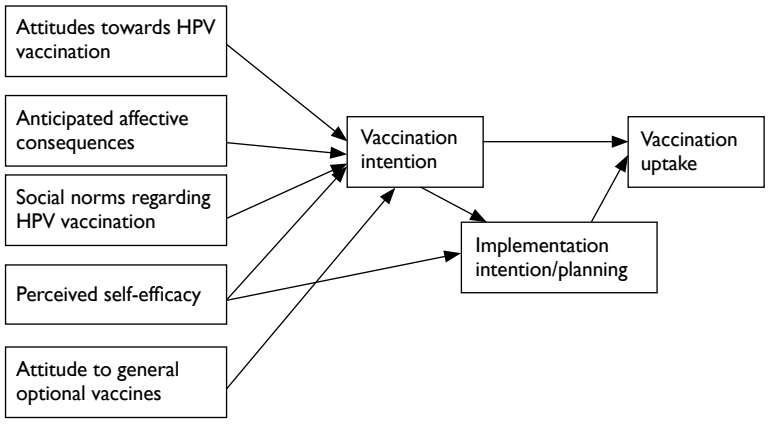

FIG 1. Theory of planned behaviour model for understanding parental decision making on HPV vaccination for their adolescent girls

Methods

A random sample of Hong Kong Chinese parents who had at least one daughter aged 12 to 17 years and were aware of HPV vaccine but have not yet had their daughters vaccinated against HPV were interviewed through telephone about their attitudes and perceptions towards HPV vaccination. At 6 and 12 months after the first interview, the participants were re-contacted to collect their daughters' HPV vaccination status. Structural equation model analysis was used to examine factors predicting adolescent girls' vaccination uptake.

Results

Between February and November 2014, of 3337 eligible parents, 1996 completed the baseline telephone interviews (response rate, 60%). Approximately 40% of the participants regarded optional vaccines as unimportant; 63% considered that it was unnecessary to give their children optional vaccines; 51.9% believed that too many vaccines can harm children's immune systems; and 22.1% said that they would not give their children any vaccines if not mandated by government. Of the 1996 participants, 979 completed and 1017 did not complete the 1-year longitudinal survey; both groups were comparable in terms of sociodemographics (Table).

Of the 1996 participants, 526 (26%) reported that they would 'likely/very likely/certainly' vaccinate their daughter against HPV in the next 6 months. However, at 1-year follow-up survey, among 988 participants who reported their daughters' HPV vaccination status, only 97 (9.8%) of their daughters actually received HPV vaccination.

For structural equation model analysis, only the 988 participants who reported their daughters' HPV vaccination status at 1-year follow-up survey were included. Confirmatory factor analysis assessed the validity and adequacy of the model for each latent variable, leaving six latent variables in the final structural model (Fig 2). Two additional paths were added based on the modification indices, including a path from social norms to vaccination planning and a path from barriers to HPV vaccination to vaccination planning. The paths from perceived self-efficacy to vaccination intention, and from barriers to taking HPV vaccination to vaccination intention were removed. Coefficients for these two paths were non-significant and too small to be meaningful. The final model indicated a good fit, with comparative fit index of 0.95, Tucker-Lewis Index of 0.97, and root

TABLE. Comparison between participants who did (n=979) and did not (n=1017) complete the 1-year follow-up survey

Characteristics	Baseline (n=1996)*	Month 6 (n=1255)*	Month 12 (n=979)*	P value
Age, y	47.5±5.5	47.5±5.5	47.7±5.5	0.789
Sex				0.162
Female	1485 (74.4)	963 (76.7)	742 (75.8)	
Male	511 (25.6)	292 (23.3)	237 (24.2)	
Marital status				0.815
Married	1883 (94.7)	1192 (95.0)	928 (94.8)	
Single/divorced/widowed/separated	106 (5.3)	63 (5.0)	51 (5.2)	
Educational level				0.143
Primary or below	161 (8.1)	87 (6.9)	68 (6.9)	
Secondary	1365 (69.8)	884 (70.4)	685 (70.0)	
Tertiary or above	441 (22.1)	284 (22.6)	226 (23.1)	
Employment status				0.063
Employed	1114 (55.8)	689 (54.9)	530 (54.1)	
Currently unemployed	865 (43.3)	563 (44.9)	448 (45.8)	
Family monthly income, HK$				0.321
<10 000	148 (7.4)	81 (6.5)	72 (7.4)	
10 000 to <20 000	506 (25.4)	324 (25.8)	243 (24.8)	
20 000 to <40 000	575 (28.8)	387 (30.8)	300 (30.6)	
≥40 000	547 (27.4)	372 (29.6)	291 (29.7)	
Birth place				0.276
Hong Kong	1253 (65.1)	807 (64.3)	633 (64.7)	
Mainland China	671 (33.6)	411 (32.7)	318 (32.5)	
Elsewhere	26 (1.3)	34 (2.7)	26 (2.7)	
Religious affiliation	691 (34.6)	426 (33.9)	329 (33.6)	0.885
Children ever experienced vaccination adverse effects	852 (42.7)	546 (43.5)	430 (43.9)	0.146
Health insurance for children	924 (46.3)	597 (47.6)	452 (46.2)	0.837
Family history of cancer	575 (28.8)	398 (31.7)	321 (32.8)	<0.0001

* Data are presented as mean±SD or No. (%) of participants

mean square error of approximation of 0.065.

Parental intention to vaccinate daughters against HPV was greater when perceiving benefits of HPV vaccination (b=0.17), descriptive norms (b=0.28), anticipation of affective consequences (regret/worry) if not vaccinated (b=0.32), and holding positive attitude to general optional vaccines (b=0.09) were all higher. Vaccination planning was associated with barriers to taking HPV vaccination (vaccination cost and concern about potential side-effects of vaccination) [b= -0.31], descriptive norms beliefs (b=0.17), perceived self-efficacy in taking daughter(s) for HPV vaccination (b=0.73), and vaccination intention (b=0.11). Both vaccination intention (b=0.31) and vaccination planning (b=0.18) significantly predict HPV vaccination uptake (Fig 2).

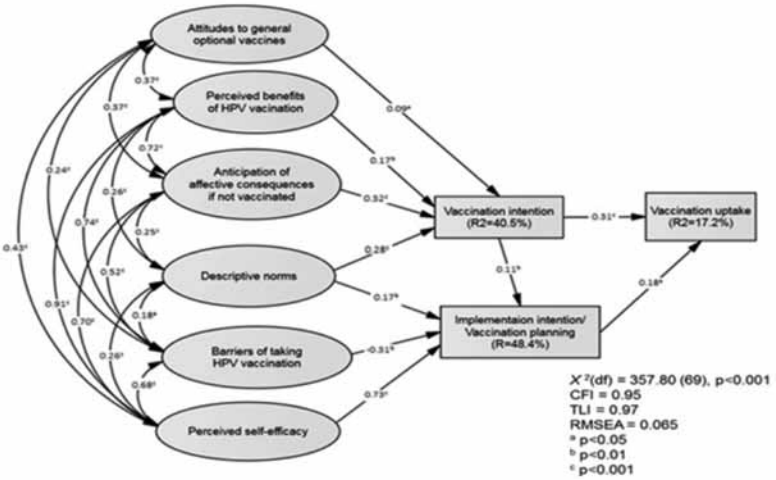

FIG 2. Structural equation model of factors influencing Chinese parents' intention to vaccinate adolescent daughters against HPV and actual vaccination uptake.
Numbers represent the standardised parameters (ß). R2 represents the explained variance of the dependent variables by the predictors (n=988). Ovals represent latent variables; rectangles represent observed variables.

Discussion

The results supported the three hypotheses. Anticipated affective consequences (regret/worry) if not vaccinated was significantly associated with parental HPV vaccination intention, consistent with the utility model prediction that the primary motivating factor for adopting preventive behaviour is resolution of the anxiety associated with the threat, rather than the threat itself.[3] This suggests that vaccination can be both an instrumental- and an emotion-focused coping response to an otherwise uncontrollable threat.[4]

Descriptive norm beliefs were significantly associated with parental vaccination intention and vaccination planning. Parents who perceived that a higher proportion of peers who have vaccinated their daughters also expressed higher intention to vaccinate their daughter. In light of the absence of government-organised HPV vaccination programmes and concrete vaccination advice from healthcare organisations, decision-making regarding HPV vaccination could be difficult owing to uncertainty and ambiguous risks/benefits, and lay responses often revert to reliance on the heuristic of 'imitate the majority'.[5] This results in adoption of the wait-and-see approach, which can impair the value of prophylactic vaccination programmes.

Hong Kong has almost universal immunisation coverage rate for mandatory vaccines, but the uptake rate for optional vaccines is much lower. Some parents considered optional vaccines not important, but Chinese parents accept mandatory vaccines. This may reflect removal of the concerns of cost and side-effects as well as reassurance about efficacy of government-funded vaccination programmes (eg, if government provided the vaccine free-of-charge, they would only do so if it was cost-effective).

Financial cost was a major barrier for HPV vaccination uptake,[1] particularly for disadvantaged families. The median value local Chinese parents willing to pay for the full course of HPV vaccination was HK$1000, which is one third of the market price.[1] A modelling study suggests that among individuals with high conformity to social influence, the vaccination coverage increases only if the vaccination cost is low.[6] Thus, we anticipate that if HPV vaccination cost remains unchanged, and no subsidy is provided, then HPV vaccination coverage will likely continue to be suboptimal in in a high conformity society like Hong Kong.

The theory of planned behaviour posits that intention leads to behaviour, but in this study we observed that although a relatively high proportion (26.4%) of parents expressed positive intention at baseline survey, only 9.8% vaccinated their daughters, indicating that there was a considerable gap between intention and behaviour, with only 21% of those expressing positive intention translating this into action, compared to 14% in those undecided (8.9%) or against vaccination (5%). Barriers to taking HPV vaccination (vaccination cost and concern about potential side effects of vaccination) and perceived self-efficacy were significantly associated with vaccination planning but not vaccination intention, which may partially explain why the actual vaccination rate is much lower than the rate of reported positive intention to vaccinate.

Public health implication/recommendation

Descriptive norms had significant impact on parental HPV vaccination intention. Public health campaigns may utilise social norm marketing to promote HPV vaccination, as behaviour change does not have to start at an individual level. However, it should be

used with caution as normative messages may create a psychological backlash that undermines campaign efforts, and some descriptive norm messages can even induce negative effect. For instance, regarding HPV vaccination for adolescent girls, if the message states that <10% of Hong Kong Chinese girls have been vaccinated against HPV, it may further inhibit parental intention to get their daughter vaccinated. Instead, public health campaigns should use parents as a source of positive messages, eg "Now my daughter has had HPV vaccination, like her friends, I am no longer worried about her risk of developing cervical cancer when she grows up. I feel so much better."

Public health education that emphasises the association between personal lifestyle factors and cancer risk often lacks detailed information about the causes or risk factors for specific cancers (eg, high prevalence of HPV infection in general population). This could result in unintended negative social effects, such as increasing public stigma towards cervical cancer patients. Among many Chinese and western women, cervical cancer is stigmatised as reflecting past promiscuity. Therefore, future cervical cancer prevention programme should emphasise the high prevalence of HPV infection in the general population, which may increase parental awareness/fear of HPV infection and cervical cancer. This may help to reduce optimistic bias and potential stigmatisation towards cervical cancer patients.

Hong Kong Chinese parents consider optional vaccines much less important than mandatory vaccines. Negative attitudes to optional vaccines indicate parental HPV vaccination acceptance and intention. The lack of a formal government-organised HPV vaccination programme encourages parents to adopt a wait-and-see approach, perpetuating low uptake rates. Future public education and campaigns regarding optional vaccines should clarify necessity and provide explicit guidance. If high uptake is required, vaccinations should be free of charge or at very least subsidised. Redesigned vaccination record cards may clarify increasingly complicated combination vaccine regimens. These include both mandatory and optional vaccines, with 'must, should, could' types of recommendation. This would help more parents to make informed decisions and less reliant on herd responses. Increasing the channels for vaccination information delivery, concrete vaccination advice from health professionals, particularly public sector clinicians, and school leaflets, and interactive communications (such as expert-led community-based health education programmes) may facilitate parental acquisition of more accurate and timely information to make informed decisions regarding vaccination.

Financial cost is among the most important barriers to HPV vaccination uptake. Provision of free vaccination for both girls and boys may be considered. Hong Kong government announced to provide 9-valent HPV vaccines free-of-charge to girls of lower income groups who might lack affordable access to this potentially important health initiative. We recommend that offering subsidies for school-based HPV vaccination for all children or, better still, adding HPV vaccine into the mandatory vaccination programme would remove these barriers. A sustained government programme with a move towards a pre-mandatory status, perhaps linked to some financial benefit such as lower health insurance premiums (as with vaccination status) would also prompt increased uptake. Finally, inclusion of the vaccine in the childhood vaccination record, along with other beneficial non-mandatory vaccines would help to reassure parents' need and safety of the HPV vaccine.

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Results from this study have been published in:

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