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Title Page

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Title: Cervical cancer prevention practices through screening and vaccination: a cross-sectional study among Hong Kong Chinese women

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Abstract

Objective: No published data are available that currently evaluate Chinese adult women's cervical cancer prevention practices through screening and vaccination using population-based samples. This study describes patterns and correlates of these behaviours among Hong Kong Chinese women aged 30-59 years.

Methods: From February to November 2014 a random sample of 1,482 Hong Kong Chinese women having at least one 12-17 year-old daughter, who had heard of HPV vaccine before but had not sought HPV vaccination for daughter(s) completed structured telephone interviews. Multiple logistic regression analyses were conducted to examine factors associated with participants' cervical screening attendance, HPV vaccination uptake and intention to uptake.

Results: Overall, 80.8% of the participants reported attending asymptomatic cervical screening and 73% had regular screening. Family income and attitudes to cervical smear testing were associated with asymptomatic cervical screening attendance. Only 3.0% (45/1482) of all participants had received HPV vaccination. Among those who had not received HPV vaccination, 12.3% (183/1437) indicated positive intentions. Age below 50, household income and encouragement from family/friends were significantly associated with women's intended and actual uptake of HPV vaccination. Trusting formal and informal HPV vaccination information was positively associated with vaccination intention, while lack of concrete recommendation from doctors was negatively associated with vaccination uptake.

Conclusions: Information trust was associated with vaccination intention but not actual uptake whereas encouragement from family/friends facilitates women's HPV vaccination. Continued

efforts are needed to ensure Chinese women adopting cervical cancer preventive behaviours, and must consider different specific needs of population subgroups.

Key words: Cervical cancer; cancer prevention; screening; Human papillomavirus; vaccine

Introduction

Cervical cancer is the fourth most common cancer in women globally causing an estimated 266,000 death worldwide in 2012 [1]. Cervical screening and probably HPV vaccination provide effective prevention reducing the disease burden. The Hong Kong Cancer Registry 2012 indicates a local age-standardised incidence rate (ASR) for cervical cancer of 8.2 per 100,000 standard population [2], indicating a cervical cancer prevalence intermediate to other developed societies such as Australia/New Zealand (around 5.5 per 100,000) and Russia (around 15.3 per 100,000) [1]. In March 2004 an organized Cervical Screening Program (CSP) was launched by the Maternal & Child Health Centres (MCHCs) of the Hong Kong Department of Health (DH) for 25-64 year-old women with prior sexual experience [3]. However, the program does not proactively recruit eligible but never-screened women. Such women have to proactively seek cervical smear services from family doctors, general practitioners or gynecologists. The charge for a cervical smear varies among different service providers, ranging from about HK\$100 (~US\$13) to HK\$1,000 (~US\$130), depending on whether it is a standalone test or part of a health check package, type of smear performed and who performs the test. As of 2012 nearly one-third of eligible women in Hong Kong had never had a cervical smear [3]. Previous local studies found that the most commonly cited reasons for failure to utilize cervical screening were ignorance regarding service access, inconvenience, cost, and embarrassment [4-6].

Two types of Human Papillomavirus (HPV) vaccines (Gardasil® and Cervarix®) were introduced in Hong Kong in 2006 and 2007, respectively. Cervarix® is approved for use in females from 9 years of age onwards. Gardasil® is approved for use in females aged 9 to 45 years (and also approved for use in males aged 9 to 26 years for prevention of genital warts

caused by HPV types 6 and 11) [7]. Although the main population for prophylactic HPV vaccination is adolescent girls and young women before sexual debut, adult women who often show strong interest in the vaccine [8] may also benefit from HPV vaccination [9]. A recent multinational randomised controlled trial study reported that vaccine efficacy against HPV 16/18-related 6-month persistent infection or cervical intraepithelial neoplasia grade 1 or higher (CIN1+) was significant in all age groups of women aged 26 and above with a combined efficacy of 81.1% (97.7% confidence interval 52.1–94.0) [10]. In Hong Kong, HPV vaccination is widely promoted almost exclusively through manufacturer-funded advertising and remains an individual choice. Intending recipients must seek HPV vaccination services from private providers and pay the full cost, currently around HK\$3,000 (~US\$390) for the 3-dose injection. Previous studies of Chinese women found misconceptions and knowledge deficits to be common regarding cervical cancer, HPV infection and HPV vaccination [11-17]. However, most of the studies involving Hong Kong Chinese women were conducted shortly after HPV vaccines were first marketed, and focused on women's intention to vaccinate their daughters against HPV rather than their own acceptability to receive the vaccine. The only local quantitative study assessing Chinese adult women's own intention to receive HPV vaccination was conducted in 2007 found that despite misconceptions and inadequate knowledge about HPV and HPV vaccination, about 88% of the women indicated they would like to be vaccinated [16]. Women aged below 50 and who perceived a disruptive impact of HPV infection on current intimate relationship were more willing to be vaccinated. Responses of partner/family towards vaccination played an important role influencing Chinese women's intention to receive HPV vaccination [16]. However, so far no published data are currently available about the actual uptake of HPV vaccination among adult Chinese women after 8 years of HPV vaccine-related marketing. A more updated study is

warranted given women's acceptability may have changed significantly in the interim since information about cervical cancer risk and prevention has been more widely promulgated.

Many overseas studies reported that recommendations from healthcare providers have positive association with young and adult women's decision-making for HPV vaccination [18-20]. Empirical studies also suggest that people more trusting of formal information, that from media, government or health professionals, are more likely to adopt active health-protective behaviours [21, 22]. Lack of concrete vaccination advice from healthcare providers is commonly reported by local qualitative studies, with some women receiving conflicting views about HPV vaccination from different health professionals [23, 24]. Population-based studies are essential to assess the effect of information trust from formal and informal (family, friends, and colleagues) sources on adult women's HPV vaccination decision-making.

In this study we aimed to describe the patterns of cervical cancer prevention practices through screening and HPV vaccination among Hong Kong adult women and to identify socio-demographic correlates of their cervical cancer prevention behaviours. With particular interest in the effects of information trust, we hypothesized that (1) Trust in formal information about HPV vaccination and receiving positive vaccination advice from doctors are positively associated with women's intended and actual vaccination uptake, and (2) Trust in informal information about HPV vaccination and being encouraged by family/friends is positively associated with women's intended and actual vaccination uptake.

Methods

Subjects

As part of an ongoing longitudinal study investigating HPV vaccination decision-making among Hong Kong Chinese parents who (1) had at least one daughter aged 12-17 years, (2) had heard of HPV vaccine (3) but had not yet vaccinated daughters against HPV, the baseline data collected from mothers were analyzed in the present study.

Procedures

Because 98% of Hong Kong households have landline phones with free local calls, random-digit dialling telephone interviews were conducted for data collection by a Web-based Computer Assisted Telephone Interview (Web-CATI) system. To avoid oversampling of non-workers, most interviews were conducted between 18:30 and 22:30 on weekdays, and between 14:00 and 22:30 at weekends, though some were conducted between 14:00 and 18:00 at weekdays. To minimize sample bias, households with unanswered phone numbers were redialled at least 6 more times during different periods (2 weekdays, 3 weeknights, and 2 weekends) before being dropped and replaced by another number. Each contacted household was screened according to the inclusion and exclusion criteria. If the target subject refused to participate, the household was classified as a refusal and another telephone number used with the process being repeated until the target sample size was reached. Verbal consent was obtained from each eligible participant prior to interview. No incentive was provided to participants. Ethical approval was obtained from the Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster.

Measures

In addition to demographic information, participant women were asked about their attitudes towards and attendance of cervical screening, HPV vaccination uptake and intention to uptake.

Attitude to cervical smear test was measured by 4 items responding to a 5-point agreement scales ranging from 1 “Strongly disagree” to 5 “Strongly agree” drawing from Cervical Smear Belief Inventory, previously validated in a Chinese population [25]. Two items measured the pros of cervical smear: “(1) A cervical smear can find the problem before it develops into cancer; (2) The earlier a cervical cancer is detected, the higher chance of a cure.” Another two measured perceived norms around smear testing: “(1) Cervical smear is now a very routine medical test; (2) All women should have regular cervical smears”. Cronbach’s α for the 4 items was 0.79. Possible scores ranged from 4 to 20, higher scores indicating more positive attitude to cervical smear testing. Vaccination information trust was measured by two items addressing trust in formal (from doctors/health agencies) and informal (from friends/colleagues/neighbors) information, respectively, adapted from local studies on influenza vaccination information trust [21, 26], responding to 5-point agreement scales ranging from 1 “Strongly disagree” to 5 “Strongly agree”. Cervical screening attendance was measured by asking “Have you ever had cervical smear examination?” with responses of “Yes, with no symptoms/discomfort at the time”, “Yes, had test because of symptoms/discomfort”, and “Never”. For those who have ever attended cervical screening, the frequency of attendance was also asked. HPV vaccination uptake was measured by asking whether the participant had received HPV vaccination, possible responses being “Yes” or “No”. HPV vaccination intention was measured by asking participants who had not vaccinated against HPV about the likelihood of receiving the vaccination within next 6 months using 7-point Likert scales (from 1 “definitely not” to 7 “certain”). The questionnaire was reviewed by a panel of public health experts to check the instrument’s content and face validity and pilot-tested among 27 Hong Kong Chinese adult women to assess the

comprehensibility, the flow of the questionnaire in general, and to locate any problems that called for necessary fine-tuning before the official fieldwork started.

Data Analysis

Data were analyzed using SPSS version 20.0 and $p < 0.05$ was considered statistically significant. Descriptive statistics were used to outline the participants' demographic characteristics and to summarize the measured variables. Given most of the independent variables were categorical variables, logistic regression analysis was suitable for the current study. For analysis purpose, cervical screening attendance was re-coded as a dichotomous variable with responses of "Asymptomatic screening" and "Screened with symptoms or never screened". Vaccination intention was dichotomized by grouping Even/Likely/Very likely/Certain to "likely to be vaccinated" (indicating a positive intention) and Unlikely/Very unlikely/Never to "Unlikely to be vaccinated". All demographic variables and attitudes to cervical smear test were entered into multivariate logistic regression to identify factors associated with asymptomatic screening attendance behavior. Furthermore, all demographic variables and variables on information trust and vaccination recommendations were entered into logistic regression to calculate adjusted odds ratios (AOR) of factors associated with adult women's HPV vaccination uptake and intention to uptake, respectively. All measured variables had less than 1% missing data except demographic information where family income was missing in around 10% of cases. For multivariate logistic regression, cases with missing data were removed list-wise.

Results

Participants' characteristics

From February to November 2014 a total of 1996 respondents successfully completed the baseline interviews with effective response rate of 60% (1996/3337). Only female respondents (N=1482) were included in the current analysis. **Table 1** details their characteristics. Majority participants were married (94%) and had secondary or above educational attainment (92%). For respondents born overseas the duration of Hong Kong residency ranged from 2 to 56 years (mean=19, SD=10.4). About 55% of participants had family incomes of HK\$20,000 or above per month, comparable to the median domestic income (HK\$20,500) of Hong Kong [27].

Information sources and information trust

Although all participants had heard of HPV vaccine (commonly referred as “cervical cancer vaccine” in Chinese), only half of the participants (50.4%, 747/1482) reported having ever heard the term “HPV” before the interview. Nevertheless, overall only 4.6% (68/1482) correctly identified HPV infection as the cause/risk factor of cervical cancer (**Figure 1**). More than half (53.7%, 796/1482) of all participants attributed cervical cancer to sexual activity, of which 37.7% (300/796) particularly cited promiscuity. Only 0.8% (12/1482) of the participants linked cervical cancer to smoking. The most common sources of HPV vaccine-related information were TV (72.5%, 1074/1482), leaflet/posters from hospitals/MCHCs/private clinics (52.5%, 778/1482), and newspapers (21.4%, 317/1482). More than half (61.2%, 907/1482) of all participants reported that they felt the amount of information about HPV vaccines they have obtained was less than they desired. Overall, 91.6% (1357/1482) of the participants reported that their doctors had never spoken to them about HPV vaccination, only 3.6% (53/1482) ever received positive vaccination recommendation from doctors and another 1.4% (21/1482)

participants were discouraged by doctors regarding HPV vaccination. A higher proportion of participants (10.9%, 161/1482) had received encouragement from family or friends for HPV vaccination uptake, although more than half (59.6%, 883/1482) of the participants reported that their family/friends had never discussed HPV vaccination with them.

Most (89.2%, 1322/1482) participants reported they would trust formal HPV vaccination information (from doctors) and fewer (51.3%, 761/1482) tended to trust informal information from friends/colleagues/neighbors regarding HPV vaccines. Notably participants born outside of Hong Kong ($\chi^2=18.86$, $p<0.001$), having lower educational attainment ($\chi^2=23.49$, $p<0.001$) and lower family incomes ($\chi^2=20.79$, $p<0.001$) were more likely to report trusting informal information, whereas no significant associations were found between participants' demographics and trust in formal information from doctors.

Cervical screening attendance

Participants' attitudes to cervical smear testing generally appeared quite positive (mean=17/20, SD=2.19). Participants who were younger ($p=0.023$), born overseas ($p<0.001$), and who had secondary education level ($p=0.028$) expressed more positive attitudes to cervical screening than did their counterparts.

Overall, 17.8% (264/1482) of the participants reported that they had either never been screened or only undergone symptomatic screening, while 80.8% (1197/1482) undertook asymptomatic screening. Multivariate logistic regression analysis showed that participants with higher family income, and holding more positive attitudes to cervical smear testing were more likely to attend for asymptomatic cervical screening (**Table 2**).

Most participants (73.0%, 1082/1482) reported they attended for regular screening. Among 1033 participant women who indicated their screening intervals, 40.4% attended for screening at least annually, 70.0% at least bi-annually and 97.5% at least tri-annually. The maximum screening interval reported was 6 years (0.4%). Most (82.4%) participants had never had an abnormal Pap smear results.

HPV vaccination uptake and vaccination intention

Overall only 3.0% (45/1482) of the participating women reported having received HPV vaccination, comprising 5.1% (6/117) of 30-39 year-olds, 4.1% (36/887) 40-49 year-olds, and 0.4% (2/459) of 50-59 year-olds.

Participants' vaccination uptake was positively associated with younger age (below 50 years) and encouragement from family/friends, but negatively associated with middle-level household income and lack of concrete vaccination advice from doctors (**Table 2**).

Among 1,437 women who had not received HPV vaccination, overall 12.7% indicated a positive intention to be vaccinated in the coming 6 months, comprising 23.9% (26/109) of 30-39 year-olds, 15.0% (125/836) of 40-49 year-olds, and 6.7% (30/448) of 50-59 year-olds. Women aged below 50, born out of Hong Kong, who had middle-level family income, had been encouraged by family/friends, trusted formal and informal HPV vaccination information, and had never been screened or only screened following symptoms were more likely to receive HPV vaccination (**Table 2**). Notably most (89.9%, 1333/1482) participants recognized that regular cervical screening remains necessary after HPV vaccination, and this perception seemed not to influence their actual and intended HPV vaccination uptake ($p>0.05$).

Discussion

To illustrate the importance of updating this kind of survey on knowledge and attitudes from time to time as knowledge and attitudes can change quite quickly, this study found, in contrast to the earlier finding that 90% of Hong Kong Chinese women had never heard of the term HPV and had difficulties understanding and accepting the linkage between cervical cancer and the sexually transmitted HPV infection [28], now more than half (54%) of the participating women were well informed of the link between sexual activity and cervical cancer and 50% were aware of the term HPV. This is possibly due to cervical cancer prevention-oriented health education and HPV vaccine promotion. In particular, given that most participating women reported that TV, leaflet/posters, and newspapers were the most common information sources of HPV vaccines, and that vaccine advertising is now also prominent on buses and mass transit railway station platforms, HPV vaccination promotion through mass media is most likely to account for the observed increase in knowledge. However, some women interviewed continue to believe promiscuity leads to cervical cancer despite the high population prevalence of HPV infection, suggesting that those women remain unaware of how common HPV infection is or are possibly reducing their anxiety through defensive optimistic bias.

Besides HPV infection, smoking (including passive smoking) is another confirmed important contributor to cervical cancer [29-31]. However, very few participants (0.8%) recognized smoking to be a contributing factor in cervical cancer, suggesting Chinese women have inadequate knowledge about the wider impacts of smoking. This is not uncommon. Lay people generally have a limited understanding of the extensive nature and severity of illnesses caused by cigarette smoking [4, 32]. Female smokers seem to neglect their increased risk of cervical cancer and the increased value of regular cervical screening [33]. Future cancer prevention education

and smoking control programmes should emphasize the wider impacts of smoking on women's health.

In contrast to previous studies conducted shortly after HPV vaccination was introduced which reported high vaccination intention (88%) among Chinese adult women [16], however this study found that only 3.0% of the 1,482 participating 30-59 year-old women reported having been vaccinated, and even among the younger age group (aged 30-39) only 5.1% had been vaccinated against HPV. This finding is consistent with local seasonal influenza vaccination studies showing significant vaccination intention-uptake gaps both before and after the vaccine was introduced [26].

In Hong Kong HPV vaccination is primarily offered through private sector doctors, so these practitioners are in a privileged position to recommend and prescribe HPV vaccination. However, only 8.3% of the participating women reported that their doctors ever talked to them about HPV vaccination. Many Hong Kong private doctors' vaccination advising behaviour may be affected by equivocal local government recommendations [34]. Given the absence of government-organized vaccination programmes or of any clear advice on vaccination, it is unsurprising that this translates into the lack of concrete vaccination advice from healthcare professionals that was commonly reported [23, 24].

Whereas previous studies findings suggested that people more trusting of formal information are more likely to adopt active health-protective behaviours [21, 22], the present study found that trusting what the doctors said about HPV vaccination is associated with women's vaccination intention but not actual uptake, supporting prior local qualitative study findings that in contrast to trust in medical authority regarding routine vaccines, once direct payment was involved

regarding optional vaccines (including HPV vaccines), trust is undermined by suspicion of pecuniary gain, and doubt regarding the motivation behind clinician's recommendations on optional vaccines, particularly from private doctors [24].

Compared to the general female population data that nearly one-third of eligible women in Hong Kong had never had cervical smear tests [3], a high cervical screening attendance rate was observed among our sample, with 81% of participants having ever attended asymptomatic screening and 73% attending screening regularly, probably because this sample included higher proportion of middle-to-old-aged married women than general female population. Over-screening was common with 40% of the regular attendees seeking annual screening and 70% being screened at least biannually, consistent with earlier study findings that women who are being screened are screened more frequently than necessary [6]. Conversely, women who are never screened may continue to have higher risk since the cervical screening program in Hong Kong does not proactively recruit eligible but never-screened women, suggesting the design of the current screening system is inadequate and wastes resources.

Financial cost is likely to be a major barrier for cervical cancer prevention, particularly among women of lower social-economics status, given women with lower family income were less likely to seek cervical smear testing unless symptomatic. The lack of choice of female practitioners discourages many Hong Kong Chinese women from utilizing screening services provided by the affordable government sector, while the high financial cost in the private sector blocks utilization there [4]. Cost is also a barrier to HPV vaccination uptake [13, 24, 35]. A recently published survey revealed potential social disparities in HPV vaccination with Hong Kong adolescent girls who are socio-economically advantaged (locally born, mothers educated to

tertiary level or above) being more likely to be vaccinated [36]. Therefore, making cervical screening and HPV vaccination accessible and affordable would potentially reduce women's health disparities in Hong Kong.

This study has several limitations suggesting that the results should be interpreted with some degree of caution. The current analysis is based on cross-sectional data. Therefore, causal relationships between the variables could not be drawn from the present data. Second, the present study did not measure socio-psychological determinants of cervical cancer preventive behaviours among adult women per se, such as perceived personal risk of cervical cancer, attitudes to HPV vaccination, and perceived self-efficacy, although those variables were assessed in the main study that considered HPV vaccination for daughters. Therefore, we could not draw a conclusion from current analysis regarding whether cultural beliefs about HPV being a sexually-transmitted infection affect women's HPV vaccination uptake. However, our study found that more than half (54%) of the participant women were aware of the link between sexual activity and cervical cancer, multivariate logistic regression showed that there were no association between awareness of HPV and HPV vaccination uptake or intention to uptake, although previous qualitative studies found that some Chinese women considered HPV vaccination to be unnecessary or dispensable and believed that adopting a 'proper' lifestyle characterized by monogamy and condom use could help reduce the risk of cervical cancer [4]. The third limitation results from subjects recruitment criteria, which may limit the generalizability of study findings to the wider general adult female population. Nevertheless, this study adds important insights for understanding Chinese adult women's cervical cancer prevention practices and associated factors in this population.

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Conflict of Interest statement

The authors declare that they have no competing interests.

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Table 1. Characteristics of participants, Hong Kong 2014 (N=1482)

Characteristics	n	%^a
Age group (years)		
30-39	117	7.9
40-49	894	60.3
50-59	464	31.3

Marital status		
Married	1390	93.8
Single/Divorced/Widowed/Separated	88	5.9

Education level		
Primary or below	112	7.6
Secondary	1087	73.3
Tertiary or above	278	18.8

Employment		
Employed	664	44.8
Currently unemployed	809	54.6

Personal income (HK\$/month)		
No income	632	42.6
1- <10,000	327	22.1
10,000 - <20,000	239	16.1
20,000 - <40,000	135	9.1
≥40,000	92	6.2

Family income (HK\$/month)		
<10,000	119	8.0
10,000 - <20,000	381	25.7
20,000 - <40,000	442	29.8
≥40,000	369	24.9

Birth place		
Hong Kong	867	58.5
Out of Hong Kong	606	40.9

Had family history of cancer	468	31.6

^a Unaccounted percentage is missing data.

Table 2. Determinants of cervical cancer screening and HPV vaccination among Chinese adult women in Hong Kong 2014 (N=1482) using multivariable logistic regression.

Characteristics	Asymptomatic screening	Vaccination uptake	Vaccination intention ^a
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Age (years)			
30-39	1.11 (0.60-2.01)	16.33* (1.36-	3.32*** (1.70-
40-49	0.93 (0.66-1.30)	13.74* (1.58-	2.36*** (1.47-
50-59	1.00	1.00	1.00
Place of birth			
Hong Kong	1.35 (0.97-1.88)	0.73 (0.29-1.86)	0.67* (0.45-0.99)
Out of Hong Kong	1.00	1.00	1.00
Marital status			
Married	0.89 (0.47-1.67)	0.71 (0.12-4.10)	0.96 (0.39-2.36)
Single/Widowed/Divorced/Sep	1.00	1.00	1.00
Education level			
Primary or below	1.00	1.00	1.00
Secondary	0.93 (0.54-1.59)	0.98 (0.17-5.56)	1.29 (0.65-2.55)
Tertiary or above	0.995 (0.48-2.08)	0.33 (0.04-2.77)	1.28 (0.51-3.18)
Employment			
Employed	0.75 (0.44-1.29)	0.70 (0.14-3.48)	1.06 (0.60-1.90)
Currently unemployed	1.00	1.00	1.00
Personal income (HK\$/month)			
No income	1.00	1.00	1.00
1- <10,000	1.52 (0.89-2.59)	0.52 (0.11-2.42)	1.29 (0.72-2.33)
10,000 - <20,000	1.23 (0.65-2.33)	1.37 (0.20-9.35)	1.10 (0.54-2.25)
20,000 - <40,000	1.53 (0.67-3.50)	1.53 (0.21-11.04)	0.61 (0.22-1.73)
≥40,000	2.03 (0.71-5.78)	0.45 (0.03-7.69)	1.03 (0.32-3.31)
Household income (HK\$/month)			
<10,000	1.00	1.00	1.00
10,000 - <20,000	1.83* (1.09-3.06)	0.09** (0.02-0.51)	3.51** (1.45-8.51)
20,000 - <40,000	2.75*** (1.59-	0.22* (0.05-0.95)	2.73* (1.09-6.84)
≥40,000	3.01** (1.54-	0.49 (0.10-2.49)	2.00 (0.69-5.83)
Heard of HPV			
Yes	1.03 (0.75-1.40)	1.98(0.80-4.94)	0.98 (0.67-1.41)
No	1.00	1.00	1.00
Had family history of cancer			
Yes	0.96 (0.69-1.34)	0.71 (0.27-1.90)	0.79 (0.53-1.19)
No	1.00	1.00	1.00
Attitude to cervical smear test	1.21*** (1.13-	-----	-----
Trust in formal information			
Yes	-----	3.09 (0.31-31.13)	4.17** (1.47-
No	-----	1.00	1.00

Trust in informal information about HPV Vaccination			
Yes	-----	1.83 (0.74-4.55)	1.52* (1.05-2.10)
No	-----	1.00	1.00
Opinions from doctors			
Discourage to vaccinate	-----	1.00	1.00
No concrete recommendation	-----	0.09* (0.01-0.90)	1.49 (0.18-12.33)
Encourage to vaccinate	-----	2.99 (0.28-31.54)	8.82 (0.92-84.48)
Opinions from family/friends			
Discourage to vaccinate	-----	1.00	1.00
No recommendation	-----	4.18 (0.38-46.23)	1.71 (0.74-3.94)
Encourage to vaccinate	-----	15.73* (1.34-	3.05* (1.21-7.71)
Cervical screening attendance			
Screened with symptoms or never screened	-----	1.05 (0.35-3.15)	1.59* (1.03-2.45)
Asymptomatic screening	-----	1.00	1.00
Perceived necessity of screening after vaccination			
Need	-----	0.86 (0.20-3.67)	0.67 (0.38-1.18)
No need/Not sure	-----	1.00	1.00

AOR, Adjusted Odds Ratio; CI, Confidence Interval; ^a Among 1437 participants who had not been vaccinated against HPV by the interview, 1399 participants indicated their intention of getting HPV vaccination in the next 6 months. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure 1. Proportions of adult Hong Kong Chinese women attributing different causes/risk factors for cervical cancer 2014 (N=1482).

