Attitudes and knowledge among parents or guardians of 12-year-old girls about HPV vaccination – A population-based survey in Iceland

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Summary

Purpose: To assess attitude and knowledge among parents or guardians of 12-year-old girls about human papillomavirus (HPV), cervical cancer, and HPV vaccination. *Material and Methods:* A mail survey was sent to a randomized sample of 1,000 parents or guardians of 12-year-old girls from a cohort of total 2,092 girls born in 1995 and registered in the Icelandic National Register by the end of December 2007. *Results:* Of the 994 eligible parents, 583 (59%) returned the questionnaire. Majority of the respondents were mothers who had two or three children. More than one-third of respondents had university education and 84% were married or living with a partner. Over two-thirds did not know that HPV causes cervical cancer and genital warts. Almost all (>90%) would vaccinate theirs daughters with a HPV vaccine, 73% said they would vaccinate their sons, or themselves if the vaccine was effective for them. Only 11% believed HPV vaccination would increase promiscuity or decrease cervical screening attendance. *Conclusion:* In Iceland, willingness to vaccinate young girls with HPV vaccine is high, however, knowledge about HPV infections is limited.

Key words: HPV; Attitudes; Knowledge; Acceptability; Cervical cancer.

Introduction

Human papillomavirus (HPV) infection is one of the most common sexually transmitted infection of the genital mucosa and there is conclusive evidence for its role as the main causal factor of cervical cancer [1, 2]. Approximately 40 HPV genotypes infect the mucosa of the genital tract and are categorized as low-risk or high-risk according to their clinical sequelae. Two low-risk types, HPV 6 and HPV 11, cause more than 90% of ano-genital warts and recurrent respiratory papillomatosis. Infection with high-risk HPV types causes virtually 100% of cervical cancer, approximately 90% of anal cancers, 50% of vulvar, vaginal, and penile cancers, and 12% of oropharyngeal cancers [1, 3]. Epidemiologic data indicates that HPV 16 and HPV 18 cause approximately 70% of cervical cancers, whereas types 16, 18, 45, 31, 33, 52, and 58 cause approximately 85% of cervical cancers [2, 4]. In addition, HPV 16 and HPV 18 cause approximately 50% of cervical cancer precursors [5].

Two prophylactic vaccines against HPV infections have been licensed and registered in Iceland. Cerverix, a bivalent HPV 16/18 (HPV2), vaccine in November 2007 and Gardasil, a quadrivalent HPV 16/18/6/11 (HPV4), vaccine in September 2006. Because the vaccine has the maximum benefit when given before a person becomes sexually ac-

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tive, the Advisory Committee on Immunization Practices of the Center for Disease Control and Prevention (CDC) have recommended routine vaccination for girls aged 11 or 12 years [6].

Pre-teen and young adolescent women will be an important target population for HPV immunization, since it will be important to provide protection prior to onset of sexual activity and exposure to oncogenic HPV types. Since the pre-teenage children are under-age, parental consent will be required. HPV infection commonly occurs in young women around the time of first sexual encounter. Studies from the United States have shown point prevalence ranges between 25% and 40% in young women, with a cumulative prevalence up to 82% in selected groups of adolescent women [7]. Many countries in Europe as well as United States, Australia, and New Zealand have recommended including a HPV vaccine in the school vaccination program for young adolescent girls [6].

Studies in the United States and Europe have shown that HPV vaccine acceptance among parents was high prior to availability of the vaccine, even though HPV awareness was fairly low [8-10]. Some concern has been that HPV vaccination of teenagers might lead to increase in sexual activity and possible harmful side effects related to the vaccine [11].

An advisory committee on vaccination and screening against communicable diseases and cancer in Iceland recommended a vaccination of all 12-year-old girls in February 2009. A national program for a free school-based HPV vaccination of 12-year-old girls was commenced in September 2011. The HPV vaccine Cervarix was chosen after a tender. Acceptance of vaccination of young adolescent girls before they become sexually active will be paramount to achieve high coverage rates through successful immunization programs [12]. In an era of scepticism and resistance against immunizations, it was considered important to conduct a study which would assess the attitude and knowledge of Icelandic parents or guardians of 12-year-old girls about HPV, cervical cancer, and their willingness to vaccinate their children against HPV before potential implementation of a HPV vaccination program.

Materials and Methods

The study was conducted in Iceland, by mail survey. Randomized sample of 1,000 parents or guardians of 12-year-old girls were selected from all 2,092 girls born in 1995 and registered in the Icelandic National Register by the end of December 2007. In Iceland, every citizen has a unique personal identification number, comprising information about sex and date of birth. These numbers are stored in the centralized Icelandic National Register, which has links between children and their parents or guardians and contains their current addresses. The first mailing was posted on February 21, 2008 and included an anonymous self-administrated questionnaire designed to assess attitude and knowledge about cervical cancer and HPV vaccination, acceptability of vaccines, and previous gynecologic and cancer history in addition to demographic information. Cover letter explaining the purpose of the study was included, along with information regarding cervical cancer and HPV. In addition, a numbered answer card and a prepaid return envelope for the questionnaire and another prepaid return envelope for the answer card were included. A reminder was posted on March 25, 2008 to participants who had not responded to the first mailing based on answer cards received. Reception of questionnaires was stopped on May 15, 2008. Six individuals were excluded because of unknown address. A total of 583 individuals responded, 84% after the first mailing and 16% after receiving a reminder; the total response rate was 59%. Before conducting the study, the questionnaire was pilot-tested with a group consisting of ten parents of 12-year-old girls. The participants completed the questionnaire and provided feedback on the readability and context of the questionnaire. Their responses were used to develop the final questionnaire. Participation in the study was voluntary and by answering the questionnaire, the parent or guardian automatically gave his or her consent. Through the questionnaire, the present authors collected information on socio-demographic variables, HPV and cervical cancer awareness, knowledge about HPV vaccine, and willingness of parents or guardians to vaccinate their children.

The study was accepted by the National Bioethics Committee on November 20, 2007 (VSNb2007060011/03-1) in accordance with Icelandic law and the Data Protection Authority was notified of the study in June 2007. Statistical analysis was done with the aid of R Statistical Software. Significance was accepted at a fivepercent level.

Table 1. — *Background characteristics of the study sample and corresponding response rates.*

Characteristics			No. (%) of
			participants
Gender of parent	Female		444 (76.2)
	Male		139 (23.8)
Age (years)	30-39		188 (32.2)
	40-49		314 (53.9)
	50-59		67 (11.5)
	≥ 60		4 (0.7)
	Data missing		10 (1.7)
Educational level	Primary		129 (22.1)
	Secondary		169 (29.0)
	University		213 (36.6)
	Other		70 (12.0)
	Data missing		2 (0.3)
Marital status	Married		381 (65.4)
	Cohabitation		107 (18.4)
	Divorced		45 (7.7)
	Widow	Widow	
	Single parent		46 (7.9)
	Data missing		2 (0.3)
Number of children	1		37 (6.3)
	2		197 (33.8)
	3		200 (34.3)
	4		97 (16.6)
	5		25 (4.3)
	≥ 5		10 (1.8)
	Data missing		17 (2.9)
Household income (€	E/month)	≤1,000	6 (1.0)
		1,001-2,000	41 (7.1)
		2,001-3,000	63 (10.8)
		3,001-4,000	84 (14.5)
		4,001-5,000	87 (14.9)
		5,001-7,500	137 (23.5)
		7,501-10,000	83 (14.2)
		\geq 10,001	51 (8.7)
		Data missing	31 (5.3)

Results

Of the 994 eligible parents or guardians, a total of 583 returned the questionnaire, with an overall response rate of 59%. Table 1 presents the background characteristics of the study sample and the corresponding response rate. Mothers accounted for 76% of participants; 84% of respondents were married or had a partner. Majority or 68% had two or three children and 37% had university education.

Table 2 presents information regarding participant's knowledge and attitude of issues related to cervical cancer. Almost 97% of respondents believe that cervical screening programs are effective. About 50% of respondents knew someone who has had abnormal Pap smear or has undertaken a colposcopy with cervical biopsy and about two-thirds knew someone who has had a conization. About 13%, 15%, and 18% knew someone who had been diagnosed with cervical cancer, genitals warts or had undergone hysterectomy because of abnormal Pap smear or cervical cancer, respectively.

Believe in cervical screening programs?	
Yes	564 (96.8)
No	4 (0.7)
Do not know	13 (2.2)
Data missing	2 (0.3)
Know anyone who has had abnormal PAP?	
Yes	309 (53.0)
No	182 (31.2)
Do not know	81 (13.9)
Data missing	11 (1.9)
Know anyone who has had cervical cancer?	<u>, , , ,</u>
Yes	75 (12.9)
No	314 (53.9)
Do not know	81 (13.9)
Data missing	113 (19.3)
Know anyone who has had genital warts?	
Yes	87 (14.9)
No	222 (38.1)
Do not know	168 (28.8)
Data missing	106 (18.2)
Know anyone who has had cervical biopsy?	
Yes	282 (48.4)
No	195 (33.5)
Do not know	104 (17.8)
Data missing	2 (0.3)
Know anyone who has had conization?	
Yes	217 (37.2)
No	257 (44.1)
Do not know	109 (18.7)
Data missing	0 (0.0)
Know anyone who has had hysterectomy beca	use of abnormal
PAP or cervical cancer?	
Yes	106 (18.2)
No	385 (66.0)
Do not know	91 (15.6)
Data missing	1 (0.2)
Ever received a diagnosis of cancer (not cervic	al cancer) or an-
other serious disease?	
Yes	16 (2.7)
No	563 (96.6)
Do not know	4 (0.7)
Data missing	0 (0.0)
Family member received a diagnosis of cancer	other than cervi-
cal cancer?	
Yes	230 (39.5)
No	351 (60.2)
Do not know	2 (0.3)
Data missing	0 (0.0)
0	× · · · /

Table 2. — *Knowledge and attitude of issues related to cervical cancer.*

Table 3. — *Knowledge and attitude of issues related to HPV and vaccinations.*

Ch	ildren received childhood vaccines	
	Yes	578 (99.1)
	No	3 (0.6)
	Do not know	2(0.3)
	Data missing	0 (0.0)
Ch	ildren received vaccine complications	. ()
	Yes	116 (19.9)
	No	450 (77.2)
	Do not know	15 (2.6)
	Data missing	2(0.3)
Δσ	ainst vaccinations	2 (0.5)
ng	Ves	13(22)
	No	15(2.2)
	Do not know	337(93.0)
	Do not know	11(1.9)
A		2 (0.3)
At	what age should sexual education begin?	0 (1.2)
	≤ 9	8 (1.3)
	10	53 (9.1)
		73 (12.6)
	12	291 (49.9)
	13	105 (18.0)
	14	33 (5.7)
	≥15	12 (2.0)
	Data missing	8 (1.4)
Wo	uld you vaccinate your daughter with HPV vacc	ine?
	Yes	530 (90.9)
	No	10 (1.7)
	Do not know	43 (7.4)
	Data missing	0 (0.0)
If y	you had a son, would you vaccinate him with HP	V vaccine?
	Yes	428 (73.4)
	No	18 (3.1)
	Do not know	133 (22.8)
	Data missing	4 (0.7)
IfF	IPV vaccine was effective for you, would you get va	accinated?
	Yes	428 (73.4)
	No	67 (11.5)
	Do not know	85 (14.6)
	Data missing	3 (0 5)
Do	es HPV vaccine efficacy influence your decision	2
00	Ves	. 328 (56 3)
	No	108(34.0)
	Do not know	56 (9 5)
	Data missing	1(0,2)
<u>Kn</u>	owledge of HPV causes carvical concer and gan	$\frac{1}{1}$ (U.2)
KII	Vas	178(20.5)
	No.	1/0(30.3) 207(69.1)
	INU De net Imerry	397(08.1)
		8 (1.4) 0 (0.0)
$\overline{\mathbf{D}^{-1}}$	Data missing	0 (0.0)
ве	V	$(A (11 \ A))$
	res	04 (11.0)
		320 (33.9)
	Do not know	193 (33.1)
-	Data missing	0 (0.0)
Bel	ieves HPV vaccination will decrease cervical screeni	ng attendance
	Yes	64 (11.0)
	No	351 (60.2)
	Do not know	168 (28.8)
	Data missing	0 (0.0)

Table 3 presents participants attitude and knowledge regarding vaccination and HPV. Almost all participants had their children receive childhood vaccines and very few were opposed to vaccinations. Over 90% would vaccinate their daughter with HPV vaccine and over 70% would choose to vaccine their sons and themselves if the vaccine proved to be effective for them. Less than one-third had knowledge about HPV causing cervical cancer and genital warts. Only 11% believed HPV vaccination would increase promiscuity or decrease cervical screening attendance. Both bivariate and multiple logistic regression analysis were unable to find any significant explanatory variables for willingness to vaccinate.

Discussion

The objective of the study was to investigate attitude and knowledge of parents or guardians of 12-year-old girls about HPV, cervical cancer, and HPV vaccination acceptance. When this study was conducted, HPV vaccine was not included in the national childhood program in Iceland. It was considered important to assess the willingness of parents to vaccinate their children before potential implementation of a HPV vaccination program, because of growing scepticism and resistance against vaccinations in general. The present authors found that acceptability to HPV vaccination of 12-year-old girl was high (91%). This is in line with existing literature where most studies observed vaccine acceptability between 66 and 96 percent [9, 10, 13-16].

HPV awareness has previously been reported as a predictor for acceptance, but the majority of studies did not investigate or find any association [17, 18]. The present authors were unable to find any statistically significant predictor for HPV vaccine acceptance because of the overwhelming willingness to receive vaccination.

Because of the design of this study, the authors did not know if parents with positive attitude toward HPV vaccination would actually vaccinate their children in the future. Iceland has a tradition of high vaccine uptake, on average around or above 90%, in the national childhood vaccination program which offers free vaccination. Since the free school-based HPV vaccination program started in 2011, about 90% of all 12-year-old girls have received all three doses of Cervarix [19].

Despite great willingness of parents to vaccinate their daughters with HPV vaccine, vaccine uptake has generally been low outside the free school-based HPV vaccination programs. A Swedish study found a relatively small difference between the willingness to vaccinate even when the vaccination against HPV comes with a cost, however the vaccine uptake was low outside the free or subsidized programs in Sweden [20]. The relatively high unsubsidized cost of HPV vaccination seems to be a major factor for low vaccine uptake; other factors like limited awareness of HPV related diseases among parents and healthcare providers are also likely to play a role in low vaccine uptake outside a free organized program.

Studies among healthcare providers have shown that their attitude is also important for successful HPV vaccine implementations [21]. Similar studies among Icelandic healthcare providers have not been carried out and therefore the present authors do not know the level of their HPV or HPV vaccine knowledge. However, the implementation of the free school-based HPV vaccination program has been successful in Iceland, which is in line with other school based vaccination programs [22].

The fact that over 99% of respondent's children had received childhood vaccinations in the Icelandic childhood vaccination program could be one of the main factors explaining the general acceptance of HPV vaccine. HPV vaccine acceptance seems to be dependent on vaccine acceptance in general and trust in physicians and health authorities [10, 23]. Several studies have shown that parents who believe vaccination to be a safe and effective way to prevent diseases are more willing to vaccinate their children against HPV [13, 20, 24, 25].

Parental concerns over the sexual implications of HPV vaccination, i.e. it might promote adolescent promiscuity or early sexual activity, may reduce uptake of vaccination, thereby reducing the efficacy of an HPV vaccination programme [10, 26]. The present findings and others do not indicate that HPV vaccination would increase promiscuity [27-29].

Despite the fact that the respondents were predominantly mothers that had great trust in cervical screening programs, as well as knowing someone who had had abnormal Pap smear or cervical biopsy, less than one-third of the parents knew that HPV causes cervical cancer and genital warts. Many other studies have found that accurate knowledge about HPV and its link to cervical cancer is limited [10, 30, 31].

The response rate of this study was 59% which might have impacted the generalizability of the findings. However, the study was based on a nationwide randomized sample of half of the birth cohort and the overwhelming willingness to vaccinate found in the study corresponds well with the actual HPV vaccination coverage in Iceland. The study design did not allow comparison between respondents and non-respondents regarding willingness to vaccinate. The study shows that a higher proportion (37%) of respondents reported having completed university education compared with the nation's average of 25%. Most of the respondents were married mothers, half of them had more than two children and household income was above average. All of those factors were found to disfavour willingness to vaccinate according a study from the USA [32]. A study form Sweden found that parents with higher education were less willing to vaccinate their children [20]. Maybe these factors play less important role in Iceland that in other countries because of the equality in Iceland, e.g. disposable income of those with only primary education is 87% of those with university education.

Conclusion

The aim of this study was to assess the attitude and knowledge of Icelandic parents or guardians of 12-year-old girls about HPV, cervical cancer, and their willingness to vaccinate their children against HPV. Despite a lack of knowledge of HPV infections, cervical cancer and HPV vaccination, most parents were willing to vaccinate their 12-year-old daughters against HPV. Important factor regarding the acceptability of HPV vaccination seems too dependent on vaccine acceptance in general and trust in physicians and governmental recommendations. A threeyear experience of the free school-based HPV vaccination program in Iceland reveals that 89% of 12-year-old girls have received all three doses of HPV vaccine, which mirrors the acceptability of HPV vaccination found in this study. It is important to address the limited knowledge of HPV infections and it is essential that women understand the link between HPV and cervical cancer.

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