



HUNGARIAN HIGH SCHOOL STUDENTS' ATTITUDES TOWARD HPV VACCINATION

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Summary

Introduction. On annual average, in a five year period (2008-2012) there died 407 women and 1490 new cases were diagnosed of cervical cancer in Hungary. The country's screening program set up 2003 is available free of charge for all women aged 25-65.

Aim. Our study aimed to explore the knowledge and attitudes of senior high school girls (18/19 years) in Budapest about cervical cancer and toward the HPV vaccination.

Material and methods. 492 girls (52.6% of grammar and 47.3% of vocational schools) were selected randomly out of 12 facilities. They completed anonymously and voluntarily our self-administered questionnaire between April 2013, and May 2014. The survey of 54 matrix questions concerned basic socio-demographic and lifestyle factors and questions partly assessing the girls' knowledge about cervical cancer partly testing their attitudes toward HPV vaccination and vaccination programs.

Results. 70.1% of the girls knew exactly the STD nature of HPV infection, however 9.8% heard never of the HPV vaccine. Their views about the vaccination were rather positive as 59.9% would make it compulsory, and 79.5% would have vaccinated their own future children too. Additionally, 63.2% of girls (among them the significant majority of vocational schools) would have vaccinated boys as well. More than two out of ten girls (23.1%) were already vaccinated. As for secondary prevention, 91.4% believed that the regular attending of cervical cancer screening was important.

Conclusions. The girls' knowledge in our sample about cervical cancer and the HPV vaccination proved to be substandard. Grammar schools girls had more thorough knowledge that increased their receptiveness of vaccination.

Keywords: HPV vaccine, attending cervical cancer screenings, boys' vaccination, attitudes and receptiveness toward vaccination, knowledge about vaccination programmes

INTRODUCTION

In Hungary, cervical cancer is the eight most common cause of female cancer mortality and was the second among cause related malignant morbidity rates of women aged 15-44 in 2009-2012. The mortality rate was 6.23/100 000 in 2012, which exceeded three times the relevant EU-15 member states' data. On average 407 women died annually of cervical cancer in 2008-2012 and around 1490 new cases became diagnosed every year (1). Even though numbers seem to be unchanged, from 2001 to 2010 the standardised early incidence (25-64 years of age) had gradually dropped from slightly above 35/100 000 to around 25/100 000 (2).

Hungary's national cervical cancer screening program available for all women aged 25-65 was established in 2003. This target group is invited to screening every three years by postal letters. However, attendance rates were far from optimal level in the initial years. In 2007 it was estimated to be only 24.3% (3).

Cervical cancer is due to human papillomavirus (HPV) infection. The worldwide HPV prevalence is above 99%

among cervical cancer patients (4). This DNA virus has more than 200 known serotypes (5, 6), forty of those can infect the epithelium of the perineal region (7, 8). Types 16, 18, 31, 33, 35, 45 are carcinogenic thus "high-risk" (HR) sexually transmitted HPVs, while others, like types 6 and 11 are "low-risk" (LR) ones. 70% of cervical cancers are caused by HR-HPV types 16 and 18 (9), and 90% of genital warts are caused by LR-HPV types 6 and 11 (10, 11). Infection of carcinogenic serotypes is usually of transitory nature. The clearance of the infection is about 12-18 months in general (12). The peak of prevalence of transitory HPV infections is in the late teens and early 20s, usually after entering sexual activity (4, 13, 14, 15, 17). 10% of HR-HPV infections are persisting for several years and may develop precancerous lesions. The peak of prevalence of these lesions is in the 30s and it takes about 5-10 years to change for invasive cancers with a maximum of prevalence between 40-50 years of age (18-20).

Actually, there are two HPV vaccines available on the pharmaceutical market. Both are recombinant, assembled from virus-like particles (VLP) of the L1 capsid pro-

tein. The quadrivalent Gardasil (Merck), protecting against serotypes 6, 11, 16 and 18 was introduced in the European Union since December 2006. The bivalent Cervarix (GlaxoSmithKline), protecting against serotypes 6 and 11 is available since July 2007 (22, 23). The US Food and Drug Administration approved in 2009 the HPV vaccine also for males of 9-25 years, identical with the age group of females. The aim of males' vaccination is to decrease the number of genital warts, anal and penile cancers (23).

Among the EU-27 member states, alongside with Norway and Iceland, 20 countries have established the HPV vaccination program. In all countries – except for Austria, where boys are also included – regular vaccination is proposed to girls from 9-18 and catch up vaccination for women from 12-40 (24). Since 2009, around 300 Hungarian municipalities decided to participate in the HPV vaccination by partial or total public financing of the vaccine for underage and young adult females. From September 1, 2014 two doses of the Cervarix vaccine are recommended and available free of charge for 12-13 year old schoolgirls in Hungary as a part of the optional school vaccination program (25). As a result, the program has achieved by 2014 the vaccination rate above 80% in the target population (26).

AIM

In our study, we explored the attitudes toward the HPV vaccine and the knowledge of cervical cancer among high school senior girls in Budapest. Data obtained could predict their future participation in screening programs and their receptiveness toward HPV vaccination (27). Additionally, blanks in their knowledge may indicate the weak points of the Hungarian health education programmes. Our decision for high school seniors of 18-19 years was adjusted to the average age (17.3 years) of the first sexual intercourse in Hungary according to the Global Sex Survey Report (16). The prevalence of HPV infection is the highest in this age group (16) member of which enter also the age of starting a family.

MATERIAL AND METHODS

Based on the Ministry of Education's online databank of the middle schools, we selected randomly 12 high schools in the Hungarian capital between March 2013 and May 2014 (28). First we contacted them via email and when the principals' approval was obtained, we distributed 670 questionnaires among the 18 years old girls who filled them out during the biology class or the class master's session. Given that these girls were not underage, we did not need their parents' consent. The questionnaire and the method of data sampling procedure were reviewed and approved by the institutional board of ethics of the Semmelweis University (reference number: 32/2013). All questionnaires were administered anonymously and voluntarily without any incentives.

The questionnaire contained 54 matrix questions of which 26 concerned basic demographic, socio-eco-

nomie and lifestyle factors, 13 tested the knowledge about the HPV infection and cervical cancer, 11 the information about HPV vaccine and 4 the screening of cervical cancer. The response rate was 73.44% (n = 492). All "I don't know" answers were added to the no reply options. After data processing, we used the IBM-SPSS 21.0 program to explore frequencies and analyse associations by Pearson Chi-square test and binary logistic regression at a significance level of $p < 0.05$.

RESULTS

Socio-demographic background and lifestyle factors

233 girls (47.4%) studied in grammar schools and 259 (52.6%) in vocational schools representing equally both school types. 66.2% of girls lived in Budapest, others rented an apartment, lived in a school's dormitory or were daily commuters to the capital from the suburbs. The majority (87%) had siblings and 12.3% had a mother employed in the health service. The fathers' proportion employed in the health service was only 1.6%. Religious affiliation was admitted in 25%. Atheism was indicated in 19.5% while 13.8% were undecided in religious matters. The overwhelming majority (73.1%) followed no special diet but only 50.3% dined regularly at the same time of the day. 83.3% exercised regularly or occasionally, from light jogging to rigorous physical activity. As for unhealthy habits, 28.8% of the girls were smoking tobacco (tab. 1).

Table 1. Basic socio-demographic and lifestyle factors of the sample (n = 492).

Variables	Proportions in %
Number of siblings (n = 492): none (n = 64) one (n = 228) two or more (n = 200)	13.0 46.3 40.7
Perception of family's income (n = 484): good (n = 103) average (n = 311) below average (n = 70)	21.3 64.3 14.5
Religious affiliation (n = 287): religious (n = 123) atheist (n = 96) indecisive (n = 68)	42.9 33.4 23.7
Attitude toward marriage (n = 479): positive (n = 357) negative (n = 43) indecisive (n = 79)	74.5 9.0 16.5
Time of giving birth to first child (n = 444): before the age of 25 (n = 189) after the age of 25 (n = 227) no plans for childbearing (n = 28)	42.6 51.1 6.3
Internet usage (n = 490): constantly online (n = 70) 2-3 hours/day (n = 255) 1 h/day or less (n = 165)	14.2 52.1 33.6

Attitudes toward vaccines in general

To the general question about vaccination programmes, 63.1% indicated that compulsory vaccines were important. The attitude toward recommended vaccination was markedly different, thus only 16.4% would accept this option. The main reason for 83.6% rejection was a negative concern about efficacy. As for family background, 16.4% of the girls had experienced supportive attitudes by family members toward recommended vaccination (tab. 2). Concerning the origin of their knowledge, girls gained information more likely from friends and family members (37%) and via Internet (30.1%), than from distinct medical professionals (24.6% gynaecologist, 19.5% GP and 15.9% district nurse). Television and radio programs were source of information in 22.4%.

Knowledge about cervical cancer and attitudes towards the HPV vaccine

Only 33.7% of the girls knew that cervical cancer was caused by infection. Nevertheless, the majority (74.7%) marked HPV as a possible causative agent. Thus they

did either not conceive that "V" of the acronym "HPV" stood for a virus, or they ignored the viral origin of the cervical cancer. Significantly more girls knew in grammar schools than vocational schools that the partner's promiscuity could also be a risk factor (tab. 3).

About the possible ways of prevention, the overwhelming majority (98.4%) believed that attending cervical cancer screening was important. When asking them about possible reasons for the low attendance rates, 41.1% marked uncompensated losses in time and money, 31.1% indicated lack of motivation, 28.9% shame, and 22.8% unfriendly circumstances, finally 21.7% mentioned fear of pain by the examination.

Attitudes towards HPV vaccine (tab. 4) were rather supportive independent of the school type. 90.2% had heard of the vaccine however only 23.1% were already vaccinated with significant majority of the grammar school students. 60.7% of grammar school and 59.3% of vocational school girls would make the vaccine compulsory ($p = 0.078$). Vocational school girls (70.2%) were more supportive than those in grammar schools of vaccinating boys and the significant ($p = 0.008$) majority

Table 2. Receptiveness toward and rejection of vaccines.

Type of vaccination	Receptive with high importance (%)	Receptive with minor importance (%)	Rejected (%)
Compulsory	63.1	29.3	7.6
Recommended	16.4		83.6

Table 3. Girls' knowledge about cervical cancer and its risk factors in grammar and vocational schools.

Variables	Grammar schools (%)		Vocational schools (%)		p-value
	Yes	No	Yes	No	
Cervical cancer is due to infection	33.5	66.5	34	66	0.906
HPV infection is an STD	72.1	27.9	68.3	31.7	0.363
Promiscuity is a risk factor	64.8	35.2	56.4	43.6	0.056
Partner's promiscuity is a risk factor	45.9	54.1	33.6	88.4	0.005
Unprotected sex is a risk factor	57.9	42.1	49.8	50.2	0.071

Table 4. Attitudes toward the HPV vaccine in grammar and vocational schools.

Variables	Grammar schools (%)	Vocational schools (%)	p-value
In favour of compulsory vaccination	60.7	59.3	0.078
In favour of vaccinating boys	54.4	70.2	0.008
In favour of vaccinating their future children	79.1	79.9	0.864
Positive vaccine status	30.8	15.7	0.001
Negative vaccine status but in favour of getting vaccinated	15.2	12.7	0.102
Awareness of risk of infection	24.8	75.2	0.071

(54.4%) would have vaccinated them indeed. Parental attitudes and that of other relatives could also have influenced their beliefs thus 19.6% had family members who had already received the HPV vaccine.

By three binary logistic regression models (tab. 5) we analysed the factors influencing the girls' attitudes toward making the HPV vaccine compulsory, giving the vaccine to their own future children and getting boys also vaccinated. Ten outcomes of the models were statistically significant ($p < 0.05$). Perceived HPV risk showed significant positive association with all three dependent variables ($p = 0.014$, $p = 0.030$, $p = 0.046$). Fear of adverse effects showed a negative association with compulsory HPV vaccination ($p = 0.014$) and rejection of vaccinating own future children ($p = 0.004$). The belief that cervical cancer was preventable by vaccination was only associated with increased willingness to get their future children vaccinated ($p = 0.007$). The belief that HPV can cause cervical cancer had a significant

effect both on preferring the compulsory vaccination ($p = 0.003$) and to get their future children vaccinated ($p = 0.040$). Positive family attitude toward recommended vaccination was associated with increased preference toward making it compulsory ($p = 0.019$) and getting males also vaccinated ($p = 0.036$).

DISCUSSION

Only few studies have explored so far the attitudes toward the HPV vaccination in the Central-Eastern European region (29, 32, 42, 43). To our knowledge, no Hungarian study has questioned females in secondary education whether they would support vaccinating boys too, or what consequences HPV could cause in males.

As we learned it, our sample did not have any educational intervention focused on HPV prior to our survey. We hoped to recognise whether girls were able to perceive possible risk factors of cervical cancer and

Table 5. Multiple binary logistic regression model of independent variables related to compulsory, the future own children's and boys' vaccination.

Independent variables	Girls attitudes toward vaccination								
	If compulsory			Of their future children's			If provided for boys too		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
School type: grammar v. vocational	1.567	0.836-2.939	0.162	1.594	0.736-3.453	0.237	1.764	0.908-3.425	0.094
Place of residence: capital v. others	0.520	0.268-1.008	0.053	0.603	0.268-1.355	0.221	0.953	0.475-1.911	0.891
Smoking: yes/no	1.715	0.895-3.287	0.104	1.792	0.733-4.376	0.201	0.903	0.441-1.849	0.781
Perceived HPV risk: yes/no	1.968*	1.013-3.822*	0.046*	2.767*	1.102-6.951*	0.030*	2.073*	1.013-4.242*	0.046*
Fear of adverse effects: yes/no	0.472*	0.259-0.862*	0.014*	0.351*	0.170-0.722*	0.004*	1.284	0.674-2.444	0.447
Vaccination is preventive: yes/no	1.804	0.849-3.934	0.125	3.343*	1.381-8.090*	0.007*	1.268	0.582-2.763	0.550
HPV can cause cervical cancer: yes/no	6.093*	1.861-19.943*	0.003*	3.395*	1.060-10.874*	0.040*	1.308	0.448-3.817	0.623
HPV is STD agent: yes/no	1.036	0.470-2.282	0.930	2.117	0.863-5.191	0.101	1.857	0.792-4.350	0.154
Positive family attitude toward recommended vaccination: yes/no	3.025*	1.195-7.653*	0.019*	3.331	0.872-12.721	0.078	2.784*	1.068*	0.036*

* $p < 0.05$

HPV infection. We believe that knowledge about specific diseases is essential for shaping one's future behaviour, lifestyle and attitudes toward primary and secondary prevention specifically the vaccination (30). A recent Greek study of 17-24 year old female students has also shown that knowledge plays a protective role in regular cervical screening attendance and increased vaccine uptake (31).

Based on the fact that both grammar and vocational school students were almost equally represented in our sample, we believe that comparisons of different school types provided excellent opportunity to evaluate the general attitudes and knowledge of the age group concerned. Our findings confirm that Hungarian female students of our study are mostly supportive of the HPV vaccine, which correlates with findings of previous Hungarian (29, 32) and international studies (31, 33, 34). Nevertheless, only 23% had been vaccinated, with significantly more girls from grammar than vocational schools. The lesser uptake of the vaccine compared to other studies (31, 33-37) may be explained by the fact that free of charge vaccination was only recently implemented in this country. More than half of the girls support the compulsory HPV vaccination and the majority would have their future children also vaccinated. We found no direct link between the attitudes toward vaccines in general and specifically the HPV vaccine, even though most were supportive of compulsory vaccination and 2 of 10 girls were receptive of recommended vaccination. However, when asked about factors of rejecting vaccines generally, they indicated concerns about the efficacy.

Our sample also seems to have conceived the other gender's responsibility in spreading the virus, for 63.2% with significantly more girls of vocational schools was in favour of including boys in the vaccination program. However, concerning this outcome, it must be emphasised that the vaccination of males has not been globally proven cost-effective yet (38-42).

Related to the secondary prevention, and similar to the findings of previous Hungarian studies, the girls believed that cervical cancer screening was important (28). They explained the low attendance rates of the target population with uncompensated financial losses and time-consuming procedure (41.1%) due to absence from the workplace and by the additional transport fees. Nearly a third of them indicated also the lack of motivation as a possible negative factor (31.1%).

Despite their positive attitudes toward the vaccine, the students of our study do not have sufficient knowledge about the cervical cancer. This correlates with the findings of previous Hungarian (41-43) and international studies, which indicated low levels of knowledge among the adolescent population (30, 34, 36, 37, 44-47). While only 33.7% of the sample were aware of the infectious origin of this cancer, 74.7% believe that HPV is the caus-

ative agent, which may suggest that they are either not familiar with the virus or the definition of infections. Additionally, they may not have any detailed information on the risks of infections. Nevertheless, several studies suggest that young females are more than willing to be educated on this disease and its prevention (29, 30, 41, 46). Even though the girls were positive toward the vaccination of boys, they were not aware of the nature of affections caused by the virus in men.

CONCLUSIONS

Our study of 18/19-year-old senior girls from 12 high schools in the Hungarian capital revealed that this population either lacked essential knowledge of cervical cancer or their knowledge (if any) was insufficiently structured. Education and school type appear to have a significant impact on the level of information – girls in grammar schools proved to have a more founded knowledge than those in vocational schools. This phenomenon may be traced back to the fact that grammar schools provide more global and extensive training, whilst vocational schools are rather focused on their professional curriculum. However, more accurate knowledge had a protective role – girls having more information about the disease were more aware of the risk of getting infected and were also more in favour of being vaccinated and providing active immunisation for their own future children. These girls were also more likely to support the boys' compulsory vaccination. However, their rather negative attitudes toward recommended vaccination and the doubts regarding efficacy of vaccine raises the question whether these girl had sufficient knowledge on vaccines in general. These facts – as blanks of knowledge – underline the significance of primary prevention and the role of health education in Hungary, including also a complex and more thorough education on sexual life respectively. Although the recent extension of the recommended vaccination schedule with HPV bivalent vaccine may strengthen the primary prevention it does not relieve the health policy from the responsibility of more effective health education, or from pursuing the sustained support of secondary prevention.

STRENGTHS AND LIMITATIONS

Given that we selected our sample randomly in 12 high schools in Budapest, this capital centred population was not representative that of the general high schools senior girls' in Hungary. Furthermore, we did not collect data on the girls' past and current sexual habits and experiences, and their medical history regarding STDs. Concerning their status of immunisation we did not asked whether they have already received all the three doses of the HPV vaccine. The strength of our study is a quite homogenous and specific population, thus our results may reflect a reliable pattern of their attitudes. □

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