

Full Length Research

What teens know about HPV? A cross-sectional study with HBSC Portuguese survey

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Accepted 17 May, 2016; Published 25 June, 2016

Globally, cervical cancer is the fourth leading cause of death for women and is usually associated with infection by the human papillomavirus (HPV). To analyse knowledge related to HPV in Portuguese adolescents, and identify the influence of gender, school year, having had sexual education/sexual intercourse in adolescents' knowledge of HPV. The 2010 study provides national representative data of 5050 Portuguese adolescents, randomly chosen from those attending 6th, 8th and 10th grades during the 2009/2010 academic year. The sample included 52.3% girls and 47.7% males; whose mean age was 14.0 years old. Measures included knowledge of HPV transmission/prevention and having had sexual education/sexual intercourse. Overall, results showed the majority had low level of knowledge, responding incorrectly or saying they did not know the answer. Nevertheless, girls and adolescents who reported having had sex education in a school context showed significantly more knowledge than boys and adolescents who did not report having had sex education in a school context. Another result that should be emphasized is the positive effect that sex education at school had specifically in what regards knowledge about HPV. These results could have significant implications for information provision and the targeting of future education programmes. In terms of prevention, it emphasises the need to teach about this issue, encourages HPV vaccination and regular screening for cervical cancer and other STIs, that are crucial for the promotion of healthy sexual behaviours.

Key words: HPV, sexually transmitted infection, knowledge, adolescents, sexuality.

INTRODUCTION

Globally, cervical cancer is the fourth leading cause of death for women and is usually associated with infection by the human papillomavirus (HPV), which is the most sexually transmitted viral agent. The estimated risk of HPV infection is about 50-80% in both sexes. In 2012 528,000 new cases were diagnosed worldwide (Ferlay et al., 2013). In addition, there is a high prevalence of infection by this agent in young people with sexual activity, constituting the group with the highest number of infected, reaching rates of 46% in women aged 20-30 years old (Ferlay et al., 2013). Early initiation

of genital sexual life, especially initiation within the first year since menarche occurred, increases the risk and persistence of infections and the risk of more severe damages because of the immaturity of the genital organs, and that finding justified the recent prescription of the vaccine to younger ages (SPG, 2014). Portugal is the country of Western Europe with the highest incidence rate of cervical cancer. The presence of a malignant tumor associated with a virus in almost 100% of cases has led to the development of preventative vaccines against some subtypes of HPV (Bray et al., 2013; Ferlay et al., 2013; 2014).

According to research, having been vaccinated against HPV has the potential to dramatically reduce cervical cancer rates (Bray et al., 2013). In June 2006, the Food and Drug Administration approved Gardasil,

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manufactured by Merck, for use in females ages 9-26. This vaccine protects females from HPV strains 6, 11, 16 and 18. Types 6 and 11 are the identified causes of 90% of genital warts and types 16 and 18 are high-risk HPV strains that cause 70% of cervical cancers. Ideally, this vaccine should be given to females before they become sexually active, so as to prevent an HPV infection. The vaccine is most effective in females who have not acquired any of the 4 types covered by the vaccine (McLemore, 2006).

For these reasons, national immunization programs in Portugal have recommended HPV vaccination for adolescents (Ferlay et al., 2015; DGS, 2008, 2014). In Portugal, the HPV vaccine was introduced in the Vaccination Plan in October 2008, for all 13 year old adolescent girls in a three-dose schedule. Starting on October 1st, 2014, the vaccination plan changed its recommendation to include girls between 10 and 13 and altered the dose schedule for two (DGS, 2008, 2014).

However, given the potential consequences of HPV infection in males, the experts argue that the only way of reducing the risk of disease individually beyond indirect protection, is vaccinating both boys and girls (DGS, 2008, 2014).

While some lawmakers, physicians and health educators have worked diligently to encourage citizens to take advantage of the first cancer vaccine, some parents of adolescent and teenage girls resist the opportunity to immunize their children against this common infection (Brabin et al., 2006).

Moreover, several studies have shown that young people don't present good knowledge of HPV and they don't associate it with cervical cancer (Brabin et al., 2006; Noakes et al., 2006; Walsh et al., 2009). With the beginning of marketing of preventive vaccines and, subsequently, the introduction of the tetravalent vaccine in the National Vaccine Program, there was an increase of information disseminated by different means (DGS, 2008, 2014). For these reasons, all adolescents and young adults are considered relevant groups in preventive actions and practices in what HPV prevention is concerned.

The goals of this article were to a) analyse knowledge related to HPV in Portuguese adolescents, and b) identify the influence of gender, school year, having had sexual education in school and having had sexual intercourse on the knowledge of HPV transmission/prevention.

Thus, this study aimed to examine the knowledge of adolescents on this issue and understand if the adopted educational strategies was appropriate and sufficient.

METHODS

This study was based on data from the Health Behaviour in School-Aged Children (HBSC) Portuguese survey (Matos et al., 2011). The Health Behaviour in School-aged children (HBSC) is a collaborative WHO study,

undertaken in 44 countries with the aim to study school-aged behaviour regarding health and risk behaviours in adolescence. Portugal is part of this group of countries since 1996 (Currie et al., 2000). The HBSC is a school-based survey of adolescents' health behaviours, carried out every 4 years. Collected data is used at a national and international level, using an internationally standardized methodological protocol (Roberts et al., 2009) to gain new vision into young people's health and well-being, so as to understand the social and psychological determinants of health, and to incorporate policies to improve young people's lives.

The 2010 study provided national representative data of 5050 Portuguese adolescents, randomly chosen from those attending 6th grade, 8th grade (middle school) and 10th grade (high school) during the 2009/2010 academic year. The sample included 52.3% of girls and 47.7% of males, whose mean age was 14.0 years old (standard deviation 1.9). The majority of adolescents were Portuguese (94.4%), 30.8% attended the 6th grade, 31.6% attended the 8th grade and 37.6% attended the 10th grade. This study used a subset of 8th (n=1594) and 10th graders (n=1900) to represent middle school and high school educational stages. The majority was female (middle school, 51.0%; high school, 55.7%), Portuguese (94.1% and 94.3%, respectively) and their mean ages were respectively 13.8 and 15.9 years old (standard deviation 0.8 for both).

The HBSC 2010 survey was, like the previous waves, nationally representative. All ethical procedures were followed, and school and parental informed consent was obtained. Pupil participation was voluntary and anonymous. Details on methods and data collection are published elsewhere (Matos et al., 2011; Roberts et al., 2009).

Although numerous aspects of health behaviour were addressed in the survey, only those relating to socio-demographic characteristics, sexual education at school context, knowledge about HPV, and sexual behaviour, namely having had sexual intercourse, were addressed. The main focus of the present study was to: a) analyse knowledge related to HPV, and b) identify the influence that gender, school year, having had sexual education at school context and having had sexual intercourse on the knowledge of HPV transmission/prevention. Connections between these elements of study were examined descriptively in addition to evaluating their potential for prevention.

Measures

These study included issues related to socio-demographic characteristics (gender and school year), identifying if the participant had ever had sexual education at school (Yes/No) and if the participant had ever had sexual intercourse (Yes/No), and issues that assessed knowledge regarding HPV

transmission/prevention (constituted by 4 items). Young people were asked to respond to four statements about HPV transmission/prevention: 1. "condom protects against HPV"; 2. "HPV can cause cervical cancer"; 3. "there is a HPV vaccine"; 4. "the HPV vaccine protects against cervical cancer"; items were rated on a three response options (Yes, No and I do not know). Only responses that showed correct information scored and so final scores ranged from 0 to 4, with high scores suggesting more positive knowledge/more information.

Data analysis

Analyses and statistical procedures were carried out in the *Statistical Package for Social Sciences* program (SPSS, version 22.0 for Windows). Overall, structured self-reported questionnaires were responded by the subset of middle school (8th grade) and high school (10th grade) students from the HBSC (3494 participants) survey. The total number differed according to the sub-sample used (middle school and high school; reporting they have had sex or not, and they have had sex education at school or not), and considering that some participants have not replied to some questions.

Frequencies, Means, standard deviations, and other descriptive statistics were performed to characterize the sample. HPV knowledge was then compared between genders, school year, students who reported having had and not having had sex education at school, and between those reporting having had and not having had sexual intercourse, using Chi-square (χ^2) and ANOVA tests. The level for statistical significance was set at $p < 0.05$. Only significant results were discussed.

RESULTS

Differences between gender/school year and knowledge regarding HPV transmission/prevention of Portuguese adolescents

Knowledge regarding HPV transmission/prevention: the distribution of each item is shown in Table 1. The majority showed a low level of knowledge, responding incorrectly or saying they did not know the answer. The mean total score in relation to knowledge about HPV was 1.94 ($SD=1.50$), with boys showing significantly less knowledge ($M = 1.76$, $SD=1.51$) than girls [$M = 2.09$, $SD=1.48$ ($F(1, 3073) = 37.316$, $p < 0.001$)]. No statistically significant differences were found for school year.

Differences between having had sex education/sexual intercourse and knowledge regarding HPV transmission/prevention of Portuguese adolescents

The majority said that they had sex education at school in the last years ($n=2081$, 66%) and 21.8% ($n=748$)

reported having had sexual intercourse. The results showed that the students who have had sexual education showed significantly more knowledge ($M = 2.01$, $SD=1.49$) than those who reported not having had sexual education [$M = 1.82$, $SD=1.53$, ($F(1, 3015) = 10.471$, $p \leq 0.001$)]. As for the comparison between the students who reported having had sexual intercourse and those who reported not having had it, it did not show statistically significant differences (Table 2).

Differences between having had sex education at school by gender and knowledge regarding HPV transmission/prevention of Portuguese adolescents

Considering the total sample that mentioned having had sexual education, there were 888 boys and 1193 girls. Results showed that girls who reported having had sex education presented more knowledge regarding HPV transmission/prevention than girls who did not have sex education. A significant variation was found between having/not having had sex education for the following items of knowledge - HPV can cause cervical cancer ($\chi^2(1) = 27.89$; $p < .001$), there is a HPV vaccine ($\chi^2(1) = 16.74$; $p < .001$) and the HPV vaccine protects against cervical cancer ($\chi^2(1) = 6.82$; $p < .05$). No statistically significant differences were found for boys having or not having had sex education (Table 3).

Predictors of facts about knowledge regarding HPV transmission/prevention

It was carried out by stepwise multiple regression method in order to assess predictive factors of knowledge about HPV to the total sample. They were introduced as potential predictors, gender, grade, having had sexual education and having had sexual intercourse.

The results obtained showed the existence of two independent predictive variables at the level of knowledge about HPV, which in its full explained 31% of the variance of the model. Gender was the first independent variable which was found and it explained 14% of the model and having had sex education was the second independent variable found, explaining 17% of the model (Table 4).

DISCUSSION

The aim of this study was to analyze knowledge related to HPV in Portuguese adolescents, and understand if the adopted educational strategies are appropriate and sufficient. This study was designed to complement public health surveillance data on the knowledge HPV transmission/prevention by obtaining information from Portuguese adolescents, namely girls in the age-range

Table 1. Differences between gender/ school year and knowledge regarding HPV transmission/prevention of Portuguese adolescents in 2010 (N = 3494).

Variable	Gender						SchoolYear						χ^2 (Gender)	p	χ^2 (Grade)	p	M	SD	F
	Boy (N=1622)		Girl (N=1872)		Total ¹ (N=3494)		8 th grade (N=1594)		10 th grade (N=1900)		Total ¹ (N=3494)								
	N	%	N	%	N	%	N	%	N	%	N	%							
The condom protects against HPV infection													1.498	n.s	.570	n.s			
Correct answer	704	49.1	858	50.8	1562	50.0	711	50.5	851	49.6	1562	50.0							
In correct answer	91	6.3	115	6.8	206	6.6	96	6.8	110	6.4	206	6.6							
Do not know	636	44.6	717	42.4	1314	43.4	602	42.7	754	44.0	1356	43.4							
HPV can cause cervical cancer													17.885	.000	12.773	.002			
Correct answer	527	36.8	743	44.0	1230	40.7	569	40.4	701	41.0	1270	40.7							
In correct answer	118	8.2	107	6.3	225	7.2	127	9.0	98	5.7	225	7.2							
Do not know	786	54.9	838	49.6	1624	52.1	712	50.6	912	53.3	1624	52.1							
Knowing about the existence of HPV vaccine													82.238	.000	.252	n.s			
Correct answer	498	34.8	859	50.9	1357	43.5	605	43.0	752	43.9	1357	43.5							
In correct answer	272	19.0	265	15.7	537	17.2	244	17.4	293	17.1	537	17.2							
Do not know	659	46.1	565	33.5	1224	39.3	557	39.6	667	39.0	1224	39.3							
The HPV vaccine protects against cervical cancer													54.914	.000	2.680	n.s.			
Correct answer	437	30.6	719	42.7	1156	37.2	537	38.3	619	36.2	1156	37.2							
In correct answer	88	6.2	56	3.3	144	4.6	70	5.0	74	4.3	144	4.6							
Do not know	527	36.8	743	44.0	1810	58.2	794	56.7	1016	59.4	1810	58.2							
HPV Total knowledge																	1.94	1.504	
Boys																			37.316**
Girls																	1.76	1.51	
8th grade																	2.09	1.48	
10th grade																			.234
																	1.96	1.51	
																	1.93	1.50	

¹ The total numbers differ considering that some young people have not replied to some parameters. n.s. = not significant / In bold – values that correspond to an adjusted residual $\geq |1.9|$

Table 2. Differences between having had sex education/ sexual intercourse and knowledge regarding HPV transmission/prevention of Portuguese adolescents in 2010 (N = 3494).

Variable	Having had sex education						Having had sexual intercourse						χ^2 (SE)	p	χ^2 (SI)	p	M	SD	F
	Yes (N=2081)		No (N=1075)		Total ¹ (N=3156)		Yes (N=748)		No (N=2688)		Total ¹ (N=3436)								
	N	%	N	%	N	%	N	%	N	%	N	%							
The condom protects against HPV infection													1.293	n.s	9.545	.008			
Correct answer	1031	50.8	510	49.3	1541	50.3	358	54.3	1173	48.5	1531	49.8							
In correct answer	119	5.9	70	6.8	189	6.2	48	7.3	154	6.4	202	6.6							
Do not know	878	43.3	455	44.0	1333	43.5	253	38.4	1091	45.1	1344	43.7							
HPV can cause cervical cancer													21.897	.000	25.683	.000			
Correct answer	872	43.2	379	36.5	1251	41.0	270	41.0	983	40.8	1253	40.8							
In correct answer	109	5.4	93	9.0	202	6.6	76	11.5	144	6.0	220	7.2							
Do not know	1036	51.4	565	54.5	1601	52.4	313	47.5	1285	53.3	1598	52.0							
Knowing about the existence of HPV vaccine													20.122	.000	1.995	n.s			
Correct answer	939	46.5	397	38.4	1336	43.8	287	43.6	1049	43.5	1336	43.5							
In correct answer	338	16.7	182	17.6	520	17.0	124	18.8	404	16.7	528	17.2							
Do not know	741	36.7	456	44.1	1197	39.2	247	37.5	960	39.8	1207	39.3							
The HPV vaccine protects against cervical cancer													9.548	.008	15.819	.000			
Correct answer	784	38.9	355	34.3	1139	37.4	242	36.9	898	37.3	1140	37.2							
In correct answer	73	3.6	55	5.3	128	4.2	49	7.5	92	3.8	141	4.6							
Do not know	1156	57.4	624	60.3	1780	58.4	365	55.6	1416	58.9	1781	58.2							
HPV Total knowledge																	1.94	1.504	
Having SE																	2.01	1.49	
NothavingSE																	1.82	1.53	
																			4.264
Having SI																	2.47	1.50	
Nothaving SI																	1.91	1.51	

¹ The total numbers differ considering that some young people have not replied to some parameters. n.s. = not significant / In bold – values that correspond to an adjusted residual $\geq |1.9|$

Table 3. Differences between having had sex education by gender and knowledge regarding HPV transmission/prevention of the Portuguese adolescents in 2010 (N = 3156).

Variable	Having Had Sex Education										χ ²	p		
	Boy ¹ (N=1434)				χ ²	p	Girl ¹ (N=1722)						χ ²	p
	Yes (N=888)		No (N=546)				Yes (N=1193)		No (N=529)					
	N	%	N	%			N	%	N	%				
The condom protects against HPV infection					.300	n.s					4.260	n.s		
Yes	423	49.0	265	50.3			608	52.2	245	48.2				
No	50	5.8	28	5.3			69	5.9	42	8.3				
Do not know	391	45.3	234	44.4			487	41.8	221	43.5				
HPV can cause cervical cancer					1.541	n.s					27.893	.000		
Yes	330	38.4	185	35.2			542	46.8	194	38.0				
No	59	6.9	40	7.6			50	4.3	53	10.4				
Do not know	470	54.7	301	57.2			566	48.9	264	51.7				
Knowing about the existence of HPV vaccine					1.763	n.s					16.735	.000		
Yes	311	36.2	172	32.8			628	54.1	225	44.1				
No	159	18.5	101	19.2			179	15.4	81	15.9				
Do not know	388	45.2	252	48.0			353	30.4	204	40.0				
The HPV vaccine protects against cervical cancer					1.325	n.s					6.824	.033		
Yes	269	31.4	158	30.0			515	44.5	197	38.8				
No	42	4.9	33	6.3			31	2.7	22	4.3				
Do not know	545	63.7	335	63.7			611	52.8	289	56.9				

¹ The total numbers differ considering that some young people have not replied to some parameters. n.s. = not significant / In bold – values that correspond to an adjusted residual ≥ | 1.9 |

which is eligible for the vaccine. These data provided some of the first nationally representative estimates of both adolescents' and young girls in what knowledge and the barriers for adopting HPV prevention are concerned.

Results showed the majority had a low level of knowledge, responding incorrectly or saying they did not know the answers. Boys and adolescents who reported not having had sex education at school showed significantly less knowledge than girls and adolescents who reported having had sex education at school.

When assessing the level of knowledge

amongst all the participants, it was found that 1810 respondents (58.2%) did not know that the HPV vaccine protects against virus that cause cervical cancer. One thousand, six hundred and twenty-four (52.1%) did not know that HPV can cause cervical cancer. One thousand, two hundred and twenty-four (39.3%) did not know that there is a vaccine to prevent HPV.

Boys in particular demonstrated a poor overall knowledge of the issues concerning HPV. Seven hundred and eighty-six (54.9%) boys did not know that HPV can cause cervical cancer and 659 (46.1%) did not know that there is a vaccine to

prevent HPV.

Another result that should be emphasized is the effect that sex education at school, and specifically with regard to knowledge about HPV, has shown, verifying that it only presented positive effects although mainly on girls.

Having had sexual intercourse did not show to be an important variable in order for teens to look for knowledge and thus protect themselves. And the linear regression analysis confirmed that significant factors that affected the level of knowledge amongst all participants were gender and having had sexual education at school.

Table 4. Predictors of factors about knowledge regarding HPV.

DV	Steps	IV	R2	R2 adjusted	β	t
Knowledge regarding HPV	1	Gender	-0.114	0.014	-0.114	-6.118***
	2	Having had sex education at school	-0.056	0.017	-0.056	-3.019**
% Variance explained				31.0%		

DV – dependent variable; IV – independent variable, Removed variables –school year and having had sexual intercourse, *p<.05;** p<.01***p<.001.

Their overall lack of knowledge can discourage the use of barrier contraceptives, leading to an increase in the incidence of various STIs. Also it can lead to having false health beliefs. Because health beliefs are known to influence health behaviors (Medeiros and Ramada, 2010a), lack of knowledge regarding HPV infection may hinder efforts to prevent HPV infection.

Overall, these results, also found in other studies, have shown that knowledge of HPV as an STI, among adolescents and young women, is low (Friedman and She peard, 2007; Tiro et al., 2007).

Other studies concluded that vaccine acceptance is improved with knowledge but also with the parents' acceptance. This corroborates previous research that finds sexual health and HPV to be difficult and time consuming topics for some providers to discuss with adolescents (Medeiros and Ramada, 2010b). However, given the high prevalence of HPV (Dunne et al., 2007; Giuseppe et al., 2008; Medeiros and Ramada, 2010a; 2010b) and the recent opportunity to intervene with a vaccine, these topics are of growing importance to the health of all teens, boys and girls (Reis et al., 2011).

This study has several limitations due to the cross sectional nature of the study survey, the fact that the study was not originally designed for this particular study, and the fact that is based on self-reports. Despite these limitations, this study provided novel data about knowledge toward HPV with nationally representative data of Portuguese

adolescents.

In conclusion, our results suggested that knowledge amongst the public, particularly in subgroups such as boys and those who haven't had sex education at school is poor. Furthermore, there are many misconceptions about the causes of cervical cancer which reinforces the need for post vaccination cervical screening and contraception. These results could have significant implications for information provision and the targeting of future education programmes. Further studies should focus on which source or media of information is most effective in educating such participants, and improving the uptake of the vaccine. In terms of prevention, a continuing emphasis on teaching about this issue and encouraging HPV vaccination and regular screening for cervical cancer and other STIs are crucial for the promotion of healthy sexual behaviors.

Also public policies must be affordable. There is no point in advertising an HPV vaccine and advise about the advantages of getting immunized, and then the vaccine is not integrated in the national vaccination plan nor provided for free, and they appeared in the market with a price equivalent to one or two monthly salaries.

Although the prevalence of HPV is high, infection testing is not regularly recommended before the age of 25, mainly because the HPV infection is frequently transitory and, testing regularly for HPV is not a good screening method.

of ten being a source of anxiety, being far preferable to do regular screening for cervical cancer prescribed in Portugal 2 years after sexual initiation (since genital sexual intercourses less than one year after the menarche is a risky behaviour due to the immaturity of the genital organs) or at 21 years old. The use of condom is advisable in all sexual intercourses. Although the condom does not grant a total protection against HPV because the infection may be outside of the area covered by the condom, it protects partially against HPV and it may prevent other infections that actually increase the damages of a HPV infection (SPG, 2014).

Studies conducted recently by Staines et al. (2013) and Matos (2015) have suggested the need "to give a voice to young people", including young people as active participants in all phases of the interventions: problem identification; planning, implementation, and evaluation. This is especially true regarding sexuality and sexual health in adolescence- perhaps adolescents know better what is really missing when they fail to take preventive measures and engage into sexual health compromising behaviours: what is missing? is it motivation; financial matters, access, fear to have privacy problems? They know it better and their voice has to be taken into consideration when trying to implement effective and relevant public policies.