RESEARCH COMMUNICATION

HPV Vaccine Awareness and Willingness of First-Year Students Entering University in Western Turkey

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Abstract

The objectives of this study were to assess the level of knowledge on HPV and HPV vaccination, and to determine vaccination attitude among Ege university students in Izmir, Turkey. A cross-sectional survey was conducted in first-year English preparatory class. Systematic cluster sampling was applied and 717 (72.6%) of students registered to the 54 classes in 17 different faculties/schools were contacted. Data were collected between April 30 and May 18, 2010, through a self-reported questionnaire including 40 questions. A knowledge score was calculated by summing up the number of correct answers given to the 12 knowledge questions. Analyses were done using t-test, chi-square test, univariate and multivariate logistic regression. The mean age of participants was 19.7±1.5 and 445 (62.1%) were female. Overall, 132 (18.9%) had experienced sexual intercourse, but only 7 of them were female. Among participants, 24.1% had heard of HPV and 25.1% about HPV vaccine. The knowledge item with the highest correct answer rate (32.3%) was that HPV caused cervical cancer. The mean total knowledge score was remarkably poor (1.8±2.6 over 12 items), with 59.6% of respondents having zero as their score. There was no difference in mean knowledge scores between males and females. Higher income, history of sexual intercourse and higher knowledge score were significant factors increasing HPV and vaccine awareness for the whole group, adjusted for gender. Genital cancer history in the family significantly increased awareness, but only among girls. Only three students (0.4%) had already been vaccinated, all being female. Among females, 11.6% intended to be vaccinated vs. 10.1% for males, without any significant difference. Visiting a gynaecologist/urologist in the last three years, a history of genital cancer in the family, vaccine awareness, a higher total knowledge score, and being from the East of Turkey were significant predictors of a positive vaccination attitude. HPVvaccination still remains as a 'hot medical topic' in Turkey, since it hasn't yet become a popular health issue. Based on their age of first intercourse, first year at the university seems to be appropriate timing to inform Turkish girls, whereas it is a bit late for boys. Thus, integration of HPV education into secondary/high school curricula should be considered.

Keywords: HPV vaccine - university students - young adults - knowledge - attitudes

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Introduction

Cervical cancer is the second most common cancer among women worldwide, with half a million who develop it annually and more than half of the cases dying of the disease. In Turkey, it is estimated to be the eighth most common cancer among women with an incidence rate of 4.2 per 100.000 corresponding to 1443 new cases per year (Ferlay et al., 2010).

Since 1960's, cervical cancer prevention has primarily been based on screening paradigms but with the development of vaccination against human papillomavirus (HPV), the cause of the disease, has now become a primary preventative measure that has been recommended (Herzog et al., 2010). HPV vaccine has been widely studied in trials in the last decade and is a cancer vaccine produced for the most commonly carcinogenic types of cervical cancer. Since their licensing in Turkey in 2007 and 2008, both HPV vaccines are commercially available. Debates about the HPV vaccine and HPV-related disease began within the Turkish health community and media since then, as in other parts of the world. However, the incidence of HPV infection in Turkey is not well studied; though hospital based investigations suggest the prevalence of HPV infection ranging from 2.1% to 16.5% among low-risk Turkish women (Inal et al., 2007; Eren et al., 2010).

Knowledge about disease and vaccines are accepted as cornerstones for the success of a vaccination program. Therefore, the aims of this study were to assess the level of knowledge on HPV and HPV vaccination, and to

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determine vaccination attitude among university students in Izmir, who are considered to be in an age group when sexual activity is generally assumed to initiate (Yamazhan et al., 2007).

Materials and Methods

This cross sectional study was conducted among undergraduate students attending the preparatory classes of Ege University in 2009-2010. The data were collected between April 30 and May 18, 2010.

Ege University is in Izmir, the third largest province of Turkey with a population of 3,868,308 (Turkish Statistical Institute, 2009). The total number of students in Ege University is 40,555 and the number of students enrolled in the academic year 2009-2010 was 9880. Among these, 6010 had entered faculties and training schools requiring an English preparatory class. After an exemption exam, 3864 were enrolled in the program and were the target group of the study.

Before the study, a meeting with the head of the School of Foreign Languages was arranged where approval and collaboration were obtained. The questionnaire was pilot tested with 22 first-grade students at a vocational training school of Ege University where English class was not required.

Sampling

A sample size of 1291 students was calculated using 50% prevalence, 4% error, a design effect of 2 and a non-response rate of 20% at 95% confidence interval. This corresponded to 54 classes, using a cluster sampling scheme. The classes were stratified according to their level of English. The clusters were selected in a randomized systematic manner from the total list of 161 classes.

Questionnaire and data collection

A self-reported questionnaire including 40 questions on socio-demographic characteristics and medical history, knowledge about HPV and HPV vaccine, attitude and practice towards vaccination was developed relying on the relevant literature. The questionnaires were delivered to students in their classrooms. The students completed the questionnaire in about 15 minutes, in accompany of one researcher and a school teacher in each class.

Informed consent was sought from students by inviting them to participate after giving a brief explanation at the classrooms by the researchers and a short letter provided at the beginning of the questionnaire containing information about the purpose and objectives of the study. During this process, it was indicated that participation was voluntary. It was also emphasized that privacy and confidentiality would be strictly protected. For this purpose no personal identifiers were included in the questionnaire.

An informative pamphlet on HPV and HPV vaccine was distributed to the participating students after the completion of the questionnaires. The pamphlet included the correct answers to the questions used to measure their level of information.

Data management and statistical analysis

Questions regarding knowledge about HPV and its prevention could be answered as 'true', 'false' or 'don't know'. Total knowledge scores were calculated by adding 1 point for each correct answer. The maximum possible score for knowledge was 12.

The regional classification used in Turkey Demographic Health Survey 2008 has been used to classify the regions of origin according to the province provided by the student (HIPS, 2008). The five regions were; west, south, central, east and north. For income level, the total monthly income declared was divided by the number of household members. Monthly incomes per capita and vaccine prices were converted to Euros according to the

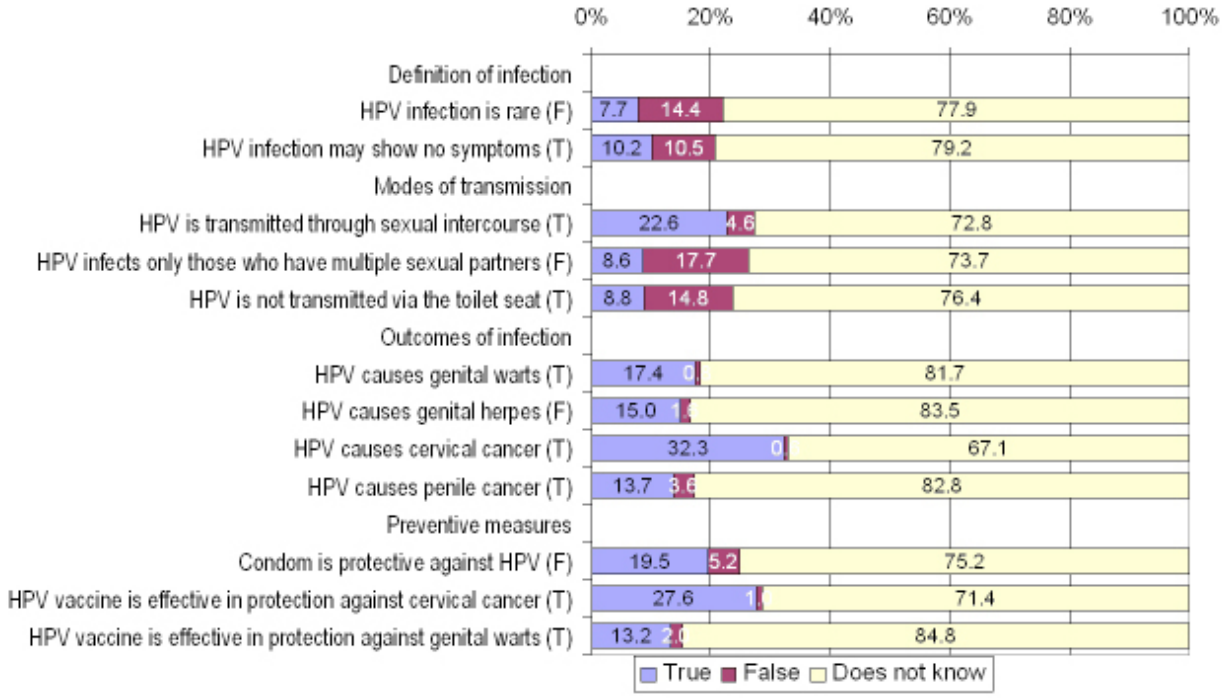

Figure 1. Students' Replies to the Statements Questioning Knowledge on HPV and HPV Vaccine (%). Correct answers included in parentheses as T-true, F-false.

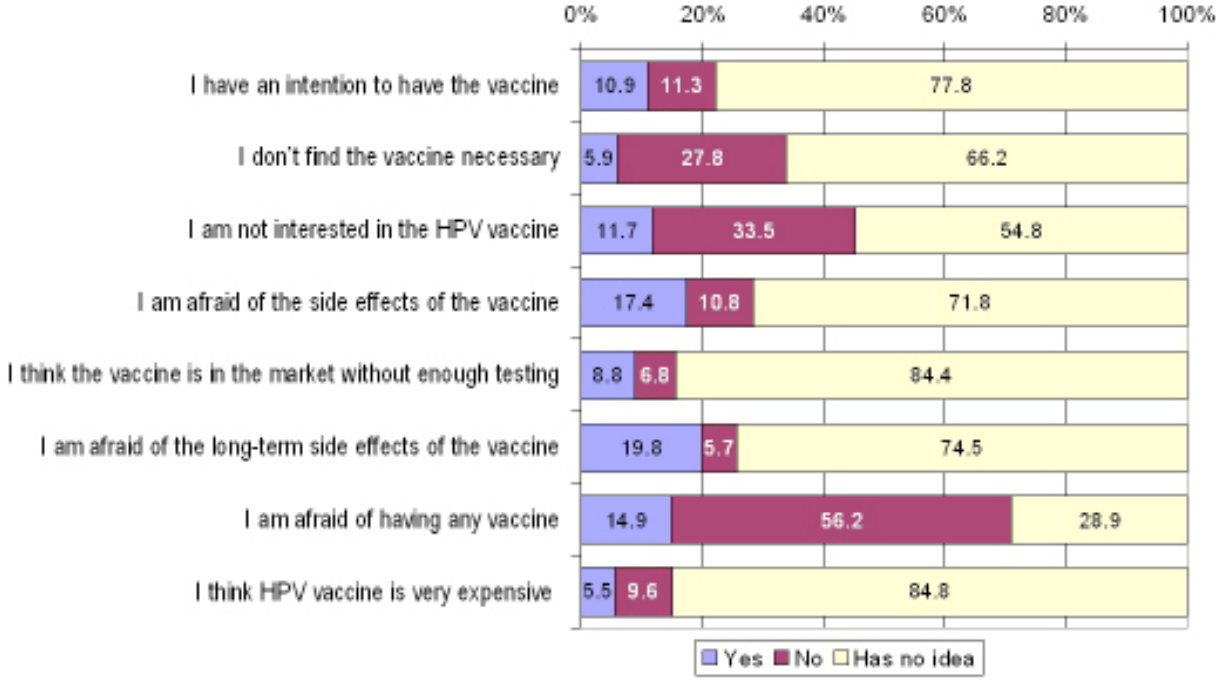

Figure 2. Attitude of Students About the HPV Vaccine (%)

currency conversion rates of Turkish Central Bank, as of May 7, 2010. Overall, 594 (82.8%) students had stated their average monthly income while almost all (n=715) had replied to the question on perceived income. As it is more objective, the first was used for analysis and was categorized according to quartiles.

As much of the literature relied on studies conducted on females, many analyses were stratified according to gender. Analyses were done using t-test, chi-square test, univariate and multivariate logistic regression.

Table 1. Socio-demographic Characteristics of Participating Students

Characteristic		Total (n=717) n (%)
Mean age		19.7±1.5
Gender	Female	445 (62.1)
	Male	272 (37.9)
Faculty/school	Science & engineering	332 (46.4)
	Social sciences and sports	284 (39.7)
	Health sciences	99 (13.8)
Region	West (40.0%)	478 (66.9)
(% of population	South (12.7%)	78 (10.9)
Turkey, 2009 (Turkish	Middle (21.4%)	70 (9.8)
Statistical Institute,	East (18.3%)	50 (7.0)
2009)	North (7.4%)	31 (4.4)
	Abroad (0.2%)	7 (1.0)
Place of family's	Centre of the province	441 (61.7)
residence	District	232 (32.4)
	Village	42 (5.9)

Results

There were a total of 1202 students registered to the classes that were selected as the sample. Although enrolled, 214 students discontinued school and were excluded. The total number of students surveyed was 717 with a coverage rate of 72.6%. There was no refusal in participating but the approaching of the end of the semester and the presence of a spring festival at the campus had led to absenteeism among students.

The socio-demographic characteristics of participants are shown in Table 1. They were from 17 different faculties/vocational schools. Students were from 70 out of 81 provinces of Turkey. The proportion of students from each region was significantly different from the proportions among the population of Turkey, with the exception of the proportion of students from the south. The median monthly income per capita of the study group was 375 TL (189€).

Medical history and sexual experience

The medical and sexual histories of participants are

Table 2. Medical and Sexual History, Overall and Stratified According to Gender

Characteristic		Total n=717	Females n=445	Males n=272
Family history of genital cancer*		33 (4.6)	26 (5.9)	7 (2.6)
Ever had sex before*		132 (18.9)	7 (1.6)	125 (48.4)
Age at first sexual intercourse**	≤16 years	37 (30.1)	0 (0.0)	37 (32.0)
	17-18 years	70 (56.9)	5 (71.4)	65 (56.0)
	≥19 years	16 (13.0)	2 (28.6)	14 (12.0)
MD visit in last three years*	Gynaecologist/urologist	93 (13.1)	82 (18.6)	11 (4.1)
	To other doctor	503 (71.0)	302 (68.5)	201 (75.3)
	No	112 (15.8)	57 (12.9)	55 (20.6)

* p<0.05 between females and males; ** Percentage calculated among students who ever had sex and stated when (n=123) (n, %)

Table 3. Sources of Information About the HPV Vaccine and Under Which Circumstances They Would be Vaccinated

Sources of information on HPV vaccine (n=179)	n (%)
Television	93 (52.0)
Journals & magazines	68 (38.0)
Posters & pamphlets in health facilities	54 (30.2)
Health staff	44 (24.6)
Their acquaintances (friends, mother, etc.)	7 (3.9)
Internet	4 (2.2)
Advertisements in places like cinemas	4 (2.2)
Circumstances under which they would be vaccinated (n=687)	
Doctor's recommendation	613 (89.2)
With their family's recommendation	139 (20.2)
After their friends' recommendation	21 (3.1)
Would be vaccinated in any case	31 (4.5)
Would definitely not be vaccinated in any case	40 (5.8)

described in Table 2. Overall, 18.9% of students stated that they had a sexual intercourse (Table 1). This ratio was 48.4% among males and 1.6% among females (p<0.001), with only 7 of the 132 students with previous intercourse being females. Their mean age at first sexual intercourse was 17.1±1.4 (range 12-21). None of the female students had sex before the age of 17 as compared to 32.0% of their male peers.

Awareness and general knowledge on HPV and its vaccine

Among students, 75.9% had never heard of HPV, 23.1% had heard about the virus but did not know much, and only 1.0% stated that their level of knowledge was good. Students' responses to the questions on knowledge about HPV are shown in Figure 1.

Across the sample, the total knowledge score was remarkably poor with a mean value of only 1.75±2.61 (range 0-10, median 0) over 12, and with 59.6% of respondents having zero as their score. Only 13.0% of the study group had a score ≥6. There was no difference in mean knowledge scores between males and females. According to the single knowledge items in Figure 1, there was significant difference according to gender in only two questions: Among females, 17.2% knew that HPV infection was not rare vs. 9.8% of males (p=0.007) and,

Table 4. Factors Influencing Vaccine Awareness (Reference Categories Shown as OR=1)

	Aware of the vaccine (n, %)			Univariate OR (95% CI)			OR adjusted for gender (95% CI)
	Total (n=717)	Females (n=445)	Males (n=272)	Total (n=717)	Females (n=445)	Males (n=272)	Total (n=717)
Factors							
Place of residence							
Centre of the province	119 (27.1)	89 (30.9)	30 (19.9)	1	1	1	1
District	45 (19.4)	31 (23.5)	14 (14.0)	0.65 (0.44-0.95)	0.69 (0.43-1.10)	0.66 (0.33-1.31)	0.67 (0.46-0.99)*
Village	15 (36.6)	6 (27.3)	9 (47.4)	1.55 (0.79-3.03)	0.84 (0.32-2.21)	3.63 (1.36-9.72)*	1.65 (0.84-3.24)
Income per capita							
Lower (<576 TL)	102 (23.0)	71 (25.3)	31 (19.0)	1	1	1	1
Highest quartile (>575 TL)	48 (32.4)	35 (40.7)	13 (21.0)	1.61 (1.07-2.42)*	2.03 (1.22-3.37)*	1.13 (0.55-2.34)	1.66 (1.10-2.52)*
MD visit in the previous three years							
Yes, obs&gyne/urology	31 (33.3)	29 (35.4)	2 (18.2)	1.06 (0.59-1.90)	1.01 (0.50-2.05)	0.54 (0.11-2.79)	0.90 (0.50-1.65)
Yes, other doctor	109 (21.8)	74 (24.7)	35 (17.5)	0.59 (0.38-0.92)*	0.61 (0.33-1.11)	0.52 (0.26-1.03)	0.56 (0.36-0.89)*
No	36 (32.1)	20 (35.1)	16 (29.1)	1	1	1	1
Ever had sexual intercourse							
Yes	33 (25.0)	5 (71.4)	28 (22.4)	1.00 (0.65-1.55)	6.60 (1.26-34.46)*	1.44 (0.78-2.69)	1.79 (1.00-3.20)*
No	141 (25.0)	119 (27.5)	22 (16.7)	1	1	1	1
Genital cancer in the family							
Yes	12 (36.4)	12 (46.2)	0 (0.0)	1.78 (0.86-3.71)	2.33 (1.05-5.20)*	n/a	1.66 (0.80-3.46)
No	164 (24.3)	111 (26.9)	53 (20.2)	1	1		1
Total knowledge score (over 12)							
< 3	54 (11.3)	41 (14.0)	13 (7.0)	1	1	1	1
3 - 5	51 (48.6)	34 (52.3)	17 (42.5)	7.40 (4.60-11.91)*	6.71 (3.73-12.09)*	9.78 (4.21-22.72)*	7.55 (4.67-12.20)*
≥ 6	55 (64.0)	35 (66.0)	20 (60.6)	13.90 (8.23-23.46)*	11.90 (6.17-22.97)*	20.36 (8.30-49.94)*	14.35 (8.45-24.37)*

* p<0.05

Table 5. Factors Influencing the Tendency to Get Vaccinated (Reference Categories Shown as OR=1)

	Has a tendency to get vaccinated (n, %)			Univariate OR		
	Total (n=717)	Females (n=445)	Males (n=272)	Total (n=717)	Females (n=445)	Males (n=272)
Factors						
Age						
<20 years	48 (11.4)	30 (10.2)	18 (14.2)	1	1	1
20 or more	30 (10.5)	21 (14.5)	9 (6.4)	0.91 (0.56-1.48)	1.49 (0.82-2.71)	0.41 (0.18-0.96)*
Region						
West	56 (11.9)	39 (12.8)	17 (10.2)	1	1	1
South	3 (3.8)	3 (6.0)	0 (0.0)	0.30 (0.09-0.97)*	0.43 (0.13-1.46)	n/a
Middle	5 (7.2)	3 (7.9)	2 (6.5)	0.58 (0.22-1.50)	0.58 (0.17-1.99)	0.61 (0.13-2.78)
North	2 (6.5)	1 (4.8)	1 (10.0)	0.51 (0.12-2.20)	0.34 (0.04-2.60)	0.98 (0.12-8.22)
East	12 (25.0)	5 (22.7)	7 (26.9)	2.47 (1.21-5.03)*	2.00 (0.70-5.72)	3.25 (1.19-8.85)*
MD visit in the previous three years						
Yes, obs&gyne/urology	20 (21.5)	18 (22.0)	2 (18.2)	4.03 (1.62-10.03)*	3.66 (1.17-11.47)*	3.78 (0.55-25.88)
Yes, other doctor	50 (10.0)	29 (9.7)	21 (10.6)	1.64 (0.72-3.73)	1.40 (0.47-4.14)	2.01 (0.58-6.99)
No	7 (6.4)	4 (7.1)	3 (5.6)	1	1	1
Ever had sexual intercourse						
Yes	18 (13.7)	3 (42.9)	15 (12.1)	1.38 (0.79-2.44)	5.98 (1.30-27.55)*	1.67 (0.72-3.86)
No	58 (10.3)	48 (11.1)	10 (7.6)	1	1	1
Genital cancer in the family						
Yes	9 (29.0)	8 (32.0)	1 (16.7)	3.63 (1.61-8.20)*	4.12 (1.68-10.13)*	1.81 (0.20-16.07)
No	68 (10.1)	42 (10.2)	26 (10.0)	1	1	1
Total knowledge score (over 12)						
< 3	27 (5.7)	15 (5.2)	12 (6.6)	1	1	1
3 - 5	18 (17.1)	13 (20.0)	5 (12.5)	3.42 (1.80-6.48)*	4.60 (2.07-10.23)*	2.02 (0.67-6.11)
≥ 6	24 (27.9)	16 (30.8)	8 (23.5)	6.39 (3.47-11.78)*	8.18 (3.73-17.94)*	4.36 (1.63-11.68)*
Has heard about the vaccine						
Yes	36 (20.3)	26 (21.0)	10 (18.9)	2.95 (1.82-4.78)*	3.06 (1.69-5.54)*	2.70 (1.15-6.29)*
No, never heard	42 (8.0)	25 (8.0)	17 (7.9)	1	1	1

* p<0.05

more male students were unaware of the fact that condom wouldn't prevent HPV infection, as compared to females (26.6% vs. 15.2%, p=0.002). The HPV knowledge scale showed good internal consistency (α=0.92).

Among participants, 179 (25.1%) had heard about the vaccine. Their sources of information are presented in Table 3. The vast majority of the students (89.3%) replied that they would like to receive more information about the HPV vaccine. Female students were significantly more interested in becoming more informed (96.1% vs. 78.2%, p<0.001).

Vaccination attitude for HPV

Eight students (1.1%) had an acquaintance vaccinated against HPV. There were only three students (0.4%) who already had the vaccine: all were female, two had visited a gynaecologist in the past three years, none had a history of genital cancer in the family and one had a vaccinated acquaintance.

The students' responses to attitude questions are shown in Figure 2. Gender differences were observed in responses to four of the attitude questions: more males (20.1%) than females (5.9%, p<0.001) stated they did not intend to have the vaccine. Among males, 12.3% considered the vaccine unnecessary and 21.3% were not interested in the vaccine, vs. 2.0% and 5.9%, respectively, among females

(p<0.001).But, more females were concerned about long-term side effects than males (22.4% vs. 15.4%, p=0.006).

Correlates of HPV vaccine awareness and intention

When evaluating the awareness of the vaccine, female students were 1.64 (95% CI: 1.14-2.35) times more likely to have heard of the vaccine with 28.4% of females vs. 19.6% of males (p<0.05). According to both univariate and gender-adjusted logistic regression, age (<20 years vs. 20 or more), region of origin, faculty/school and social security did not affect vaccine awareness. Factors having a significant impact on vaccine awareness are shown in Table 4.

There was no gender difference in the tendency to get vaccinated: Among females, 11.6% had a tendency to get vaccinated vs. 10.1% for males (OR=1.17, 95% CI 0.72-1.92, p>0.05). Thus, only univariate ORs are shown in Table 5 for factors with significant impact. Insignificant factors were place of residence, income per capita, faculty/school and social security.

Discussion

Based on the results of our study, unfortunately, first year students entering Ege University are mostly ignorant of HPV infection and HPV vaccine, with only one fourth having heard of them. The most cognised item on HPV causing cervical cancer was known only by one third of the respondents. The mean knowledge score was remarkably poor (1.8 over 12) and 60% of respondents had zero as their score. From the literature, a proportionately similar mean knowledge score (0.62 over 6) was obtained in a study from Malaysia, where awareness was even lower than our study (Wong and Sam, 2010). Coming to west from east, HPV and vaccine awareness was much better in Western populations (Gerend and Magloire, 2008; Mehu-Parant et al., 2010), though the timing of the surveys were also important (Lenselink et al., 2008). Before the licensing of the vaccines, it was well established that both adults and adolescents had limited understanding of HPV (Zimet, 2005). After their introduction, awareness and knowledge on HPV and its vaccine has risen to much higher levels (Donders et al, 2009), especially in countries where women have less financial obstacles to get the vaccine.

Studies from countries with governmentally funded vaccination for girls have found a gender difference in both knowledge and attitude (Chelimo and Wouldes, 2009; Agius et al., 2010; Mehu-Parant et al., 2010). In our group, there was no difference in mean knowledge scores between males and females. Given the very low rate of immunisation in our group and no gender difference in mean scores and vaccination attitude, our findings support the idea that the process of being immunised per se leads to an increased knowledge of the disease. This is probably through the information provided to students before vaccination (Agius et al., 2010).

Although mean knowledge scores and intentions were similar in both genders, young women were more aware of the vaccine and their correct answer rates were higher for two of the 12 knowledge items in our study. This might be a consequence of mass media messages, publicities and leaflets being mostly targeted towards women, since the television (52%) and journals & magazines (38%) were the most common sources of information in our group. The importance of mass media as a source of information on HPV and its vaccine is revealed by other studies as well (Di Giuseppe et al., 2008; Donders et al., 2009; Mehu-Parant et al., 2010; Wong and Sam, 2010). Besides female gender, other significant factors increasing awareness for the whole group were higher income, history of sexual intercourse and higher knowledge score. In addition, girls having genital cancer in the family were 2.3 times more likely to have heard of the vaccine, in concordance with other studies (Di Giuseppe et al., 2008; Chelimo and Wouldes, 2009).

There is a wide range of behavioural approach to the intention of HPV vaccination from country to country. Speaking for the west, acceptability of the vaccine is high with 75-80% (Di Giuseppe et al., 2008; Liddon et al., 2010] while 48-63% is reported for the East (Hsu et al., 2009; Wong and Sam, 2010). The conservative attitude with 10.9% intention in our group might be related with their lack of information, a higher proportion of undecided participants (77.8%) compared to other studies (Chelimo and Wouldes, 2009) or a habituation to or trust in receiving the vaccines delivered free of charge by the state, and considering the 'new' vaccines out of the vaccination scheme as extra or optional. In our study, visiting a gynaecologist/urologist in the last three years (4.0 times), a history of genital cancer in the family (3.6 times), being aware of the vaccine (3.0 times), having a higher knowledge score and being from the East of Turkey (2.5 times) were factors that had a significant positive impact on vaccination attitude.

In our study group, the vaccination rate was very low, with only 0.4%. Similar figures are observed in Eastern populations (Hsu et al., 2009; Kang and Moneyham, 2010). Rates are higher when vaccination against HPV is covered by the state (Chelimo and Wouldes, 2009; Mehu-Parant et al., 2010). The three-dose price of the vaccine is 195€ ($249) for the bivalent and 405€ ($517) for the quadrivalent vaccine in Turkey, which are quite high compared to the median monthly income per capita of the study group, 189€ ($240). It is interesting to note that Gardasil® (Merck), considered as the most expensive vaccine ever marketed, was cheaper at $360 in the US, where the GDP per capita is 4 times higher than Turkey (Fisher et al., 2008; CIA, 2010). Vaccine cost has been an important issue for intention in other studies as well (Conroy et al., 2009; Donders et al., 2009; Kang and Moneyham, 2010; Liddon et al., 2010).

This study has a good sample size, there is no refusal in participation and there are students from almost all over the country. However, there are some limitations of our study. First, it is difficult to interpret vaccination intention in a group with such a low level of information. Latter is that obtained data rely on self-reports. Students who have recently come from villages might have tried to hide their unawareness or, due to cultural norms, girls might have under-reported while boys overstated sexual activity. The coverage rate was also somewhat low with 73% but

absenteeism is not expected to cause a non-responder bias in HPV knowledge or vaccination intention.

In conclusion, HPV and vaccination still remain as a 'hot medical topic' in Turkey, since it hasn't yet become a popular health issue. Based on their age of first intercourse, first year at the university seems to be appropriate timing to inform Turkish girls, whereas it is a bit late for boys. Thus, the integration of HPV education to secondary/high schools could be considered in Turkey. The important role of healthcare providers is also beyond question for this era. There were only two factors positively affecting both awareness and intent: the first of them is the history of sexual intercourse (only for girls) and total knowledge score of HPV and vaccination. All other factors significantly affecting awareness and intent were different from each other, so different strategies might be needed to increase awareness and to modify intent. Thus, the modification of pricing of the vaccine in Turkey could be one of the steps for increasing vaccination rate.

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