

RESEARCH COMMUNICATION

Assessing the Role of Education on Turkish University Students' Knowledge about HPV and Related Diseases

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Abstract

Background: Human papillomavirus (HPV) is one of the most common sexually transmitted causes of infections and adolescents are at high risk. The aim of the study was to evaluate university students' HPV knowledge before and after educational intervention on HPV. **Methods:** This study was undertaken in the Celal Bayar University, Manisa, Turkey. A total of 553 university students were educated about HPV and related diseases. Pre-test was administered before education intervention, and then university students' knowledge was evaluated by using post-test. Paired sample t test was used to evaluate differences between pre-test and post-test answers. **Results:** The mean pre-test score for HPV knowledge was 11.6 (SD 1.76, range 10-20). After education, the mean post-test score was 18.8 (SD 1.52, range 11-20) ($p < 0.001$). **Conclusion:** Information campaigns and education specifically targeting university students are needed in the near future, to promote greater and more adequate knowledge of HPV and related diseases in the general population.

Keywords: HPV - cervical cancer - genital warts - university students

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Introduction

Human papillomavirus (HPV) is one of the most common sexually transmitted infections and the cause of 99.7% of cervical cancer cases, which is among the most frequent cancers in women (Hillard and Kahn, 2005; Gerend and Magloire, 2008; Mehu-Parant et al., 2010; Wong and Sam, 2010). Because HPV poses a greater threat to women's health than men's, research has focused primarily on women's awareness and knowledge of HPV. A recent review of 39 studies worldwide found women's knowledge to be poor despite further studies revealing strong support for HPV vaccination (Klug et al., 2008). Previous studies were conducted among university students (Yacobi et al., 1999; Dell et al., 2000; Lambert, 2001; Wetzel et al., 2007; Gottvall et al., 2009; Höglund et al., 2009; Kim, 2009; Wong and Sam, 2010), many of which show students to have low awareness of HPV.

Adolescents are at high risk for HPV infection: cumulative prevalence rates up to 82% had been reported in sexually active adolescent girls (Brown et al., 2005). Prevalence of HPV infection is highest among young women aged 20-24 (44.8%), overall prevalence among females age 14-24 is 33.8% (Dunne et al., 2007). In a Danish study among male conscripts aged 18-29 years, approximately one-third of the men had an HPV infection detected (Kjaer et al., 2005). Investigations have attributed higher rates of HPV among young and adolescent women to behavioral and biological risk factors including earlier age of sexual debut, number of partners and vulnerability of the adolescent cervix to sexually transmitted diseases

(STDs) (Head et al., 2009).

HPV-associated conditions in adolescents range from asymptomatic and latent infection to genital warts to cervical dysplasia, a precancerous condition. For most adolescents, HPV infection is cleared by the immune system. HPV-associated cervical dysplasia also can regress in adolescent and young adult women. In some adolescents, HPV causes symptomatic genital warts that may cause embarrassment and discomfort, and may necessitate treatments that are costly in terms of time and resources. Adolescents who are exposed to high-risk HPV types, viral infection will persist, resulting in cervical dysplastic changes and a markedly increased risk of cervical cancer (Hillard and Kahn, 2005). Infection with HPV is also associated with vulvar, anal, penile, oropharyngeal, and esophageal carcinomas. A positive test for high-risk (cancer-associated) HPV types is highly sensitive for the detection of cervical dysplasia, due to the etiologic role of HPV in the development of cervical cancer. HPV DNA testing has recently been incorporated into guidelines for primary cervical cancer screening in women older than 30 years of age, and follow-up of adolescent and adult women with abnormal cervical cytology and cervical dysplasia (Wetzel et al., 2007). HPV infection is a major issue in our population as the incidence of cervical cancer announced by the Ministry of Health increased from 0.7/100.000 in 1996 to 3.87/100.000 in 2007 (Onan et al., 2009).

A causal relationship between cervical cancer and HPV has been established. HPV 16 and 18 play the most important role and are associated with approximately

70% of all cervical cancer. Approximately 90% of genital warts are result from with HPV 6 and 11 infections (Chan et al., 2009). In June 2006, the US Food and Drug Administration licensed HPV quadrivalent vaccine for use in girls and women aged 9 to 26 years as a vaccine against HPV types 6, 11, 16, and 18, which collectively account for 70% of cervical cancers and 90% of genital warts (Christian et al., 2009; Weisberg et al., 2009). Although parents will likely be the primary decision makers regarding vaccination in preadolescents, older adolescents and young women will hold some or all of the responsibility for making decisions about vaccination. Lack of knowledge about HPV may make it difficult for these young women to make appropriate decisions (Wetzel et al., 2007).

However, the risk of cancer from HPV infection is not confined to women. HPV can cause genital warts, anal, penile, and head and neck cancers in men. In addition, men's sexual behavior plays a large role in the transmission of HPV. Awareness among men of HPV and the risks it poses for themselves and their female partners is therefore crucial for reducing the incidence of cervical and other cancers, especially because HPV is rarely symptomatic, and men are unlikely to know if they have been infected. In the U.S., a public health education campaign, *Healthy People 2010*, aims to reduce the proportion of people with HPV. However, the success of this and similar campaigns depend on men having knowledge of HPV and awareness of the risks posed by their sexual behavior on their sexual partners' health (US Dept of Health and Human services 2000). Raising men's awareness of the risks of HPV is also essential for maximizing HPV vaccination uptake in countries proposing to establish HPV vaccination programs. Increased awareness in men may not only help in preventing HPV-related diseases in men, but also reduce transmission of HPV to women, resulting in decrease in occurrence of cervical cancer. Because of this reason, it is necessary to evaluate awareness of HPV among men from the university students. Therefore, we enrolled both male men and female university students in Turkey.

The primary objective of this study is evaluation of university students' HPV knowledge before and after educational intervention on HPV.

This study was designed

- (1) to assess knowledge of university students toward HPV and related diseases (especially genital warts and cervical cancer) before education intervention,
- (2) to develop an educational intervention about HPV and related diseases for university students,
- (3) to evaluate the educational intervention for its effectiveness in increasing knowledge about HPV and related disease by using peer to peer education.

Materials and Methods

Design and participants

This study was conducted in the Celal Bayar University, Manisa, Turkey which has five faculties, four colleges, 15 occupational colleges, three institutes, six research and practice centers and one search and practice

hospital exists in total of 34 departments (Celal Bayar University. International Office. <http://www.bayar.edu.tr/english.php>). The university does not have one campus and departments are far from each other. We selected form three university departments connected to Celal Bayar University in the center of Manisa. These schools were School of Physical Education and Sports, School of Applied Sciences, Faculty of Economic and Administrative Science to facilitate transport with minimal cost since we did not receive economic support for the study.

The survey was conducted between November 2009 and February 2010. We could reached 583 university students between these dates and invited them to the study, 20 students did not want to participate and 10 students did not fully complete the questionnaire. These students were excluded from the study. The sample of research consisted of 553 university students.

Preparation for the research

The second and third researchers who were the third year nursing students in School of Health Celal Bayar University trained by first and last researchers by using first education module. This module was included the following concepts: social responsibility/sensibility, peer to peer education, communication techniques, HPV and HPV-related disease especially cervical cancer and genital warts, risk groups, signs and symptoms, diagnosis, complications, prevention, treatment for these disease and HPV vaccine. This module was prepared in accordance of literature and personal experience.

Then, the questionnaire, "HPV and related diseases" education module and the brochure was prepared by the researchers in accordance of literature (From the Immunization Action Coalition, Vaccine Information, for the public and health professionals <http://www.vaccineinformation.org/HPV/qandadis.asp>, Genital HPV Infection-CDC Fact Sheet. <http://www.cdc.gov/STD/HPV/STDFact-HPV.htm#Whatis>, Human Papillomaviruses and Cancer: Questions and Answers <http://www.cancer.gov/cancertopics/factsheet/Risk/HPV>).

Questionnaire

A three-page questionnaire was designed by the researchers on the basis of published research and guidance. The 35 item questionnaire was divided into sections that sought information about the following: (1) demographic data and social background; (2) to evaluated university students' sexual behaviors; (3) a series of questions to assess knowledge, awareness and understanding of HPV and related disease (pre-test); (4) (after education sessions) to investigate the effect of education university student's knowledge about HPV and related disease (post-test); (5) to evaluated attitudes toward being vaccinated against HPV and after education section willingness to participate in HPV vaccine.

The first section was comprised of four questions to elicit information about university students' demographic data and social background, i.e. age, department of the university, marital status, and use of cigarette. The second section included four questions about university students' sexual behaviors such as ever had sexual intercourse,

number of sexual partners, age of first sexual intercourse and use of birth control methods.

Content of pre-and post-test questionnaire

The questionnaire included 10 questions with an open-ended format, as this was considered an appropriate method for in-depth assessment of the university students' knowledge about HPV and related disease. This format would also encourage university students' to talk about

and determine any misconceptions about HPV. By writing what the university students' said, researchers classified their answers. This way, we wanted to see university students' what could write this topic to a deeper level. Questions were designed to test specific areas of knowledge, e.g. *Have you heard of HPV? Please explain, What are the potential health problems of HPV?, How do you think you get HPV?*. The questions and correct answers as supported by evidence are shown in Table 1.

Table 1. Study Questionnaire and Answers

Questions	Correct answers
1. Have you heard of HPV? Please explain	Human papillomaviruse (HPV) is one of the most common sexually transmitted disease and a group of more than 100 related viruses
2. What are the potential health problems of HPV?	HPV can cause normal cells on infected skin to turn abnormal. HPV can cause visible changes in the form of genital warts or cancer (cervical, vulvar, anal, penile, oropharyngeal, and esophageal carcinomas).
3. How do you think you get HPV?	HPV is passed on through genital contact, most often during vaginal and anal sex. HPV may also be passed on during oral sex and genital-to-genital contact. Very rarely, a pregnant woman with genital HPV can pass HPV to her baby during delivery.
4. What are the symptoms of HPV?	Most people who become infected with HPV have no symptoms. Some people get visible genital warts, or have pre-cancerous changes in the cervix, vulva, anus, or penis.
5. Do you know about HPV-related lesions?	Some types of HPV may cause warts to appear on or around the genitals or anus. Genital warts (known as condylomata acuminata) are most commonly associated with two HPV types (6 and 11). Genital warts usually appear as soft, moist, pink, or flesh-colored swellings, usually in the genital area. They can be raised or flat, single or multiple, small or large, and sometimes cauliflower shaped. They can appear on the vulva, in or around the vagina or anus, on the cervix, and on the penis, scrotum, groin, or thigh. After sexual contact with an infected person, warts may appear within weeks or months, or not at all.
6. How is HPV infection diagnosed?	Genital warts in men and women are diagnosed by visual inspection. Most women are diagnosed with HPV infection on the basis of abnormal Pap tests. Also, a specific test is available to detect HPV DNA in women. No HPV tests are available for men.
7. Did you know early diagnosis test for cervical cancer?	A Pap test is used to detect abnormal cells in the cervix. It involves the collection of cells from the cervix for examination under the microscope. A Pap test is the standard way to check for any cervical cell changes. Women have a Pap test at least once every 3 years, beginning about 3 years after they begin to have sexual intercourse, but no later than age 21.
8. Did you know condoms completely protected against HPV?	HPV is transmitted through sexual, skin-to-skin contact with an infected person; no penetration is needed to contract the virus. When a condom is worn, only the penis is protected. Other areas of the genitalia are left exposed and may come in contact with the vagina during intercourse. Though condoms do not provide absolute protection against HPV, it is still important to use a condom. It is far better to have some protection against HPV than none at all. Condoms also provide excellent protection against sexually transmitted diseases and pregnancy(Winner et al 2006)
9. How can people reduce their risk for acquiring genital HPV infection?	The surest way to eliminate risk for genital HPV infection is to refrain from any genital contact with another individual. For people who are sexually active, a long-term, mutually monogamous relationship with an uninfected partner is the strategy most likely to prevent future genital HPV infections. However, it is difficult to determine whether a partner who has been sexually active in the past is currently infected. For those who are sexually active and who are not in long-term mutually monogamous relationships, reducing the number of sexual partners and choosing a partner less likely to be infected may reduce the risk of genital HPV infection. Partners less likely to be infected include those who have had no or few prior sex partners.It is not known how much protection condoms provide against HPV, since areas that are not covered by a condom can be exposed to the virus. However, condoms may reduce the risk of genital warts and cervical cancer.
10. Did you know about HPV vaccine?	In 2006, a vaccine became available to protect females from four HPV types. HPV vaccine protects against genital warts and cervical cancer and use in age 9 to 26 for three doses of the vaccine.

Finally, the last part of questionnaire included six items to assess about attitudes toward being vaccinated against HPV and after education section willingness to participate in HPV vaccine. One question was set to assess the intention to receive the vaccine oneself. Normative beliefs were assessed by one question on participants' beliefs about approval of their HPV vaccination by the people who are important to them. Other questions in this section are as follows: *Have you worried about having/ or developing genital warts?*, *Should STDs and sex education be provided at school?*, *Do you think to share information about HPV with friends and relatives?*, *With whom do you think of sharing this information?*

Demographic data and sexual behaviors questions were collected on pretest questionnaire, attitude HPV vaccine and willingness to participate HPV vaccine questions are collected on post-test questionnaire; other wise, the pre-test and post-test questionnaires were identical.

The questionnaire content validity was assessed by HPV experts, including health care providers and nurses. The questionnaire was revised according to the suggestions of clinical experts in maternity care, including a doctor, a midwife and a nurse. A pilot study was undertaken with 10 university students to test whether the questionnaire was understandable and pragmatic.

Education session and interview schedule

Education module was developed form the literature by the researchers. Three experts in gynecology and HPV (including research facility, physicians and nurse practitioners) met to discuss the content. The decision was made to include information about what is HPV, transmission of HPV, clinical sequel of HPV, risk factor for infection, prevention of HPV infection, HPV related disease (especially genital warts and cervical cancer) and prophylactic benefit of HPV vaccine. In order to evaluate the education module for comprehensibility and clarity, it was reviewed in depth by ten university students. The education module was then revised based upon their comments.

University students were gathered in the classroom by university management organization. The average number of students in the class was 30 and 18 groups were educated at different times.

After gathering in the classroom, participants first completed a survey assessing socio-demographic questions, sexual history and the pre-test questionnaire was administered, with data collected by one researcher (the third author). After pre-test data were collected, a second researcher (the second author) offered university students the education session HPV, genital warts and cervical cancer. During the education sessions, university students were encouraged to ask questions about HPV and related diseases. First author was always present during the education as an observer and responded to the university students' questions when the second and third authors could not answer. The interviews lasted an average 50 minutes, and the sessions occurred in each classroom (pre-test 10 min, education section 30 min, post-test 10 min).

After the session, the post-test questionnaire was administered by the third author. Following this, the

university students also received a brochure about HPV and related diseases, although this was not included as part of the study education intervention. We wanted to give students an education brochure after the education section to facilitate spread of information to the ones who did not attend.

Procedure

The study protocol and consent procedure was approved by the administrative authorities of Celal Bayar University. The aims of the study were explained to university students. Verbal informed consent was obtained from all participating university students.

Analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS, Inc., Chicago, IL, USA). Basic descriptive statistics and frequency calculations were performed on all variables. Two points were given correct answer to questions; one point was given to incorrect answer. The 10 questions' correct answers were summed to create a total knowledge score. Two knowledge scores were calculated: before the education intervention (pre-test), after the education intervention (post-test). The mean values both for each question and total knowledge score were compared (pre-test and post-test) using paired t-test, in order to evaluate whether baseline knowledge improved significantly after the education intervention was administered. A *p*-level of <0.05 was considered statistically significant.

Results

Characteristics of population

The characteristics of the study population and sexual experience and protection are presented in Table 2. The 553 university students ranged in age from 18 to 32 years [mean 20.9 years, Standard deviation (SD) 1.95]; 47.6% were aged ≤20 years and 52.4% of university students were aged >20 years. The mean age was 21.23±2.08 (min=18, max=29) years for the males and 20.46±1.69 (min=18, max=32) years for the females. The majority of the students (98.2%) were single, 53.9% were male and 24.1% of the students were smoking.

Among the participants, 38.9% (n=215) reported current or previous sexual activity and were classified as sexually experienced. 85.1 percent of this group (n=183) stated that they never used a birth control method and 9.3% of participants stated using condoms and only 3.7% of them used oral contraceptives (pills) regularly. We asked students life time number of sex partners, about half (48.8%) stated that total sex partners in their lifetime was more than five (Table 2).

University student's knowledge about HPV before and after education

Data regarding pre- and post-test knowledge about HPV are shown in Table 3. In general according to present results, university students had poor knowledge about HPV and related diseases. In our population, 21.3% percent of students had heard of HPV disease before

Table 2. Characteristics of the University Students

Characteristics	Number	Percentage (%)
Age		
≤20	263	47.6
>20	290	52.4
Gender		
Female	295	46.1
Male	298	53.9
Marital status		
Married	10	1.8
Single	543	98.2
Smoking status		
Smoking	133	24.1
Not smoking	420	75.9
Ever had sexual intercourse		
Sexual experienced	215	38.9
No sexual experienced	338	61.1
Number of sex partner		
<5	110	51.2
≥5	115	48.8
Used contraceptive methods		
Not used	183	85.1
Condom	20	9.3
Oral contraceptives	8	3.7
Morning after pills	4	1.9
Total	553	100.0

education. The majority of respondents had (38.1% (n=45) heard about HPV from television, followed by internet 28.8% (n=34), their friends 28.0% (n=33). Other sources of information about HPV were newspaper (26.3% (n=31) and book (11.9% (n=14). In university students, 16.1% percent of them had heard of HPV vaccine. Only seven girls (1.3%) reported that they had already received an HPV vaccine (Data not shown).

The one statement that reached significance at a p value of <0.001 was “What are the potential health problems of HPV?” Correct response went from 4.3 % to 92.6 % after education. “How do you think you get HPV?” and “What are the symptoms of HPV?” questions had a correct response rate on the pre-test questionnaire (10.8% and 11.4% respectively). After education, correct answers reached 94.0% and 89.2% respectively. There was significant increase in knowledge scores between pre-test and post-test questions (p<0.001). The fifth pretest question, “Do you know about HPV-related lesions?” was answered correctly by 95 (17.2%). After education session, 98.7% students correctly answered this question. There were significant differences in university student’s pretest and post test result (p<0.001).

The majority of participant (87.5%) did not know how HPV infection was diagnosed. After education, 25.9%

Table 3. University Students' Knowledge about HPV Before and After Education

Questions	Pre-test	Post-test	Pre-test	Post-test	*Test
	N (%)	N (%)	Mean(SD)	Mean(SD)	
1. Have you heard of HPV? Pls explain					t=-44.393
Correct	118 (21.3)	550 (99.5)	1.21 (0.41)	1.99 (0.74)	df=552
Incorrect	435 (78.7)	3 (0.5)			p=0.000
2. What are the potential health problems of HPV?					t=-64.376
Correct	24 (4.3)	512 (92.6)	1.04 (0.20)	1.93 (0.26)	df=552
Incorrect	529 (95.7)	41 (7.4)			p=0.000
3. How do you think you get HPV?					t=-50.337
Correct	60 (10.8)	520 (94.0)	1.11 (0.31)	1.94 (0.24)	df=552
Incorrect	493 (89.2)	33 (6.0)			p=0.000
4. What are the symptoms of HPV?					t=-43.038
Correct	63 (11.4)	493 (89.2)	1.11 (0.32)	1.89 (0.31)	df=552
Incorrect	490 (88.6)	60 (10.8)			p=0.000
5. Do you know about HPV-related lesions?					t=-48.257
Correct	95 (17.2)	546 (98.7)	1.17 (0.38)	1.99 (0.11)	df=552
Incorrect	458 (82.8)	7 (1.3)			p=0.000
6. How is HPV infection diagnosed?					t=-25.774
Correct	69 (12.5)	410 (74.1)	1.13 (0.33)	1.74 (0.44)	df=552
Incorrect	484 (87.5)	143 (25.9)			p=0.000
7. Did you know early diagnosis test for cervical cancer?					t=-34.992
Correct	27 (4.9)	416 (75.2)	1.05 (0.22)	1.75 (0.43)	df=552
Incorrect	526 (95.1)	137 (24.8)			p=0.000
8. Did you know condoms completely protected against HPV?					t=-15.959
Correct	271 (49.9)	482 (87.2)	1.49 (0.50)	1.87 (0.33)	df=552
Incorrect	282 (51.9)	71 (12.8)			p=0.000
9. How can people reduce their risk for acquiring genital HPV infection?					t=-28.256
Correct	67 (12.1)	425 (76.9)	1.12 (0.33)	1.77 (0.42)	df=552
Incorrect	486 (87.9)	128 (23.1)			p=0.000
10. Did you know about HPV vaccine?					t=-40.636
Correct	89(16.1)	528 (95.5)	1.16 (0.37)	1.95 (0.21)	df=552
Incorrect	464(83.9)	25 (4.5)			p=0.000
Total score			11.60 (1.76)	18.83 (1.52)	t=-72.53
					df=552
					p=0.000

*Paired sample t test

Table 4. Attitude of University Students towards HPV Vaccination

(After education)	Number	Percentage (%)
Would you like to be vaccinated against HPV?		
Yes	345	62.4
No	182	32.9
Not sure	26	4.7
*To whom do you intend to consult about the vaccine?		
Doctor	252	45.6
Decided myself	99	17.9
Mother and father	46	8.3
Mother	37	6.7
Sister /brother	16	2.9
Father	8	1.4
Have you worried about having/or developing genital warts?		
No response	14	2.5
Moderately worried	319	57.7
Extremely worried	78	14.1
Not worried	142	25.7
Should STDs and sex education be provided at school?		
Yes	520	94.0
No	33	6.0
Do you think to share information about HPV?		
Yes	502	90.8
No	51	9.2
*With whom do you think share this information?		
Friends	429	77.6
Family	231	41.8
Girlfriend/boyfriend	219	39.6
Wife/husband	85	15.4
No response	106	19.2

* Students gave more than one answer this question

of them did not know this question ($p < 0.001$). We asked students before education "Did you know early diagnosis test for cervical cancer?" knowledge about Pap smear test among subjects in our survey was also low (4.9%). After education, majority of participants (75.2%) had learned about the Pap smear. There were statistically significant difference between pre-test and post-test result ($p < 0.001$).

About one out of two university students (49.9%) correctly answered the "Did you know condoms completely protected against HPV?" question in pre-test. After education this ratio was reached 87.2% ($p < 0.001$).

When asked how people could reduce their risk for acquiring genital HPV infection, 12.1% of students gave the correct answer prior to the intervention, and the majority (76.9%) provided the correct response after the intervention. When students were asked 'Did you know about HPV vaccine?' 16.1% of them gave the correct answer before education. The majority of them (95.5%) knew this question after education.

The mean pre-test score for HPV knowledge was 11.6 (SD 1.76, range 10-20). After education, the mean post-test score was 18.8 (SD 1.52, range 11-20). The difference between mean pre-and post- test scores was statistically significant ($p < 0.001$). After the intervention, university students were able to provide the correct answers to most of the questions about HPV.

Attitude of students to HPV vaccination after education

Table 4 summarized the willingness to participate in a HPV vaccine and attitudes toward HPV vaccination

among study participants. After education intervention 62.4% of students want to be vaccinated against HPV. Overall, 32.9 percent of university student had refused or would refuse vaccine if offered.

Most of university students (83.9%) had not heard of HPV vaccine and only 1.3% ($n=7$) vaccinated by HPV vaccine. Overall, 45.6% of the students stated that they would consult a doctor who has indicated that HPV vaccine. Only 8.3% of students reported that they would consult their parents (mother and father).

Most university students (57.7%) reported they moderately and 14.1% extremely worried about having or developing genital warts themselves.

Majority of the participants (94.0%) stated that STDs and sex education should be provided in university. Overall, 90.8% of them thought to share information about HPV with their friends and relatives. In this group, 77.6% of them stated to share this information with their friends.

Discussion

The present study is one of the first to assess awareness and knowledge about HPV infection among university student in Manisa, Turkey. The present study provides a detailed picture of university student's awareness and knowledge about HPV and assessed to effect of education. Before education intervention, awareness of HPV was poor, with only two out of ten university students had ever heard of HPV. Similar findings have been reported among women attending collage in USA (Ramirez et al., 1997; Lambert, 2001; Moreira et al., 2006). Compared with a recently published in Danish (Nielsen et al., 2009); 10% of the participants reported to have heard of HPV. Also, previous researches found adolescent and young people's knowledge HPV and Pap test was poor despite its high prevalence and potentially serious consequences (Yacobi et al., 1999; Dell et al., 2000; Blake et al., 2004; Wetzel et al., 2007; Mehu-Parant et al., 2010; Wong and Sam, 2010). The study by Pitts et al., (2009) evaluated knowledge about HPV and cervical cancer in Singaporean men and reported that Singaporean men had moderate knowledge of cervical cancer but poor knowledge and awareness of HPV (Pitts et al., 2009). Gottvall et al., (2009) stated that 13.5% of students in Sweden had heard about HPV (Gottvall et al., 2009).

The percentage of sexually active university students in this survey was 38.9%. In this group, majority of them did not use any contraceptive methods. This population is important for health care providers since they have more than one sexual partner. Health care providers currently face many challenges in addressing sexually transmitted infections.

Deficits in knowledge about HPV- related diseases occur among respondents with higher educational attainment as well as lower ones. Therefore, HPV educational programs may be needed in both developing and developed countries. In this study, we tested the effectiveness of HPV education intervention for university students. The education intervention significantly increased knowledge about HPV among university students and most of the questions were answered

correctly on the post-test questionnaire. Indeed our data suggest that many students understood the transient nature of HPV infection, the asymptomatic quality of the virus and connection between HPV and related diseases (especially genital warts and cervical cancer) after education intervention. Concordant with our findings, Wetsel et al., (2007) developed HPV educational protocol for adolescents and the protocol significantly increased knowledge scores about HPV (Wetsel et al., 2007).

There are many possible approaches to education about HPV, based on health care provider and patient or adolescents' preferences such as written brochures, internet-based materials, one-on-one education, and group education. We gave education interactively in the university students' classroom by using peer education. After post-test we gave students brochures to share with other students. Education campaigns should also emphasize the potential danger of HPV as well as the prevalence of virus. According to our education intervention experience, information concerning HPV infection was new to most university students. For instance, some university students were surprised to learn that HPV was associated with genital warts and cervical cancer and they had the misbelieved that HPV and genital warts could be treated using antibiotics or creams. University students were also surprised that condoms do not completely protect them from HPV and that HPV has an asymptomatic nature. The images and pictures included in the educational module, particularly those of genital warts, had a significant impact on participants. We suggest that educational material should include more pictures because they were a highly effective way to convey information to university students to emphasize that the consequences of infection could be serious.

Education is also essential for increasing the chances of men adjusting their sexual behavior to reduce the risk of HPV transmission to women. In this study, male and female students were trained together to create awareness about HPV and related disease. Awareness among men of HPV and the risks it poses for themselves and their female partners is therefore crucial for reducing the incidence of cervical and other cancers, especially because HPV is rarely symptomatic, and men are unlikely to know if they have been infected (Pitts et al., 2009).

In the current study, university students' knowledge about HPV and related disease was generally low before education. After education intervention, most students (92.6%) could state the HPV related diseases. In general, results from earlier studies were similar to those in our survey (Hoover et al., 2000; Lambert, 2001; Moreira et al., 2006).

Women's lack of knowledge about Pap smear may also impact their propensity to seek gynecologic care. Poor knowledge of screening techniques for cervical cancer may impede young women from knowing when to seek cervical cancer screening, their screening history, and results. The knowledge about HPV, genital warts and cervical cancer is crucial in cervical cancer prevention and specifically age of sexual debut and number of sex partners. In the present study, almost one out of 20 students knew the meaning of the term Pap smear before education.

Earlier studies typically indicate poor knowledge and misunderstanding about Pap smears among adolescents and young women (Hasenyager, 1999; Dell et al., 2000; Mays et al., 2000; Blake et al., 2004). The study in the United States found that approximately one in ten young women correctly understood the term Pap smear (Head et al., 2009). In our study, after education most university students (75.2%) knew what a pap smear was and that Pap smear was recommended to reduce the chance of women getting cervical cancer. Our population may have had an increased understanding of the Pap test since they are university students.

Due to all expenses involved in treating cervical cancer, and the lack of access to Pap smear test in many localities, and also due to eliminate from the risk of HPV transmission by condom use of the prophylactic vaccine against HPV is of utmost clinical importance (de Carvalho et al., 2009). Adolescents and young people are the target group for HPV vaccination to prevent cervical cancer (Chan et al., 2009). Research on the knowledge and attitude of HPV among adolescent and university students is therefore important. We found that university students were generally more supportive of HPV vaccination after education section when they had greater knowledge of HPV. Only seven students had been previously vaccinated for HPV, 62.4% were interested in receiving the HPV vaccine. In other countries, similar studies have been conducted and reported higher rates of acceptance. Chan et al., (2009) studied 250 adolescents to evaluate adolescent's girls' attitudes on HPV vaccination. According to this survey, initially 35% indented to receive the vaccination, the majority was not sure but after reading the information pamphlet it rose to 69% (Chan et al., 2009). Wong et al's., (2009) findings indicated that 70.8% of students were willing to accept HPV vaccination in Hong Kong (Wong et al., 2009). According to one study in Sweden, 84.0% of students would like to be vaccinated against HPV (Gottvall et al., 2009). Wong and Sam, (2010) reported that 48.0% of the participants indicated an intention to receive an HPV vaccine (Wong and Sam, 2010). We suggest education programs are likely to be successful at increasing public acceptance of HPV vaccination. Although parents will likely be the primary decision-makers regarding vaccination in preadolescent, older adolescents and young women will hold some or all of the responsibility for making decisions about vaccination. Lack of knowledge about HPV may make it difficult for young people to make appropriate decisions (Wetzel, 2007).

Almost half of the students stated that they would consult a doctor has indicated that HPV vaccine. This result is similar to Moreira et al., (2006) study (Moreira et al., 2006). These results emphasize the importance of informing and training health care providers about the vaccines and about the contribution of provider recommendations to decision making about health.

At the end of the questionnaire, we asked participants "Have you worried about having/or developing genital warts?" Most university students stated they were moderately/ extremely worried about having or developing genital warts. Most of students were worried about

genital warts and this may reflect the fact that adolescent more attuned to their own risk of contracting a sexually transmitted disease might be more concerned about the higher prevalence of genital warts in worldwide. Health care providers who educate adolescents effectively about HPV infection may be able to prevent the potentially harmful psychosocial and interpersonal responses to HPV and Pap test results, while promoting health sexual behaviors and regular Pap screening. The study increased university students' awareness of HPV and Pap smear.

In our results, majority of the students (94%) were eager to learn more about STDs and they stated that this type of education should be increased in the university. This may reflect that the importance of providing information about HPV, genital warts and cervical cancer as an effective means in promoting health issues to adolescent.

Majority of the university students reported to share information about HPV with their friends and relatives. This result is very important for "Tell someone this infection" to raise awareness of HPV infection and vaccine, the connection among HPV, cervical cancer and genital warts, and the importance of Pap testing.

One limitation of the study is that, the result may not generalize to other students in Turkey. Future research should focus on testing the effectiveness of education different population. Although use of an education intervention improved the knowledge of the study subjects, further studies are needed to define barriers to HPV vaccination. Despite these limitations, we focused educational intervention HPV infection, transmission, clinical consequences, and behavioral strategies for prevention, HPV vaccine, Pap smear, cervical cancer and genital warts. The education intervention was found to be useful in increasing university students' knowledge and understanding of HPV infection. Education about HPV, using intervention such as this, is a critical first-line approach to the prevention of HPV infection and HPV related disease. Prevention effort should include educating adolescents about HPV and counseling them about benefits of abstinence from sexual activity, delaying initiation and limiting the number of sexual partners.

In conclusion, we found a markedly low awareness of HPV and related diseases in Turkish university students before education. After education intervention, university students were able to provide the correct answers to most of the questions about HPV. On the basis of our results, information campaigns, particularly targeting university students, are needed in the near future, to promote greater and more adequate knowledge of HPV in the general population.

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