Awareness, knowledge and attitudes related to HPV infection and vaccine among non-obstetrician-gynecologist healthcare providers

Kadın hastalıkları ve doğum klinikleri dışında çalışan doktor ve yardımcı sağlık personelinin HPV enfeksiyonu ve aşısına yönelik farkındalık, bilgi düzeyi ve tutumları

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Abstract

Objective: This study was designed to evaluate the awareness, knowledge and attitudes of healthcare providers related to HPV infection and vaccine.

Material and Methods: A total of 311 healthcare providers working in specialties other than obstetrics and gynecology at the Dr. Lutfi Kırdar Kartal Education and Research Hospital as physicians (n=142) or non-physician healthcare providers (n=169) were included in the present study. A questionnaire developed by researchers based on literature and including items concerning socio-demographic features, awareness of HPV infection and vaccine, attitudes related to HPV vaccine and regular gynecological controls and knowledge about HPV infection was applied to participants via a face to face interview method. Each correct answer was scored as one to decide the level of knowledge and awareness.

Results: The frequency of parenthood was lower and the ratio of males was higher in the physician group compared to the non-physician group. Awareness of virus mediated cancer (p=0.01), human papilloma virus (p=0.0001), cervical cancer, HPV vaccine, and types of HPV vaccine was significantly higher in the physician group. While consent levels for vaccine administration for themselves were similar for physician and non-physician subjects, the frequency of subjects favoring vaccine administration for their offspring was significantly higher among physicians ($p<0.001$ for daughters, $p<0.05$ for sons). HPV-related level of knowledge in the physicians was significantly higher when compared to the non-physician staff ($p<0.001$).

Conclusion: Physicians were more competent regarding the relation of HPV infection to cervical cancer and more aware of the presence and types of HPV vaccines which may lead to a higher degree of willingness for vaccination when compared with non-physician healthcare providers. (J Turkish-German Gynecol Assoc 2010; 11: 16-21)

Key words: HPV; vaccine, awareness, knowledge level, attitude, healthcare providers

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Özet

Amaç: Bu çalışma sağlık çalışanlarının HPV enfeksiyonu ve aşısına yönelik farkındalık, bilgi düzeyi ve tutumlarının belirlenmesi amacıyla tasarlandı.

Gereç ve Yöntemler: Dr. Lütfi Kırdar Kartal Eğitim ve Araştırma Hastanesi'nde obstetrik-jinekoloji dışındaki uzmanlık alanlarında görev yapmakta olan hekim (n=142) ve diğer sağlık personeli (n=169) olmak üzere toplam 311 sağlık çalışanı ile yürütülen bu çalışmada, araştırıcılar tarafından literatür ışığında geliştirilen bir anket formu kullanıldı. Sosyodemografik özellikler, HPV enfeksiyonu ve aşısına yönelik farkındalık ve bilgi düzeyi, HPV aşısı ve düzenli jinekolojik kontrollere yönelik tutumun incelendiği maddeler içeren bu anket formu yüzyüze görüşme yöntemi ile katılımcılara uygulandı. Her bir doğru yanıt 1 puan ile kodlanarak bilgi ve farkındalık düzeyi değerlendirildi.

Bulgular: Diğer sağlık personeli ile kıyaslandığında, hekimler arasında ebeveyn olanların sayısı daha az, erkeklerin sayısı ise daha yüksek bulundu. Virüs kaynaklı kanser (p=0.01), human papilloma virüsü (p=0.0001), servikal kanser, HPV aşısı ve tiplerine yönelik farkındalığın hekimler arasında diğer sağlık çalışanlarına göre belirgin şekilde daha yüksek olduğu belirlendi. Kendilerine aşı yaptırma konusundaki tutumları arasında hekimler ve diğer sağlık çalışanları arasında belirgin bir farklılığa rastlanmazken, çocuklarına aşı yaptırma konusunda olumlu düşünenlerin sayısı hekim grubunda diğer sağlık personeline göre anlamlı şekilde daha fazla bulundu (kız çocukları için $p<0.001$ ve erkek çocukları için $p<0.05$). Hekimlerin HPV ile ilgili bilgi düzeylerinin de diğer sağlık personeline göre belirgin şekilde daha yüksek olduğu belirlendi ($p<0.001$).

Sonuç: Hekimlerin HPV enfeksiyonu ile servikal kanser arasındaki bağlantı konusunda daha bilgili olmalarının yanısıra, HPV aşı ve tiplerinin varlığı konusunda da daha yüksek farkındalığa sahip olmalarının, aşılama konusunda diğer sağlık personeline göre daha gönüllü olmalarında rol oynayabileceği düşünülmektedir.

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Anahtar kelimeler: HPV, aşı, farkındalık, bilgi düzeyi, tutum, sağlık çalışanları

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Introduction

One of the most common sexually transmitted infections (STIs), human papilloma virus (HPV) infection has a prevalence rate of 30-50% among sexually experienced young women (1,2). Infection with oncogenic types of HPV has been held responsible for causing all cases of cervical cancer and precancerous intraepithelial lesions (3).

Being one of the most preventable cancers (4), cervical cancer is the ninth most common cancer among women in Turkey and ranks 13th among cancer-related deaths. According to the GLOBOCAN database, more than 50% of the 1364 patients diagnosed with cervical carcinoma each year die from the disease in Turkey (5). In line with a significant decline documented in the incidence of cervical malignancies in countries with widespread use of the Papanicolaou test (6), less developed national or local cervical screening programmes have been reported to be characterized by a higher disease burden in cervical cancer (7). In this context, the significant public health burden of HPV-related disease, lack of access to Papanicolau test in many localities as well as the inability to totally eliminate the risk of HPV transmission via use of condoms has led to an interest in the development of vaccines aiming to prevent the HPV infection (2, 8, 9).

Relevant to the administration of the HPV vaccine, physician knowledge about HPV was demonstrated to be a predictor of intention to vaccinate patients with a direct influence on the widespread implementation of the HPV vaccine (2, 8). Hence, since professional recommendation was considered to be crucial for willingness of a vaccination in the general population, it has been of interest to study HPV-related practice patterns, opinions, and knowledge among physicians who have been known to play a significant role in the widespread administration of the HPV vaccine (5, 10).

While health professionals are known to be convinced about the efficacy of vaccines recommended by public health authorities, published heterogeneity in the opinions regarding different vaccines and among different specialties of health providers was indicated to raise a concern about the success of immunization programs (11, 12).

Since the success of HPV vaccines, the primary prevention strategy in the prevention of cervical cancer (7), will depend largely upon whether providers believe and recommend immunization (12). To be familiar with the healthcare provider's intention to recommend and prescribe immunization (2) has been considered as the critical step to establish effective vaccine delivery programs. Therefore the present study was designed to evaluate this intention among healthcare providers of different specialties excluding obstetrics and gynecology in terms of awareness and attitudes towards HPV infection and vaccine.

Material and Methods

From a targeted population of 350 subjects, 311 healthcare providers (88.5%) working in different specialties other than obstetrics and gynecology at the Dr. Lutfi Kırdar Kartal Education and Research Hospital as physicians (n=142) or non-physician healthcare providers (n=169) were included in the present study. A questionnaire developed by researchers based on literature and including items concerning socio-demographic features (n=7), awareness of HPV infection and vaccine (n=8), attitudes related to HPV vaccine and regular gynecological controls (n=4) and knowledge about HPV infection (n=6) was applied to participants via a face to face interview method (2, 13, 14). Each correct answer was scored as 1 and the knowledge level was classified to be poor (0-2), moderate (3-4) and high (5-6) according to total score obtained by the subject.

Written informed consent was obtained from each subject following a detailed explanation of the objectives and protocol of the study, which was conducted in accordance with the ethical principles stated in the "Declaration of Helsinki". The study was approved by the institutional ethics comittee.

Statistical analysis

Statistical analysis was made using software (version 13.0, SPSS Inc. Chicago, IL). The comparison between physician and non-physician groups in terms of demographic features, awareness and attitudes related to HPV infection and vaccine were made using Chi-square (χ^2) and Fisher's tests. Student's t test was used for the analysis of knowledge scores. Evaluation of primary differences between physicians and the major determinants of the knowledge scores was determined via regression analysis. Data were expressed as "mean±standard deviation (SD)" and percent (%) where appropriate. Probability value (p) <0.05 was considered statistically significant.

Results

Physician (n=142) and non-physician (n=169) groups were similar in terms of marital status and smoking habit. There were more males (p=0.0001) but fewer parents (p=0.0003) in the physician group (Table 1).

Awareness of virus mediated cancer (p=0.01), HPV (p=0.0001), cervical cancer (p=0.006), HPV vaccine (p=0.0001), and types of HPV vaccine (p=0.0001) was more significant in the physician group. While consent levels for vaccine administration for themselves were similar for physician and non-physician subjects, the percentage of subjects who consent to vaccine administration for their children (p=0.0001 for daughters and p=0.02 for sons) were significantly higher among physicians (Table 1).

Identification of medical publications as the main information source for awareness of HPV vaccine was more significant for physicians (68.3 vs. 28.4; p=0.000; Table 1).

While both physicians and non-physician providers were found to have scores indicating a moderate level of knowledge about HPV infection, the scores of physicians were significantly higher than non-physician persons (4.88±0.77 vs 4.07±0.73; p=0.0001). Correct answers concerning symptomatic nature of HPV, healing process of the disease and the value of smear

Table 1. Demographic features and awareness of HPV infection and vaccine among subjects in the physician and non-physician groups

	Occupational status						p value
	Physician (n=142)		Non-physician (n=169)		Total (n=311)		
Demographics	**n**	**%**	**n**	**%**	**n**	**%**	
Gender							
Female	53	37.3	156	92.3	209	67.2	<0.0001
Male	89	62.7	13	7.7	102	32.8	
Marital status							
Single	51	35.9	48	28.6	99	31.9	0.34
Married	83	58.5	107	63.7	190	61.3	
Other	8	5.6	13	7.7	21	6.8	
Having a child	61	19.6	106	34.0	167	53.7	0.0003
Active smoking	48	34.0	57	33.9	105	34.0	0.98
Awareness							
Sexually transmitted diseases	142	100.0	167	98.8	309	99.4	0.50
Virus mediated cancer	140	99.3	157	94.0	297	96.4	0.01
Human papilloma virus	138	97.2	136	81.0	274	88.4	0.0001
Cervical cancer	134	95.0	141	85.5	275	89.9	0.006
Early diagnosis of cervical cancer	141	100.0	162	98.8	303	99.3	0.50
Prevention of cervical cancer	140	99.3	156	97.5	296	98.3	0.37
HPV vaccine	126	90.0	107	64.8	233	76.4	0.0001
Types of HPV vaccine	113	86.3	64	43.2	177	63.4	0.0001
Favor HPV vaccine for							
Her/himself	69	52.7	90	57.0	159	55.0	0.46
Her/his daughter	113	84.3	101	66.0	214	74.6	0.0001
Her/his son	75	56.8	60	43.2	135	49.8	0.02
Information source for HPV vaccine							
Medical publications	97	68.3	48	28.4	145	46.6	
Physician	7	4.9	23	13.6	30	9.6	<0.001
Friends and family	9	6.3	11	6.5	20	6.4	
Internet	7	4.9	10	5.9	17	5.5	
Media	3	2.1	26	15.4	19	6.1	
Regular gynecological controls once							
6 months	1	1.9	17	11.4	18	5.8	0.72
a year	14	26.9	30	20.1	44	14.1	
> a year	4	7.7	18	12.1	22	7.1	
Having complaints	33	63.5	84	56.4	117	37.5	

test accounted for the higher scores obtained on the test by the physician group (Table 2).

Insufficient knowledge was the main barrier identified by non-physicians against HPV vaccination. While side effects were mentioned more frequently by non-physicians for vaccination consent for themselves and their sons, parental anxiety for the side effects of the vaccine were similar for the consent for daughters (Table 3).

Regression analysis concerning comparison of physician and non-physician group revealed that the primary difference

Table 2. Knowledge about HPV infection among physicians and non-physician healthcare providers

Knowledge about HPV infection	Occupational status						p value
	Physician (n=142)		Non-physician (n=169)		Total (n=311)		
	n						
Patient with HPV is usually symptomatic	104	74.8	38	26.0	142	49.8	<0.001
HPV infection risk increases with the number of sexual partners	138	97.9	157	98.1	295	98.0	0.99
Most types of HPV do not heal spontaneously	33	23.9	11	7.0	44	14.9	<0.001
Certain types of HPV may cause cervical cancer	141	100.0	153	99.4	294	99.7	0.99
HPV may cause genital warts	137	97.2	146	93.0	283	95.0	0.10
Abnormality in smear test may indicate HPV	132	94.3	124	85.5	256	89.8	0.01
Total Score (mean±SD)	4.88±0.77		4.07±0.73		4.49±0.85		<0.001

Table 3. Barriers against willingness to receive HPV vaccination among physicians and non-physician healthcare providers

	No consent for HPV vaccine						p value
	Physician		Non-physician		Total		
Barriers to vaccination for him/herself	**n**	**%**	**n**	**%**	**n**	**%**	
Insufficient knowledge	17	28.3	32	47.8	49	38.6	0.019
Side effects	6	10.0	12	17.9	18	14.2	
Cost	5	8.3	2	3.0	7	5.5	
Other	32	53.3	20	29.9	52	40.9	
Total	60	100.0	67	100.0	127	100.0	
Barriers to vaccination for his/her daughter							
Insufficient knowledge	11	50.0	34	63.0	45	59.2	0.180
Side effects	5	22.7	13	24.1	18	23.7	
Cost	0	0.0	2	3.7	2	2.6	
Other	5	22.7	5	9.3	10	13.2	
Total	22	100.0	54	100.0	76	100.0	
Barriers to vaccination for his/her son							
Insufficient knowledge	29	50.0	52	65.0	81	58.7	0.028
Side effects	5	8.6	13	16.3	18	13.0	
Cost	3	5.2	3	3.8	6	4.3	
Other	21	36.2	12	15.0	33	23.9	
Total	58	100.0	80	100.0	138	100.0	

between two groups was the variable questioning symptomatic nature of HPV related disease and the main determinant of the obtained score was the occupation of the subject.

Discussion

Published reports on HPV vaccination signified that intention to immunize was associated with the characteristics of the provider, knowledge about HPV and attitudes towards HPV vaccination (2). In the present study, we evaluated the awareness and attitudes towards HPV infection and vaccine among healthcare providers from a variety of specialties other than obstetrics and gynecology in Istanbul, Turkey.

Owing to the advantages of physicians to address and manipulate perceived barriers against HPV vaccine, physician recommendation has been considered a key ingredient of successful HPV vaccination programs (15).

Compatible with the recent data (8), healthcare providers composed of physicians and non-physicians in our study were aware of HPV infection and vaccine but awareness of HPV vaccination was more significant in the physician population just like knowledge about HPV infection. Concerning knowledge

level, correct answers concerning symptomatic nature of HPV, healing process of the disease and the value of smear test accounted for the higher scores obtained by the physician group. Accounting for their significant role in vaccine recommendation, awareness of HPV infection and vaccination in our population were much higher than documented in general populations published in recent cross sectional studies (13, 16, 17). Anyhow, insufficient public knowledge regarding HPV; parental intention regarding vaccination, cost, and the multiple dosages required for administration are the main barriers to the widespread use of the HPV vaccine include (8).

Being much more significant for the physicians, healthcare providers in our study were determined to be enthusiastic about vaccination of their daughters rather than sons. Refusal of HPV vaccine was reported to range from 15 to 20% among patients mostly due to cost of the vaccine which was also confirmed by a third of physicians as a commonly stated barrier to patient acceptance of the HPV vaccine (12, 15, 18). However, insufficient knowledge about the vaccine and side effects to some extent especially in the non-physician group were the main barriers identified in the present study rather than the cost of action.

The present study revealed a high (84.3%) level of acceptance of the HPV vaccine among physicians which is higher than the acceptability rates documented previously for health professionals in general as 79.7% and specific to gynecologists as 79% (3, 9, 19). In agreement with the data concerning nurses' lower level of conviction about the usefulness of vaccines when compared to other health providers (11), the frequency of healthcare providers other than physicians favoring HPV vaccine was lower than physicians in our study as well as nurses reported elsewhere in the literature (9).

In accordance with previous multivariable analyses confirming provider and practice characteristics, knowledge about HPV, and attitudes were independently associated with intention to recommend HPV vaccination and showing an association between knowledge and the intention to recommend a vaccine (2), awareness of, knowledge about and the attitude towards HPV infection and vaccine were better for physicians when compared to non-physicians. Indeed, the similar discrimination has also been shown among physicians with different specialties so that physicians who focus on women's health issues or work were suggested to have a better approach for the disease including potential health benefits of an HPV vaccine (2).

In this regard, since the knowledge about HPV disease and its prevention varies across specialties with superiority of obstetrician/gynecologists (3), moderate level of knowledge about HPV infection and vaccine among our healthcare providers composed of non-obstetrician physicians and non-physician healthcare providers seems proper.

Concerning the general population, it was documented that those who believed that HPV is an STD were three times more likely to support state-mandated vaccination, but no relation of knowledge to vaccination consent was obtained among who believed HPV causes cervical cancer (13). In our population, physicians were more likely to support HPV vaccination for their children despite similar awareness of HPV as a STD and superiority of cervical cancer awareness when compared to non-physician participant. The main barrier against vaccination was identified to be insufficient level of knowledge in overall population with higher percentages in non-physician subjects. Therefore, based on significantly higher rates of vaccine related awareness among our physicians, consent of vaccine seems to be dependent on vaccine related issues rather than the long term effects of the HPV infection at least among our population composed of healthcare providers. Indicating the value of educational intervention barriers against vaccination was shown to be handled via provision of information to people who were against vaccination (14, 20).

While parental intention to vaccinate was higher among physicians regardless of the gender of child, most of our subjects favored the vaccination for girls with much lower consent rates for boys in agreement with other papers (2, 9). In a recent study (21) concerning attitudes of nurse practitioners, lack of preference for vaccination of female adolescents among nurse practitioners was interpreted as the likelihood of their attitudes to differ from physicians who were more willing to vaccinate girls than boys due to the fact that cervical cancer affects women only and thus will have a greater impact on women's health. In fact considering past studies suggesting that vaccinating men and women will be more effective in reducing HPV prevalence than vaccinating women only gender related prepossession among healthcare providers was suggested to be reconsidered (2).

Compatible with the previously shown association between HPV awareness, knowledge and formal education (22) noting educational status as independent predictor of HPV knowledge and awareness (13), occupation was identified to be the major determinant of knowledge level related to HPV infection and vaccine in our present study.

Unfortunately compatible with moderate level of knowledge about HPV in our study, overall ignorance of HPV has been reported to be common even in 'educated' populations especially when compared with other STIs (22). Nevertheless, it must be remembered that recognition of a term does not necessarily imply an ability to understand its implications or to be able to summon it without prompt in the correct context (22).

Accounting for higher awareness of HPV vaccine among physicians leading to higher willingness of vaccination among them as parents, information source for awareness of HPV vaccination was identified to be medical publications among physicians but media by non-physicians. Likewise, physicians were reported to look at their professional organizations for information about vaccination in a past study, so communication strategies should target professional organizations and journals to provide information about the safety and efficacy of vaccines and giving general recommendations for HPV immunization (23).

One of the limitations of our study was using of a simple short item evaluation of knowledge level with the possibility of lower sensitivity. A second limitation was that the evaluation of intention to HPV vaccination among healthcare providers in

relation to themselves and their children as parents rather than the actual prescription of the vaccine for the patients. Finally, because of the small sample and the qualitative nature of the study, the findings may not be representative of the views of all healthcare providers in Turkey.

In conclusion, compatible with the identification of the occupation as the major determinant of knowledge level related to HPV infection and vaccine, physicians in our study were more competent about the relation of HPV infection to cervical cancer and the presence and types of HPV vaccination which may lead to significantly higher willingness of vaccination among them compared with non-physician healthcare providers. Larger scale studies concerning provider attitudes, intentions and barriers concerning HPV vaccine and increase in medical awareness programs and publications for healthcare providers addressing full information on vaccine properties and benefits may contribute in enhancing vaccination coverage and the design of effective STI vaccine delivery programs for physicians as well as other providers who care for children and adolescents.

Conflict of interest

The authors declare that they have no conflict of interest.

References

1. Cates W: Estimates of the incidence and prevalence of sexually transmitted diseases in the United States. Sex Transm Dis 1999; 26(suppl):S2.
2. Riedesel JM, Rosenthal SL, Zimet GD, Bernstein DI, Huang B, Lan D, Kahn JA. Attitudes about human papillomavirus vaccine among family physicians. J Pediatr Adolesc Gynecol. 2005; 18: 391-8.
3. Duval B, Gilca V, McNeil S, Dobson S, Money D, Gemmill IM, Sauvageau C, Lavoie F, Ouakki M.Vaccination against human papillomavirus: a baseline survey of Canadian clinicians' knowledge, attitudes and beliefs. Vaccine 2007; 25: 7841-7.
4. Arvas M, Gezer A. Human Papillomavirus Vaccines. J Turkish-German Gynecol Assoc 2006; 7: 250-5.
5. Turkish cervical cancer and cervical cytology research group prevalence of cervical cytological abnormalities in Turkey. Int J Gynaecol Obstet 2009; 106: 206-9.
6. Yetimalar H, Koksal A, Kasap B, Uysal A, Cukurova K. Current approach of health employees in Turkey to pap smear test. J Turkish-German Gynecol Assoc 2009; 10: 68-70.
7. Schneider A, Gleizes O, Nieminen P, Erdemoglu E, Boselli F, Jenkins D. Implications of varied patterns of cervical cancer screening for introduction of human papillomavirus vaccines in Europe J Turkish-German Gynecol Assoc 2009; 10: 61-7.
8. Leddy MA, Anderson BL, Gall S, Schulkin J. Obstetrician-gynecologists and the HPV vaccine: practice patterns, beliefs, and knowledge. J Pediatr Adolesc Gynecol 2009; 22: 239-46.
9. de Carvalho NS, Teixeira LM, Pradel EM, Gabardo J, Joly C, Urbanetz AA. Vaccinating against HPV: physicians' and medical students' point of view. Vaccine 2009; 27: 2637-40.
10. American College of Obstetricians and Gynecologists. Human Papillomavirus Vaccination. ACOG Committee Opinion. 2006; publication no. 344.
11. Gilca V, Boulianne N, Dubé E, Sauvageau C, Ouakki M. Attitudes of nurses toward current and proposed vaccines for public programs: a questionnaire survey. Int J Nurs Stud. 2009; 46: 1219-35.
12. Zimet GD, Mays RM, Fortenberry JD. Vaccines against sexually transmitted infections: promise and problems of the magic bullets for prevention and control. Sex Transm Dis 2000; 27: 49–52.
13. Millen JC, Ginde AA, Anderson AT, Fang P, Camargo CA. Multicenter study of knowledge about human papilloma virus and attitudes among emergency department patients. Jr. J Pediatr Adolesc Gynecol 2009; 22: 356-9.
14. Walsh CD, Gera A, Shah M, Sharma A, Powell JE, Wilson S. Public knowledge and attitudes towards Human Papilloma Virus (HPV) vaccination. BMC Public Health 2008; 8: 368.
15. Brewer NT, Fazekas KI. Predictors of HPV vaccine acceptability: a theory-informed, systematic review. Prev Med 2007; 45: 107-14.
16. Tiro JA, Meissner HI, Kobrin S, Chollette V. What do women in the U.S. know about human papillomavirus and cervical cancer? Cancer Epidemiol Biomarkers Prev 2007; 16: 288-94.
17. Pitts M, Clarke T: Human papillomavirus infections and risks of cervical cancer: What do women know? Health Educ Res 2002; 17: 706.
18. Jaspan DM, Dunton CJ, Cook TL: Acceptance of human papillomavirus vaccine by gynecologists in an urban setting. J Low Genit Tract Dis 2008; 12: 118.
19. Raley JC, Followwill KA, Zimet GD, Ault KA. Gynecologists' attitudes regarding human papillomavirus vaccination: a survey of Fellows of the American College of Obstetricians and Gynecologists. Infect Dis Obstet Gynecol 2004; 12: 127-33.
20. Holcomb B, Bailey JM, Crawford K, Ruffin MT. Adults knowledge and behaviours related to human papillomavirus infection. J Am Board Fam Pract 2004, 17: 26-31.
21. Mays RM, Zimet GD. Recommending STI vaccination to parents of adolescents: the attitudes of nurse practitioners. Sex Transm Dis 2004; 31: 428.
22. Cuschieri KS, Horne AW, Szarewski A, Cubie HA. Public awareness of human papillomavirus. J Med Screen 2006; 13: 201-7.
23. Krupp K, Marlow L, Kielmann K, Doddaiah N, Mysore S, Reingold AL, Madhivanan P. Factors associated with intention-to-recommend human papillomavirus vaccination among physicians in Mysore, India. J Adolesc Health 2009; 10.1016/j.jadohealth. 2009; 10:001.