

RESEARCH ARTICLE

Knowledge and Attitude of Iranian University Students toward Human Papilloma Virus

Morteza Ghojazadeh¹, Zahra Fardi Azar², Parviz Saleh³, Mohammad Naghavi-Behzad^{4*}, Nastaran Ghodratnezhad Azar⁵

Abstract

Introduction: Increasing prevalence of human papilloma virus (HPV) infection and its association with cervical cancer as a leading cause of death make it necessary to evaluate and improve the public knowledge, especially of university students, about this cause of disease. **Methods:** A cross-sectional study of knowledge and attitude of a total 669 students from Tabriz University of Medical Sciences was therefore performed with a modified validated questionnaire, arranged into 5 parts and containing 55 questions, in July 2011. Questions were directed to study socio-demographic characteristics of the participant, knowledge about HPV disease, transmission route, relationship with cervical cancer, predisposing factors, and participants attitude toward people with HPV infection. **Results:** All of the participants were Moslem with a mean age 25.6 ± 5.33 years of age. All of the participants had heard of HPV, and acquired their knowledge through university courses (90.6%); the majority of them knew that HPV is a sexually transmitted disease and a potential cause for genital warts but general knowledge about details was not high. Mean knowledge score of residents and post graduate midwifery and nursing students was high as compared to other groups ($P < 0.001$). Statements that indicated the presence of fear to communicate with people suffering HPV and people's avoidance to rely on babysitting of these patients were observed. Educational level ($\beta = 0.21$, $P < 0.001$), age ($\beta = 0.18$, $P = 0.002$), and smoking ($\beta = -0.11$, $P = 0.006$) were predicted to effect knowledge. **Conclusions:** Moderate level of knowledge about HPV among medical university students makes it necessary to set effective national public health efforts on HPV education and prevention considering the excess of young population in Iran vulnerable to cervical cancer.

Keywords: Human papilloma virus - medicine - knowledge - prevention

Asian Pacific J Cancer Prev, 13 (12), 6115-6119

Introduction

Increasing prevalence of human papilloma virus (HPV) as the most common sexually transmitted disease agent among young and sexually active people has highlighted its health importance (Li et al., 2009).

HPV is spreading through sexual contact; Studies point out that 30-60% of all sexually active adults acquire HPV during their reproductive lives (Tindle, 2002) and it is suspected to be higher in younger women comparing to older women (Smith et al., 2008). Fortunately more than 80% of HPV infections are removed over a 3-4 years without any intervention; on the other hand primary prevention through vaccination and screening for cervical cancer seems to be effective (Wong, 2009). HPV vaccine is safe and reduces development of cervical cancer up to 70% (Medeiros, 2005; Zhao et al., 2012) which should be administered before or shortly after sexual contact to have optimal effectiveness (Markowitz et al., 2007; Pollack

et al., 2007); while providing a vaccine to adolescent unmarried girls meets several challenges (Waller et al., 2007). On the other hand stress and anxiety produced by HPV infection and diagnosis mostly through Pap smear screening seems to be related to lack of understanding about HPV (Waller et al., 2007; Wong, 2009).

Relevance between HPV and cervical cancer is the most important information that the public should be aware about which may not be completely understood even by the medical community (Howard et al., 2007; Villar et al., 2011; Rashwan et al., 2012); this is a good explain why knowledge and understanding of HPV are low among the general public and they are more likely to be confused about HPV (M, 2001). Vaccine introduction, approval and ensuing advertising campaigns may cover these gaps in knowledge and shift physician behavior (Zarcadoolas et al., 2012) whereas there is not national programs of HPV education and vaccination for public in Iranian society and any studies.

¹Liver and Gastrointestinal Disease Research Center, ²Department of Gynecology and Obstetrics, Medical Faculty, ³Infectious and Tropical Disease Research Center, ⁴Medical Philosophy and History Research Center, Tabriz University of Medical Sciences, ⁵Imam Hassan Mojtaba Talented High School, Eastern Azerbaijan, Tarbiz, Iran *For correspondence: Dr.Naghavii@gmail.com

Health College students and university community need such information not only to improve their own knowledge and health level but also to instruct and educate other society groups. Studies in Western countries have shown that most adolescent and young women (Giles and Garland, 2006), even the highly educated ones (Klug et al., 2008) know very little about HPV infection. Therefore, it is essential to assess the current knowledge and attitudes about HPV in a population of college students to identify the current level and sources of HPV information to allow government authorities to set proper health education policies and programs.

Materials and Methods

In a cross-sectional study, the knowledge and awareness of a total of 669 university student of Tabriz University of Medical Sciences was checked by a modified previously used questioner; These samples were randomly recruited from population of medical, nursing, midwifery and dental faculties at the end of the second semesters in July 2011.

This study was approved by the Tabriz University of Medical Sciences Committees for personal data protection in medical research and conformed to the Declaration of Helsinki.

A questionnaire with a total of 55 questions was used. The first part of the questionnaire elicited socio-demographic details of the participants (8-item); then participants were asked a series of questions measuring their knowledge about HPV (10-item), transmission route (22-item), its relation with cervical cancer (2-item), and predisposing factors (10-item). In the third part, participants' attitude toward people with HPV infection was tested (10 items).

The initial draft of the instrument was made and circulated to technical experts and a biostatistician, objectively discussed, and modified based on their feedbacks for content validity. The questionnaire was face validated by 7 academic members of Tabriz University of Medical Sciences, pilot tested and revised.

The reliability was made through a pilot study with alpha Korbach coefficient of 80%. Informed written consent was collected from participants before enrollment. For the purpose of statistical analysis, each correct answer was given a score of "one" and wrong and do not know answers were given scores of "zero" in the items that were included in the knowledge sections of the questionnaire.

The baseline characteristics of the study population were compared by using the One Way ANOVA test, χ^2 test or Fisher's Exact test as appropriate. The One Way ANOVA test was used to compare the General knowledge and beliefs among the study groups. Linear regression model was used in order to evaluate the confounding factors on students' knowledge.

Variables with a p value ≤ 0.20 in univariate analysis were entered in the model and a p value ≤ 0.05 was considered statistically significant. Data were analyzed using the SPSS software version 17.0 (SPSS Science, Chicago, IL, USA).

Results

All of the participants were Moslem. Mean age of respondents was 25.59 ± 5.33 years of age. A few percentage of them were married and all had just once married. Undergraduate students were the majority of the participants; a few number of studied population used cigarette.

All of the participants had heard of HPV, and majority of the students in every category acquired their knowledge through university courses (90.6%), followed by internet (4.6%) and other public media (1.5%), magazines (1.2%) and health workers (0.1%). 78.6% of participants knew that HPV is a potential cause for genital warts and a remarkable percentage of students knew that it is a sexually transmitted disease. But general knowledge about details was not high (Table 1).

Mean Knowledge score of post graduate medical students about relation of HPV and cervical cancer was higher comparing to that of undergraduate students ($P=0.02$); such a difference was seen about general knowledge about HPV infection ($P<0.001$). Post graduate midwifery and medical students had even a higher scores about knowledge of HPV transmission route comparing to other groups ($P<0.001$). There was also a considerable difference about general HPV and cervical cancer knowledge between married and single participant ($P<0.001$); besides age and knowledge about transition route were consistent ($P<0.001$).

Results of different groups of students' knowledge showed that the mean scores in 3 major field consisted of HPV infection and genital warts, HPV infection relation between cervical cancer and HPV transition route were higher in Residents, Midwifery students and again Residents respectively.

A higher percentage of students in every group posed a good knowledge about risk factors of cervical cancer; the highest knowledge was about use of oral contraceptives, multiple partners and type of diet (Table 1).

Students were asked about transition route of HPV infection with some details; they represent a moderate or low knowledge in some aspects; although there was an acceptable level of knowledge about HPV in this population, they were unclear about the prevalence of HPV infections (13.6%), that HPV is transmitted via skin-to-skin contact 50 (%) and by kissing (30%).

Additionally, 59.7% of participants correctly identified that HPV cannot be transmitted via bodily fluids (blood, semen). Students demonstrated lower levels of knowledge on questions related to HPV being transmitted by warts on the hands or feet touching the genital area but it was desired about sexual contact and oral sex. Also more details and categorized percentage of knowledge, social aspects of having HPV and opinions of studied population about interacting with suspected people were summarized in Table 1.

To find the most important factors affecting knowledge of participants, some factors seemed to influence the knowledge level entered in the regression model; age ($\beta=0.18$, $P=0.002$), educational level ($\beta=0.21$, $P<0.001$)

Table 1. Knowledge and Attitude of Different Groups of Students Toward Human Papilloma Virus

Items	Percent correct by Total sample N=669 (%)	Percent correct by Undergraduate		Percent correct by Postgraduate		Residents N=185 (%)
		<3 years N=350 (%)	>3years N=93 (%)	Midwifery		
				N=28 (%)	Nursing N=13 (%)	
General knowledge and beliefs university students about HPV						
Have you ever heard of HPV?	669 (100)	350 (100)	93 (100)	28 (100)	13 (100)	185 (100)
Does HPV cause genital warts?	526 (78.6)	264 (75.4)	62 (66.6)	16 (57.1)	10 (76.9)	174 (94.0)
Is HPV a sexually transmitted disease?	593 (88.6)	307 (87.7)	76 (81.7)	25 (89.2)	13 (100)	172 (92.9)
Can HPV be a risk factor to develop cervical cancer?	424 (63.3)	224 (64.0)	53 (56.9)	16 (57.1)	6 (56.1)	125 (67.5)
Can HPV be asymptomatic?	402 (60.0)	183 (52.2)	49 (52.6)	20 (71.4)	9 (69.2)	141 (76.2)
Can HPV infection be diagnosed by Pap tests?	429 (64.1)	210 (60.0)	54 (58.0)	15 (53.5)	13 (100.0)	137 (74.0)
Does Infection involves immediate treatment?	570 (85.2)	300 (85.7)	73 (78.4)	28 (100)	10 (76.9)	159 (85.9)
Is HPV curable?	474 (70.8)	238 (68.0)	63 (67.7)	26 (92.8)	10 (76.9)	137 (74.0)
Is HPV found in over 90% of cervical cancers?	424 (63.3)	224 (64.0)	53 (56.9)	16 (57.1)	6 (56.9)	125 (67.5)
Can HPV infection be treated by antibiotics?	339 (50.6)	170 (48.5)	47 (50.5)	21 (75.0)	7 (53.8)	154 (83.2)
Students Knowledge: Risk Factors for Developing Cervical Cancer						
Smoking	151 (22.9)	95 (27.1)	18 (19.3)	7 (25.0)	3 (16.6)	28 (15.1)
Sun exposure	631 (94.5)	332 (94.8)	85 (91.3)	28 (100)	13 (100)	173 (94.5)
Use of oral contraception	607 (90.7)	305 (87.1)	84 (90.3)	13 (46.4)	16 (88.8)	179 (96.8)
Multiple partners	589 (88.0)	309 (88.3)	75 (80.6)	24 (85.7)	12 (66.6)	169 (91.3)
Alcohol use	508 (75.9)	60 (74.3)	66 (71.0)	16 (57.1)	7 (38.8)	159 (85.9)
Sexual intercourse at an early age	511 (76.3)	274 (78.3)	60 (64.5)	19 (76.9)	11 (61.1)	147 (79.5)
Genetic factors	476 (71.1)	259 (74.0)	63 (67.7)	23 (82.1)	11 (61.1)	120 (64.9)
Type of diet	628 (93.9)	329 (94.0)	84 (90.3)	28 (100)	11 (61.1)	176 (95.1)
Matrimony	506 (75.6)	261 (74.6)	75 (80.6)	20 (71.4)	8 (44.4)	142 (76.7)
Students knowledge about HPV transmission ways and predisposing factors						
HPV can be transmitted by kissing?	207 (40.3)	96 (27.4)	30 (32.2)	9 (32.1)	6 (33.3)	66 (35.6)
HPV can be sexually transmitted	593 (88.6)	307 (87.7)	76 (81.7)	25 (89.2)	13 (72.2)	172 (92.9)
HPV can be transmitted by oral sex	462 (69.0)	215 (61.4)	64 (68.8)	19 (67.8)	11 (61.1)	153 (82.7)
HPV can be transmitted by toilet seats	331 (49.4)	173 (49.4)	48 (51.6)	17 (60.7)	6 (33.3)	87 (47.0)
HPV can cause HIV/AIDS	354 (52.9)	171 (48.8)	50 (53.7)	19 (67.8)	2 (11.1)	112 (60.5)
HPV can cause herpes	304 (45.4)	132 (37.7)	32 (34.4)	14 (50.0)	4 (22.2)	122 (65.9)
HPV can cause serious health problems for women	525 (78.4)	265 (75.7)	67 (72.0)	23 (82.1)	13 (72.2)	157 (84.8)
HPV can be transmitted by warts on hand/feet touching the genital area	337 (50.3)	167 (47.7)	42 (45.1)	12 (42.8)	8 (44.4)	108 (58.3)
HPV can be transmitted by sharing underwear or towels	332 (49.6)	169 (48.2)	46 (49.4)	14 (50.0)	8 (44.4)	95 (51.3)
HPV can cause infertility	247 (36.9)	98 (28.0)	21 (22.5)	14 (50.0)	6 (33.3)	108 (58.3)
HPV can be transmitted by genital skin-to-skin contact	335 (50.0)	162 (46.2)	42 (45.1)	19 (67.8)	8 (44.4)	104 (56.2)
Using condoms during sexual intercourse prevents the spread of HPV	375 (56.0)	201 (57.4)	43 (46.2)	22 (78.5)	10 (55.5)	99 (53.5)
HPV can cause serious health problems for men	279 (41.7)	140 (40.0)	32 (32.9)	13 (46.4)	3 (16.6)	91 (49.1)
HPV can be transmitted by the exchange of bodily fluids	400 (59.7)	223 (63.7)	54 (58.0)	13 (46.4)	8 (44.4)	102 (55.1)
Percentage of sexually active people that acquire HPV (50%)	282 (42.1)	140 (40.0)	31 (33.3)	15 (53.5)	7 (38.8)	89 (48.1)
HPV Stigma Scale						
The freedom of people who have HPV should not be restricted	2.93±0.61	2.57±1.11	3.44±0.01	2.67±0.01	2.5±0.81	3.24±0.96
People who have HPV should not be ashamed	4.10±0.31	1.98±1.21	4.35±0.08	3.57±0.05	2.5±0.31	4.59±0.34
It is safe for people who have HPV to work with children	2.90±0.90	2.67±0.87	3.11±0.15	3.57±0.21	2.22±0.11	3.08±0.37
I am not afraid of contracting with people who have HPV	3.25±0.21	2.85±1.02	3.27±0.15	4.46±0.01	2.5±0.14	3.75±0.75
People who have HPV are dirty	3.42±0.54	3.08±0.21	3.54±0.01	4.46±0.03	2.77±0.91	3.81±0.43
I do not want to be friends with people who have HPV	3.13±0.11	2.71±0.43	3.01±0.11	3.92±0.07	2.22±0.91	3.89±0.81
People who have HPV should be isolated	3.57±0.13	3.27±0.11	3.65±0.01	4.46±0.04	1.94±0.87	4.05±0.89
Total Stigma Score	23.3±2.81	19.13±4.96	24.37±0.52	27.11±0.42	16.65±4.06	26.41±4.55

and cigarette smoking ($\beta=-0.11$, $P=0.006$) were detected to have a link with higher knowledge levels.

Discussion

During present study, knowledge of residents and post graduate midwifery and nursing students was higher comparing to other groups ($P<0.001$). Post graduate midwifery and medical students had even a higher level of knowledge about HPV transmission route comparing to other groups ($P<0.001$).

This study is unique in its form and aims to provide a detailed view of medical university students' awareness and attitude toward HPV infection; to our best knowledge there is no national and official report on the HPV burden in the general population of Iran. although some studies

revealed that it is nearly identical to European countries such as Germany, and Spain (Jamali, 2008); In Asia, to where the region Iran belongs, about 7.9% of women in the general population are estimated to harbor cervical HPV infection at a given time; besides we did not find any national or international published study or report about knowledge and attitudes of Iranian people about HPV infection. A systematic review in 2008 indicated a poor knowledge degree of the general public about HPV infection and emphasized on giving sufficient and unbiased information on HPV infection to the general public but Iranian information was not included in this review (Klug et al., 2008);

In order to test the society knowledge it was logical to address medical society and we started with medical students who will undertake responsibility of health

education in near future and we aim to expand the program in other society groups. We managed to determine a moderate level of total HPV knowledge among our studied group of university student which corresponds with the result of nine studies that verified higher knowledge of medical society as health professionals and physicians about HPV (Klug et al., 2008). This acceptable level of knowledge in this population is attributed to information obtained through university courses which may remarkably vary in non medical university students.

In our study higher university levels enjoyed further knowledge score comparing to earlier-years' students; such a difference was evident in a systematic review that conclude nurses had less knowledge than physicians just like what we had in our medical and nursing students (Klug et al., 2008).

Reported level of knowledge in this study can be interpreted in several ways. All of college students in this sample have heard of HPV but what details they know about the infection should be discussed. In some cases they were unaware of the more important factors about HPV infection, such as the modes of transmission, methods of prevention and prevalence.

Most of the respondents did not know that HPV is a common infection; The Centers for Disease Control and Prevention (CDCP) report that at least 50% of sexually active individuals will acquire an HPV infection at some point in their life (Li et al., 2009; Merzouk et al., 2011) but it does not mean all these attacked women will develop cervical cancer; This lack of understanding about HPV may cause unnecessary stress and alarm if participants are diagnosed with HPV in the future which indicates especial effort to improve this kind of detailed and important knowledge (Pruitt et al., 2005; Rashwan et al., 2012). On the other hand more than half of the participants (64%) were aware about its link with cervical cancer and said that Pap smear can help HPV diagnosis but we expected higher percentage of right answer in a society of medical students. The incidence of cervical cancer in developed countries is much less than developing countries which seems to be related to the screening programs in the developed world (Mandelblatt et al., 2002); fortunately in Iran the incidence is even lower and it does not rank between the first ten most prevalent cancers in Iranian women (Yacobi et al., 1999); Pap smear is well known in Iranian population with coverage of 68.5% ; this alongside with religious beliefs of Moslems about sexual freedom in Iran and preference of young people to abstinence sexual activity until marriage (Mohtasham et al., 2009) or higher society knowledge and life style can effect this lower rate of cervical cancer in Iranian women but the role of high HPV knowledge is questioned considering the result of this study.

Knowledge level of studied groups about risk factors of cervical cancer such as relation with smoking, sun exposure, alcohol use and genetic factors was low; they exhibited low levels of knowledge about the possible health consequences for men. They were even not well clear that HPV could not be transmitted by sharing underwear or towels. These are all areas that future HPV campaigns should target.

Almost half of the participants did not know that HPV can be transmitted via skin-to-skin contact or kissing, Fifty six percent believed that condoms are an effective method of protection against HPV infection whereas role of direct skin-to-skin contact was neglected.

Noteworthy, a majority of participants (90.6%) claimed that they acquired their knowledge through their university courses and the role of mass media and health system was not high lightened; this indicates a real need for effective campaigns about HPV.

Women who have a positive HPV test may express stigma of sexually transmitted infection or STIs; These feelings of guilt and shame are closely linked to concerns about transmission, and disclosure to current or future sexual partners (McCaffery et al., 2006). We found a negative correlation between stigma about HPV and knowledge, indicating that stigma decreases as individuals are more aware of HPV. Higher level of stigma exhibited about working with children and freedom restriction; these attitudes reveal a lack of awareness among university students.

Participants did not pose a good awareness in their understanding that HPV was not related to human immunodeficiency virus or herpes simplex virus (HSV) which should be addressed in future campaigns.

Results clarify the importance of targeting and educating college population about sexual health, HPV, and potential HPV vaccination which is backed by the results of other studies (Jones, Jessica). High intention of university students to get vaccinated against HPV in these studies may be influenced by higher levels of HPV knowledge. As there is not wide access to HPV vaccination in our country we did not note this in our questions which brought regret at the study.

As all of the participants were Moslems and they prefer sexual abstinence until marriage we did not have any questions about sexual activity beyond marriage; a considerable difference about total HPV and cervical cancer knowledge of married and single participant was detected in our study; pre-marriage education programs may have influenced the differences.

Although the sample was of sufficient size, number of the students in different majors was not equal. Additionally future research is needed to determine current knowledge of physician and health care providers and how the information is being conveyed. Besides, testing public knowledge about HPV Vaccine and its acceptance is recommended.

In conclusion, moderate knowledge of medical university students about HPV makes it necessary to set effective national public health efforts for HPV education and prevention considering excess of young population in Iran vulnerable to Cervical cancer ; increased education of health care providers may increase the general knowledge of HPV in the population. These all will strengthen cervical cancer prevention strategies in the country.

Acknowledgements

This research was supported by Liver and Gastrointestinal Disease Research Center of Tabriz

University of Medical Sciences, Tabriz, Iran. The authors would like to thank Dr. Nariman Nezami for his help.

References

- WHO/ICO Information Centre on HPV and Cervical Cancer (HPV Information Centre). Human Papillomavirus and Related Cancers in Iran. Summary Report 2010. [assessed 23 July 2011]. Available at www.who.int/hpvcentre.
- Giles M, S Garland (2006). A study of women's knowledge regarding human papillomavirus infection, cervical cancer and human papillomavirus vaccines. *Aust N Z J Obstet Gynaecol*, **46**, 311-5.
- Howard M, J Koteles, Lytwyn A, et al (2007). Giving patients information on abnormal cytology and human papillomavirus: survey of health providers. *Eur J Gynaecol Oncol*, **28**, 15-7.
- Jamali ZM, Ghobadi DV, Delforoosh M, Hojamoradi MH, Modarresi GM (2008). Prevalence of HPV Infection and Its association with cytological abnormalities of pap smears in Tehran. *Iranian J Publ Hlth*, **37**, 101-6.
- Klug SJ, M Hukelmann, Blettner M (2008). Knowledge about infection with human papillomavirus: a systematic review. *Prev Med*, **46**, 87-98.
- Li J, LK Li, Ma JF, et al (2009). Knowledge and attitudes about human papillomavirus (HPV) and HPV vaccines among women living in metropolitan and rural regions of China. *Vaccine*, **27**, 1210-5.
- MF (2001). Young women's issues associated with Pap tests: a qualitative study of Victorian women. *Hlth Promot J Aust*, **12**, 254-7.
- Mandelblatt JS, WF Lawrence, Gaffikin L, et al (2002). Benefits and costs of using HPV testing to screen for cervical cancer. *JAMA*, **287**, 2372-81.
- Markowitz LE, EF Dunne, Saraiya M, et al (2007). Quadrivalent Human Papillomavirus Vaccine: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep*, **56**, 1-24.
- McCaffery K, J Waller, Nazroo J, et al (2006). Social and psychological impact of HPV testing in cervical screening: a qualitative study. *Sex Transm Infect*, **82**, 169-74.
- Medeiros R (2005). Novas vacinas contra o cancro: O Vírus HPV ea Vacina Contra o Cancro do Colo do Útero. *Mundus/ Dez*. Disponível em: www.cienciapt.net/mundus (acesso em Abril de 2007): 24-25.
- Merzouk MD, P Courtney, Garrett-Albaugh S, et al (2011). Knowledge of HPV in West Virginia high school health students and the effects of an educational tool. *J Pediatr Adolesc Gynecol*, **24**, 278-81.
- Mohtasham G, N Shamsaddin, Bazargan M, et al (2009). Correlates of the intention to remain sexually inactive among male adolescents in an Islamic country: case of the Republic of Iran. *J Sch Hlth*, **79**, 123-9.
- Pollack AE, M Balkin, Edouard L, et al (2007). Ensuring access to HPV vaccines through integrated services: a reproductive health perspective. *Bull World Hlth Organ*, **85**, 57-63.
- Pruitt SL, PA Parker, Peterson SK, et al (2005). Knowledge of cervical dysplasia and human papillomavirus among women seen in a colposcopy clinic. *Gynecol Oncol*, **99**, 236-44.
- Rashwan HH, NZ Saat, Abd Manan DN (2012). Knowledge, attitude and practice of Malaysian medical and pharmacy students towards human papillomavirus vaccination. *Asian Pac J Cancer Prev*, **13**, 2279-83.
- Smith JS, A Melendy, Rana RK, Pimenta JM (2008). Age-specific prevalence of infection with human papillomavirus in females: a global review. *J Adolesc Hlth*, **43**, 5-25.
- Tindle, R. W. (2002). "Immune evasion in human papillomavirus-associated cervical cancer." *Nat Rev Cancer* 2(1): 59-65.
- Villar LM, AD Rabello, de Paula VS (2011). Evaluating knowledge about human papillomavirus infection among Brazilian health professionals. *Asian Pac J Cancer Prev*, **12**, 3251-6.
- Waller J, Marlow LA, Wardle J (2007). The association between knowledge of HPV and feelings of stigma, shame and anxiety. *Sex Transm Infect*, **83**, 155-9.
- Wong LP (2009). Preventing cervical cancer through human papillomavirus vaccination: perspective from focus groups. *J Low Genit Tract Dis*, **13**, 85-93.
- Yacobi E, Tennant C, Ferrante J, Pal N, Roetzheim R (1999). University students' knowledge and awareness of HPV. *Prev Med*, **28**, 535-41.
- Zarcadoolas C, A Pleasant, et al (2012). Advancing health literacy: A framework for understanding and action, Jossey-Bass.
- Zhao FH, Tiggelaar SM, Hu SY, et al (2012). A multi-center survey of HPV knowledge and attitudes toward HPV vaccination among women, government officials, and medical personnel in China. *Asian Pac J Cancer Prev*, **13**, 2369-78.