

RESEARCH ARTICLE

Knowledge of the General Community in Cordoba, Argentina, on Human Papilloma Virus Infection and its Prevention

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Abstract

Background: Most studies of human papilloma virus (HPV) are aimed at the natural history of the infection and its relation to cancer; however, there are few studies to assess knowledge of the general population. Our aim was analyze the degree of knowledge of Argentinians about HPV infection and its prevention. **Materials and Methods:** We conducted a voluntary, anonymous and non-binding survey with 27 multiple-choice items, in twelve private and public establishments, selected to include a broad population in terms of education, age and gender. The survey consisted of three sections: individual characteristics of the volunteer, HPV infection basic knowledge, its prevention and the virus relationship with other cancers. **Results:** One thousand two hundred ninety seven volunteers aged 18 to 80 participated. The total number of correct answers was 45.1%. The correct answers for relationship HPV and cervical cancer was 62.1%. Almost 55% did not know about types of HPV that the vaccines for protection. Statistical analysis showed that women, single people, workers, the better educated, those who have had a STDs or HPV and receiving information through medical or educational establishments had greater knowledge of the topic. Only 0.2% of participants answered all questions correctly. **Conclusions:** Knowledge plays an important role in health care and the deficiency found in our population could influence the success of the measures taken in the fight against cervical cancer. In this regard, we believe it would be appropriate, not only to emphasize early diagnosis and vaccine implementation, but also incorporate new communication strategies, facilitating reception of accurate and precise information by all strata of society.

Keywords: HPV - knowledge - education - prevention - general populace - Cordoba, Argentina

Asian Pac J Cancer Prev, 17 (5), 2689-2694

Introduction

The human papillomavirus (HPV) pertains to the Papillomaviridae family, a diverse group of viruses that infect the skin and mucous epithelia. To date, more than 100 different types of HPV have been identified (Doorbar et al., 2012). Genital infection is mainly a sexually transmitted disease (Bosch et al., 2014); however, the existence of other transmission routes have been demonstrated, such as fomite, perinatal transmission from mother to child, etc. (Martinelli et al., 2012). Both digital and oral HPV infections may occur and some evidences support that digital-genital and oral-genital contact can result in HPV transmission, although in a relatively low percentage. (Martinez et al., 2014). Since papillomavirus infections are transmitted through close skin-to-skin or mucosa-to-mucosa contact, the consistent condom use could reduce, but not absolutely prevent HPV transmission (Winer et al., 2006).

Several genotypes of HPV can cause genital warts and others are strongly associated with cervical dysplasia, cervical cancer, vulvar cancer, anal cancer, penile cancer and oropharyngeal cancer (Doorbar et al., 2012)

Associated risk factors include multiple sexual partners, history of other sexually transmitted infections (STI), smoking habit and early age at first sexual intercourse, among others (Asiaf et al., 2014)

The most HPV studies is oriented towards the etiology and natural history of the infection as a trigger factor of different types of cancer; however, there are a few studies aimed at the assessment of the public knowledge on process and prevention of HPV infections, being most of them performed by university students and targeted to this age group, with the justification that those within the age range of 18 to 24 years present higher prevalence of HPV; however, older women are at higher risk of developing cervical cancer by HPV (IARC 2012)

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Argentina has included in the Calendario Nacional de Vacunacion, an anti-HPV vaccine for girls aged 11 years old with subsequent promotional campaigns, but the degree of knowledge achieved by the residents after these measures is still unknown.

The aim of this study was to analyze the degree on the knowledge of the general community in Cordoba about HPV infection and its prevention, in order to allow the development of adequate education programs.

Materials and Methods

Survey conducted between July and November of 2014

The voluntary, anonymous and non-binding survey involved first group STUD-HEALTH: first-year students of Medical (MED) and Dentistry Schools (DENT), third-year students from the Division of Bacteriology and Virology (BVMED) of the School of Medicine of the Universidad Nacional de Cordoba, Argentina (UNC); second group STUD not HEALTH: first-year students of Mathematics, Physics, Computer Science and Astronomy (FAMAF) (UNC), Psychopedagogy students of the Instituto Superior Dr. Domingo Cabred (PSCABRED); third group PATIENTS: patients who attended the Departments of Infectious Diseases (IFHNC), Gynecology (GHNC) of the Hospital Nacional de Clinicas de Cordoba, Department of Gynecology of the Hospital Materno Neonatal de Cordoba (GHMN), Laboratorio de Andrologia y Reproduccion (LAR), Laboratorio de Chlamydia y HPV, Instituto de Virologia Dr. J.M. Vanella-UNC (INVIV), affiliates attending the Central Office of the Social Health Insurance of the Administracion Provincial de Seguro de Salud (APROSS) and fourth group EAPROSS: employees of

APROSS.

The sites were selected to include a broad population in terms of education level, academic orientation (Health, Not Health) age and gender. The questionnaire was administered by researchers to students in different courses and people who were in the waiting room of the various establishments. This action was repeated by four weeks or until complete 100 respondents per establishment. Citizens older than 18 years participated in the study after signing a written consent, in accordance the guidelines of the ethics committee.

The study was conducted through a multiple choice questionnaire developed by a multidisciplinary group of professionals and previously a pilot test was conducted in a sample of patients who attended the INVIV. The questionnaire was divided in three sections:

i) Individual characteristics of the volunteer. It is described in Table 1

ii) HPV basic knowledge. It is described in Table 2

iii) Six questions of a deeper understanding of the association of HPV with other types of cancer, risk factors, etc; such as: ninety percent of the cases of anal cancer are attributed to HPV; it can also cause penile and oropharyngeal cancer and high Risk HPV (HR-HPV) always leads to cancer. Stress is a risk factor for progression to cervical cancer and malnutrition and/or immunosuppression may influence cancer progression.

Statistics

The responses were analyzed by means of descriptive statistics. A statistical test of differences between two proportions was performed and the comparison with $p < 0.05$ values were considered significant. In order to

Table 1. Characteristics of the Population

Characteristic	All Participants	Characteristic	All Participants
Gender		Sexual Preferenc	
Female	935 (72.1)	Mal sex Fem	1036 (79.9)
Male	362 (27.9)	Mal sex Mal	95 (7.3)
Age		Fem sex Fem	20 (1.5)
Average	27.9	Bisexual	11 (0.8)
Rango	18-80	Virgin	135 (10.4)
18-30	874 (67.4)	b History of STI	
31-50	359 (27.7)	Hepatitis B	20 (1.5)
≥ 51	64 (4.9)	C. trachomatis	50 (3.9)
Marital Status		Genital warts	37 (2.8)
Single	804 (61.9)	Herpes Simplex	13 (1.0)
Married	229 (17.7)	T. vaginalis	15 (1.7)
Separated	34 (2.6)	Gonorrhea	18 (1.4)
Divorced	23 (1.8)	Syphilis	37 (2.8)
Widowed	17 (1.3)	Other	36 (2.8)
Partner	190 (14.6)	None	1105 (85.2)
a Educación		Infection of HPV	
Primary	70 (5.4)	yes	111 (8.6)
Secondary	437 (33.7)	no	1186 (91.4)
Tertiary	365 (28.1)	b Hear about HPV	
University	425 (32.8)	Media	412 (27.2)
Hours of Work		Educational establishment	392 (25.9)
<8 hs	345 (26.6)	Work	35 (2.3)
8-12 hs	242 (18.7)	Medical Doctor	179 (11.8)
>12 hs	54 (4.2)	Friend	275 (18.2)
Jobless	656 (50.6)	Never heard	219 (14.5)

a)They agreed to that grade level, but not always concluded. b) Many participants chose more than one option since they are not mutually exclusive

determine the percentage of participants who answered correctly, a histogram analysis was performed. All the analyses were performed using InfoStat version 2014 (Di Rienzo et al., 2014)

Results

Population

A total of 1,297 volunteers participated in the survey,

Table 2. Percentage Answers for the Basic Knowledge about HPV for Groups

	Patients n=551	EAPROSS n= 97	Students-Health n= 409	Students not Health n= 240	All n=1297
1. What is HPV					
Parasities	4.0	0.0	1.0	3.3	2.6
Bacteria	24.5	16.5	12.7	19.1	19.2
Virus (correct)	53.6	77.3	83.6	63.5	66.6
Fungus	11.4	4.1	2.4	7.1	7.2
I do not know	6.5	2.1	0.2	7.1	4.3
2. . How HPV is transmitted					
In sex relations(correct)	74.9	88.5	83.0	73.4	78.1
For mosquito and animals	1.6	1.8	0.9	0.7	1.3
Blood transfusions	11.9	7.1	11.6	11.4	11.3
Injectable drugs	4.5	0.0	3.0	3.7	3.5
By contaminated food	0.7	0.0	0.9	0.7	0.7
I do not know	6.4	2.6	0.7	10.0	5.1
3. During oral sex can get an HPV infection					
True (correct)	26.1	53.6	46.2	23.7	35.2
False	18.6	17.5	10.5	12.1	14.5
I do not know	55.3	28.9	43.3	64.2	50.3
4. Men do not get HPV					
True	22.9	20.6	10.7	17.5	17.8
False (correct)	43.9	64.9	64.1	39.6	51.1
I do not know	33.2	14.5	25.2	42.9	31.1
5. Oral contraceptive protect against HPV					
True	8.5	7.3	3.7	2.9	5.9
False (correct)	54.7	78.3	67.2	50.4	59.6
I do not know	36.8	14.4	29.1	46.7	34.5
6. Condoms protect against HPV					
True	60.8	73.2	71.6	46.6	62.5
False	5.4	5.2	3.4	7.1	5.1
Uncertain (correct)	8	10.3	12.5	9.2	9.8
I do not know	25.8	11.3	12.5	37.1	22.6
7. HPV can cause cervical cancer					
True (correct)	61.7	84.5	66.5	46.2	62.1
False	2	1.1	2.4	1.3	1.9
I do not know	36.3	14.4	31.1	52.5	36
8. Frequency of the Papanicolaou test					
Once a year (correct)	86.9	91.8	87.5	73.3	84.9
Once every three years	2.9	4.1	3.4	4.3	3.5
Once every five years	0.2	0	3.4	3.7	1.8
I do not know	10	4.1	5.7	18.7	9.8
9. Genital warts are caused by HPV					
True (correct)	40.3	58.8	42.5	27.5	40
False	9.1	10.3	7.6	4.2	7.8
I do not know	50.6	30.9	49.9	68.3	52.2
10. Vaccines protect against all types of HPV					
True	16.5	18.6	7.6	7.9	12.3
False (correct)	28.1	42.2	41.6	26.7	33.1
I do not know	55.4	39.2	50.8	65.4	54.6
11. Sexual intercourse at an early age is a risk factor for infection with HPV					
True (correct)	41.4	49.5	47.7	25	40.9
False	20.1	24.7	22.2	20.8	21.3
I do not know	38.5	25.8	30.1	54.2	37.8
12. Smoking is a risk factor for cervical cancer					
True (correct)	25	36.1	37.9	15	28.2
False	19.8	22.7	15.2	16.7	17.9
I do not know	55.2	41.2	46.9	68.3	53.9
TOTAL					
Correct	41.5	56.7	52.8	35	45.1
Uncorrect	25	24.4	20.2	21.8	22.6
I do not know	33.5	18.9	27	43.2	32.3

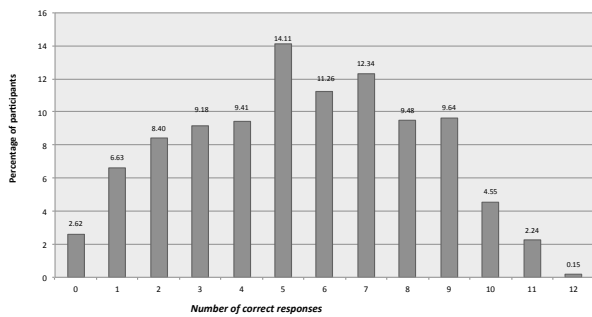


Figure 1. Histogram of responses from the second section of the survey

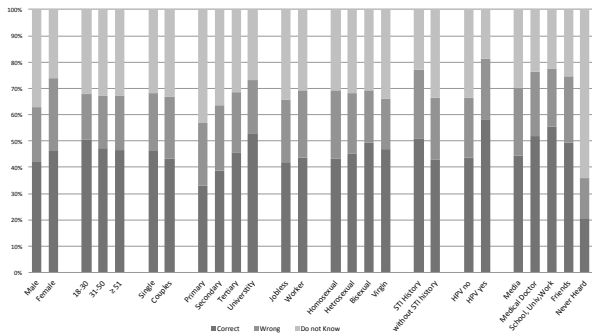


Figure 2. Comparison of correct responses, wrong answers and does not know depending on the individual characteristics of participants

935 women and 362 men, their age ranged between 18 and 80 years (\bar{x} 27.9 SD 11.1). Age distribution was similar among males and females (18-65 \bar{x} 26.6 SD 10.6 / 18-80 \bar{x} 28.4 SD 11.2, respectively). The average number of participants per institution was 108; LAR provided the lowest number of participant (n=64), while the highest number was first-year students of Dentistry at UNC (n=115). The majority of the respondents were single, with access to secondary education, unemployed, heterosexual, without history of STIs, information about HPV had been received through the media and educational institutions (Table 1).

HPV basic knowledge

Figure 1 shows the percentage of participants vs the number of correct answers to the questionnaire of basic knowledge of HPV (Figure 1). This figure shows that most of the participants (14.1%) answered correctly, only 5 questions. Table 2 shows the choices of the participants according the different establishments in terms of basic knowledge about HPV. The total percentage of correct answers in this section was 45.1%; the respondents from EAPROSS (56.7%) achieved the highest percentage for group, while the STUD-not Health (35.0%) obtained the lowest rate. The highest and lowest percentages of correct answers for establishment, corresponded to BVMED (71.8%) and FAMAF (28.3%). (Data not shown).

The analysis of proportions of correct answers for group showed significant differences between PACIENTS - EAPROSS and STUD not Health - STUD Health (p=0.007 and p=0.00001 respectively)

The question that yielded higher percentage of correct answers inquired about the optimal frequency of the PAP smear screening (84.9%), while the lowest percentage was observed in question referred to HPV protection through condom use (9.8%).

The level of knowledge of whether HPV can lead to cervical cancer yielded 62.1% of correct answers and the percentage of distribution was alike between groups (>50%) except for STUD not Health (42.2%)

The number of correct answers regarding the association of HPV with genital warts was low, only 40% of the respondents knew that papillomavirus can cause genital warts. Only EAPROSS exceeded 50% of proper answers in this question (58.8%). Figure 2 shows the comparison of “correct, incorrect and I do not know the answer” responses, depending on the individual characteristics of the participants. The analysis of proportions of correct responses showed significant differences in all comparisons, except in age group >51 and sexual election (*).

Correlation of HPV and various types of cancer: risk factors

The number of total right answers was 17.2%, while the number of participants who chose “I do not know” was 69.3%. The question that yielded the highest percentage of correct answers read: malnutrition and/or immunosuppression may promote cancer progression (33.7% of proper responses) and the lowest percentage corresponded to the question that read: 90% of the anal cancer is attributed to HPV (9.2% of right answers). The group that reached the highest percentage of correct answers was EAPROSS (26.9%) while the lowest percentage was obtained by STD not Health students (14.8%).

Discussion

In the second section, the total correct answers was 45.1%, and only 0.2% of the participants answered correctly all the questions, showing poor general knowledge of HPV. Although, the number of total correct answers, is a low rate, is higher than values reported by authors from other countries (Akanbi et al., 2015; Maier et al., 2015; Asgary et al., 2015; Zouheir et al., 2015)

The groups higher percentage of correct answers were APROSS (56.7%) and STUD Health (52.8%), however, the analysis of proportions not Showed Differences significant (p = 0.499), which would indicate that the level of knowledge is similar between the two groups.

Into the group patients surprisingly the two gynecological service (GHNC and GHMN) were the lowest percentage of correct answers (35.5 and 37.9 respectively). This must call for reflection since it is the female gender has the greatest risk of developing HPV-associated cervical cancer. (IARC 2012). An interesting result is that 61.9% of dental students had no knowledge that HPV infection can be acquired through oral sex, and only 26.5% of them answered this question correctly.

In the question referred to oral sex, the age group 18-30 years yielded the highest percentage of correct

answers (18-30 anos = 37.1%, 31-50 anos=32.6%, >51 anos=23.4%). This percentage, not very high, raises concerns since this is the age of more frequent sexual activity and, as reported in several articles, the practice of oral sex is becoming more common, especially in young people who consider this option as a less risky alternative (Remez, 2000; Holway et al., 2015).

In the question on the use of condoms, the percentage of correct answers was especially low (9.8%); for this reason, this information should be strengthened, as the majority (62.5%) of the participants believed that condom use protects against HPV infection; it is important to inform that, even though it reduces the risk, it does not eliminate it entirely.

The knowledge on the association of HPV with cervical cancer and genital warts (60% and 40% of correct answers, respectively) was similar or higher than values reported in other studies (Moreira et al., 2006; Yilmazel et al., 2014; Doshi et al., 2015)

The question about how often the PAP test should be done yielded the highest percentage of correct answers. However, within the female group, 4.7% answered incorrectly and 5% responded "I do not know the answer", which leads to believe that almost 10% of the women do not know how often they should go to the gynecologist. It is noteworthy that the average age of these women was 27 years, SD: 11 (young adults) and over 80% of them referred that they were or had been sexually active; this facts generates that, review current prevention strategies.

The 5.8% of the women believed that oral contraceptives protect against HPV infection. These participants, in addition to those who chose the option "I do not know the answer", rose the previously mentioned percentage up to 37.4%, which not only indicates lack of knowledge of HPV infection, but also about the proper use of oral contraceptives.

Along with the implementation of the anti-HPV vaccination in Argentina, some information campaigns were conducted across different media. However, in our survey, we surprisingly found out that 54.6% of the respondents were not sure whether the vaccine protects against all types of HPV and 12.3% of them believed that this vaccine is indeed effective against all genotypes. This constitutes a risk for the public because they may think that those who received the vaccine are protected against any infection for HPV; however, people may become infected with other genotypes and in consequence, get confused about the effectiveness of the vaccine.

Another worrying result that showed our study was that only 28% of the participants were aware that tobacco smoking as a risk factor for cervical cancer. This fact becomes even more important if we consider that Argentina leads the ranking of per capita cigarette consumption in Latin America (Eriksen et al., 2012)

In terms of male HPV infection, women and men selected more than 50% of correct answers (M=56.4%, F=51.0%); however, a high percentage of people still lack this information, for which we must work strongly, because recent studies report that, HPV may be transmitted more often from women to men than from men to women, suggesting a need for prevention interventions, such as

vaccination, for men. (Nyitray et al., 2014).

Like other authors, our results indicate that knowledge of HPV is closely related to educational attainment and that women are more informed than men (Kwang et al, 2014; Abudukadeer et al, 2015). Furthermore, like Holcomb et al., we did not found significant differences in the participant choice for responses related to sexual preference. (Holcomb et al 2004) Most people in our research had heard about HPV from the media, interestingly, these participants provided the lowest percentage of correct answers. In this regards, our findings were similar to other studies that suggest that these sources of information may not always be reliable (Katz et al, 2011), or that the interpretation and assimilation of the information transmitted by this route are deficient.

Likewise, Figure 2 shows that participants with history of STDs or HPV yielded greater percentage of hits than those without experience in STDs or HPV. This is important in terms of knowledge acquisition; perhaps this may be assimilated more clearly from personal experience than from information received by any other means.

On the third sections, just as, that second section no the survey, only 0.2% of the participants selected the right answers to the 6 questions.

In the last section of our survey, we observed that the percentage of participants who selected the option "I do not know the answer", was higher than in the second section (69.3% vs 32.2%, respectively), which adds to the decline in the percentage of correct responses according to each groups (example: 2nd section EAPROSS= 56.7% vs 3rd section = 26.9%). We believe that this occurred because the third section of the survey enquired about more specific facts of the subject.

Regarding questions referred to the association of HPV with penile and anal cancer, only 21% of men who have male sexual partners answered correctly. Although the incidence of this type of cancer is not as the same magnitude as cervical cancer, we consider that at the same time that information about prevention and treatment of cervical cancer are provided to the public, it would be important to include information about the involvement of HPV in the development of these lesions and neoplasias.

One alarming fact of this section of the survey is that 89.8% of participants believed that HR-HPV infection always leads to cancer. Considering that most infections are transient and that they are mainly caused by HR-HPV, this information should be clarified in order to generate caution and not panic in people. (Baseman et al, 2005)

In conclusion, we consider that the knowledge about HPV in our population is deficient. While there is a National Law of Sexual Education enacted in 2006 (N. 26.150), 14.5% of the respondents had not heard about HPV; perhaps, the quality and/or amount of information received was insufficient.

Knowledge plays an important role in health care and this deficiency, found in our population, could influence the success of the measures taken in the fight against cervical cancer. In this regards, we believe it would be appropriate, not only to emphasize early diagnosis and vaccine implementation, but also incorporate new communication strategies according to age, cultural

differences, etc. allowing the arrival of the information accurately and precisely to all strata of the society.

References

- Abudukadeer A, Azam S, Mutailipu A, et al (2015). Knowledge and attitude of Uyghur women in Xinjiang province of China related to the prevention and early detection of cervical cancer. *World J Surg Oncol*, **13**, 110.
- Akanbi O, Iyanda A, Osundare F, et al (2015). Perceptions of nigerian women about human papilloma virus, cervical cancer, and HPV Vaccine. *Scientifica*, 1-4.
- Asgary R, Alcabes A, Feldman R, et al (2015). Human papillomavirus knowledge and attitude among homeless women of New York city shelters. *Women's Health Issues*: **25**, 727-31.
- Asiaf A, Ahmad S, Mohammad, et al (2014). Review of the current knowledge on the epidemiology, pathogenesis, and prevention of human papillomavirus infection. *Eur J Cancer Prev*, **23**, 206-24.
- Baseman J, Koutsky L (2005). The epidemiology of human papillomavirus infections. *J Clin Virol*, **32**, 1, 16-24.
- Bosch F, Broker T, Forman D, et al (2014). Comprehensive control of human papillomavirus infections and related diseases. *Vaccine*, **31**, 11-31.
- Di Rienzo J, Casanoves F, Balzarini M (2014). InfoStat version 2014. Grupo InfoStat, FCA, Universidad Nacional de Cordoba, Argentina. URL <http://www.infostat.com.ar>
- Doorbar J, Quint W, Banks L, (2012). The biology and life-cycle of human papillomaviruses. *Vaccine*, **30**, 55-70.
- Doshi D, Reddy B, Karunakar P, et al (2015). HPV, cervical cancer and pap test related knowledge among a sample of female dental students in India. *Asian Pac J Cancer Prev*, **16**, 5415-20.
- Eriksen M, Mackay J, Ross H (2012). The Tobacco Atlas. Fourth Ed. Atlanta, GA: American Cancer Society; New York, NY: *World Lung Foundation*, 16-38
- Holcomb B, Bailey J, Crawford K, et al (2004). Adults' knowledge and behaviors related to human papillomavirus infection. *J Am Board Fam Pract*, **17**, 26-31.
- Holway G (2015). Vaginal and oral sex initiation timing: a focus on gender and race/ethnicity. *Int J Sex Health*, **27**, 351-67.
- IARC (2012). GLOBOCAN: Estimated cancer incidence, mortality and prevalence worldwide in 2012 [Online].
- Katz M, Krieger J, Roberto A (2011). Human papillomavirus (HPV): college male's knowledge, perceived risk, sources of information, vaccine barriers and communication. *J Mens Health*, **8**, 175-84.
- Kwang N, Yee C, Shan L, et al (2014). Knowledge, perception and attitude towards human papillomavirus among pre-university students in Malaysia. *Asian Pac J Cancer Prev*, **15**, 9117-23.
- Maier C, Maier T, Neagu C, et al (2015). Romanian adolescents' knowledge and attitudes towards human papillomavirus infection and prophylactic vaccination. *Eur J Obstet Gynecol Reprod Biol*, **195**, 77-82.
- Martinelli M, Zappa A, Bianchi S, et al (2012). Human papillomavirus (HPV) infection and genotype frequency in the oral mucosa of newborns in Milan, Italy. *Clin Microbiol Infect*, **18**, 16-8.
- Martinez G, Troconis J (2014). Natural history of the infection for human papillomavirus: an actualization. *Invest Clin*, **55**, 82-91.
- Moreira E, Oliveira B, Ferraz F, et al (2006). Knowledge and attitudes about human papillomavirus, Pap smears, and cervical cancer among young women in Brazil: implications for health education and prevention. *Int J Gynecol Cancer*, **16**, 599-603.
- Nyitray A, Lin H, Fulp J, et al (2014). The role of monogamy and duration of heterosexual relationships in human papillomavirus transmission. *J Infect Dis*, **209**, 1007-15.
- Remez L (2000). Oral sex among adolescents: is it sex or is it abstinence? *Fam Plann Perspect*, **32**, 298-304
- Winer R, Hughes J, Feng Q, et al (2006). Condom use and the risk of genital human papillomavirus infection in young women. *N Engl J Med*, **354**, 2645-54.
- Yilmazel G, Duman N. (2014). Knowledge, attitudes and beliefs about cervical cancer and human papilloma virus vaccination with related factors in Turkish university students. *Asian Pac J Cancer Prev*, **15**, 3699-704.
- Zouheir Y, Daouam S, Hamdi S, et al (2015). knowledge of human papillomavirus and acceptability to vaccinate in adolescents and young adults of moroccan population. *J Pediatr Adolesc Gynecol*, **15** 1083-3188