

UAE parental perspectives on vaccinating their adolescent girls against human papillomavirus

Seyed Morteza Mahmoudi¹, Ahmad Al-Auloque¹, Mohammad Reza Rahimi¹, Tareque Shakur¹, Rizwana B Shaikh², Shatha Al Sharbatti², Elsheba Mathew²

¹M.B.B.S. Students, College of Medicine, ²Department of Community Medicine, Gulf Medical University, Ajman, UAE

*Presenting Author

ABSTRACT

Objectives: To evaluate knowledge, beliefs, attitudes, acceptability and interest level of UAE parents of adolescent girls with regards to HPV vaccines and cervical cancer.

Materials & Methods: A cross sectional survey was conducted using 30 item self-administered questionnaire. The questionnaire was validated using the Delphi technique. Parents of adolescent girls were the target population. The schools in cities of Abu Dhabi, Al-Ain and Sharjah were randomly selected through Yellow Page telephone directory and the questionnaires were distributed to the parents of girls studying in grades 6 and 7. Each school was provided with 50 questionnaires to be distributed randomly amongst girl students.

Results: 28% of participants are Emarati nationals and 40% from other Arabic speaking countries. Paternal mean age is (43.0+/-9.7) and maternal mean age is (37.0+/-8.9). Most of the parents have already heard about HPV vaccine (80%) although 88% of them would like to know more about HPV vaccine. 89% of the participants want for their daughters to receive HPV vaccine and 48% of them think that 'recommendation by Ministry of Health' is the most important factor for their acceptance of HPV vaccine. The most important concern was identified to be the 'duration at which vaccine gives protection against cervical cancer'. Majority of the parents believe that vaccine would not increase risky sexual behaviors (57%). 50% of the parents recommend the age of 10-15 years as the appropriate age for HPV vaccination.

Conclusions: HPV vaccine is a recently introduced vaccine in UAE, majority of parents have already heard about HPV vaccine but would like to know more about it. Parents think that recommendation by Ministry of Health is the most important factor for their acceptance of HPV vaccination. Majority do not think that HPV vaccination would increase risky sexual behaviors. Overall parents are interested and have positive attitudes towards HPV vaccination.

Key words: HPV vaccine, parental attitude, KAP study, UAE parents

INTRODUCTION

Cervical cancer is the most common cancer and a leading cause of cancer deaths among women in developing countries¹. Cervical cancer is the second most common cancer among United Arab Emirates (UAE) general female population. The annual incidence of cervical cancer cases in UAE has tripled in 2005 compared to reported cases from 1998 till 2004. More than 68% of reported cervical cancer cases in UAE presents with a late stage disease².

Vaccines against the high-risk types HPV-16 and HPV-18 have been shown to be safe and immunogenic and have been shown to prevent HPV-16/18 incident infection (91% efficacy for the quadrivalent vaccine and 92% efficacy for the bivalent vaccine and 100% efficacy

against persistent HPV16/18 infection and CIN I, II and III up to four years post immunization³.

Quadrivalent vaccine is currently available in 33 countries all over the world. In the Middle East, UAE is the first country to obtain this vaccine after its Health Ministry approved the same. America, Australia and European Union have already approved and introduce this vaccine in their countries⁴.

Reviews on this topic have identified barriers to acceptance of this vaccine. These barriers include structural and attitudinal factors and problems related to implementation more so because the vaccine is designated to prevent a sexually transmitted disease.

Structural problems include, approval from the federal agencies, cost and

funding, and limited supply of the vaccine, vaccine storage facilities and challenges of multiple pre-adolescent health care visits for administering the vaccine⁵⁻⁶.

Attitudinal barriers include parental fears that HPV vaccination may convey a false sense of security to children regarding their susceptibility to STDs; early indulgence of adolescents in sexual behaviors and that adolescents may fail to take adequate self-protective measures during sexual behaviors⁵⁻⁷.

Worldwide, identified barriers to vaccine acceptance include being married, cost, and possible perception of increase in promiscuity⁸. Since UAE is the first country in the Middle East to introduce this vaccine, no other prior studies were done about acceptance of HPV vaccine in this region.

The present study therefore aims at evaluating the awareness of UAE parents of adolescent girls with regards to HPV vaccine, HPV infection and cervical cancer screening and to assess their beliefs, attitudes, acceptability and interest levels about HPV vaccination.

MATERIALS AND METHODS

Sample

This cross sectional survey study was conducted between September to November 2008. The study was designed to sample randomly parents who have daughters in grades 6 and 7 (age 10-14) from 4 major cities in UAE (Abu-Dhabi, Al-ain, Ajman, Sharjah).

The schools were alphabetically ordered from the yellow page directory. Using a series of computerized generated numbers, the schools were selected from each of the cities. In case of any schools refusal, the next school after that from the list was selected. This gave a potential sample of between 1000 and 1500 pupils. A response rate of 20%-30% was anticipated.

Data collection

A 30 item questionnaire was prepared through Delphi technique with 7 rounds of validation. Taking into consideration the sensitive nature of the study and the

awareness of the conservative nature of general populations all attempts were made to keep the questions as neutral as possible. The approval of the Ethics and Research Committee at Gulf Medical University, Ajman was obtained. An Arabic translation of the questionnaire was prepared and approved by translation committee.

Due to apparent lack of parental knowledge a sheet of information answering the key question regarding HPV vaccine was provided to the participants prior to answering the questionnaire (Box 1). Out of 7 schools that have been approached 4 have refused to participate in the study and were replaced by other schools. The questionnaires were distributed to the girls at the school taking the help of school nurses, and the completed ones were collected the following day.

Box 1: Key questions and answers addressed to the participating parents prior to answering the questionnaires

- 1- What is HPV?
- 2- What is cancer of cervix?
- 3- How can you get HPV infection?
- 4- Do we have cure for it?
- 5- Can we prevent it?
- 6- What is a vaccine?
- 7- Who should get HPV vaccine?
- 8- Is it safe?
- 9- How much is the cost of HPV vaccine?
- 10- What vaccinated girls need to know?

Statistical analysis

The major outcome variables are knowledge, attitude and practice of parents of adolescent girls with regard to HPV vaccine. The predictor variables for parent population are:

1. Age of the parents,
2. Income,
3. Qualifications,
4. Nationality and religion,
5. Place where they are living,
6. Experience of cancer in the family

A multinomial logistic regression was

used to examine the relationship between acceptance toward HPV vaccination and its predictor variables. Acceptance toward HPV vaccination was grouped into 3 levels: (i) will to accept HPV vaccination. (ii) not willing to accept HPV vaccination. (iii) not sure about it.

A binominal logistic regression was used to examine the relationship between parental knowledge about HPV vaccine and its predictor variables. Knowledge was grouped into 2 levels: (i) has heard about HPV vaccine (ii) not heard about HPV vaccine. Based on the Chi-square statistic *p* values for each categorical effect was calculated.

RESULTS

Out of four hundred and fifty questionnaires distributed hundred and ten were returned, an overall response rate of 16%. 45 of them due to being incomplete were discarded.

Social demographics

Table 1 represents the social demographic data of participating parents. Mothers accounted for 66.7% respondents and fathers 24%, and in 4.5% of cases the questionnaires were answered by both of the parents. Paternal mean age is (43.0+/-9.7) with minimum and maximum of 22 and 66 years old respectively, maternal mean age is (37.0+/-8.9) with minimum of 18 years old and maximum of 59 years old. 28% of the participants were Emirati

Table 1: Socio-demographics of participating parents (N=75)

Characteristic	Men (n = 18)	Women (n = 50)
	n (%)	n (%)
AGE	Mean: 43.0 SD: 9.7	Mean: 37.0 SD: 8.9
NATIONALITIES		
Emaraties	21 (28.4)	
Other Arabic speaking nationalities	30 (40.5)	
Asians	18 (23.4)	
Others	6 (7.7)	
RELIGION		
Muslims	72(96)	
Non-Muslims	3(4)	
EDUCATION		
Primary	1 (6.66)	13 (25.33)
High school	3 (17)	9 (18.66)
Diploma	4 (22)	5 (9.33)
College	7 (37)	20 (41.33)
Post graduate	3 (17)	3 (5.33)
SOCIOECONOMICALLY STATUS		
Affluent there is plenty for all	28 (37.3)	
Comfortable	33 (44)	
Money is tight	5 (6.7)	
	9 (12)	
VARIABLE		
Number of girls in the family		
1	28(37)	
2 or more	47(63)	
Number of boys in the family		
1	27(36)	
2 or more	48(64)	

nationals, 53.3% were from other Arabic speaking countries mainly Iraq, Egypt, Syria and Palestine. Nationals of other Asian countries (India, Pakistan, etc) constitute 23.4% of our participants.

Muslims have constituted 96% of respondents. The Majority of participants were having more than high school degrees with 76% of fathers and 55% of mothers having diploma, college or post-graduate degrees. Socioeconomically 44% and 37.3% of the participants reported having comfortable and affluent status respectively as compared to 12% of variable status and 6.7% of poor status.

The percentage of number of girls and boys are almost equal among different families with 28% reported having one girl and 27% one boy in their families.

Knowledge about HPV vaccine

A strikingly high percentage of participating parents have heard about HPV vaccine (80%). When parents were asked from which source they have heard of HPV vaccine the majority reported having heard of vaccine in TV (26) and equal number of parents has heard about the vaccine through their relatives and health journals. 5.3% of the parents have heard about the vaccine through their doctors. Majority of the participating parents reported having little knowledge about the vaccine (44%). When asked whether they are interested in knowing more about the vaccine 88% of the parents reported being interested. The most important piece of information parents are looking for have identified to be 'the type of vaccine available' and 'the duration at which it gives protection'. The most important concerns that could be identified regarding HPV vaccine was the duration for which it gives protection against cervical cancer and secondly was the efficacy of the vaccine. 21% of the parents were concerned about the risks of HPV vaccination. Table 2 shows the

parental knowledge characteristics. Chi-square analysis of 'parental education level' and 'knowledge about HPV vaccine' showed that parents with college degree have more knowledge about HPV vaccine (p value 0.05).

Also parents who have reported having had experience of STDs, cancers (cervix or breast) or abnormal PAP results have also reported having more knowledge about HPV vaccine (95% confidence limit).

Parental attitude towards HPV vaccine

Strikingly high percentage of parents is interested for daughters to receive HPV vaccine (89.3%). Most of the parents believe that HPV vaccine should be given within 10-15 years of age which corresponds to the recommended age of vaccination by UAE Ministry of Health (50.7%). 48% of parents think that 'recommendation by Ministry of Health' is the most important factor for their acceptance of HPV vaccine. With regards to sex education to girls 30% of the parents recommend the age of 10-15 years while another 30% believe that 15-20 years is the appropriate age group. Most of the parents (49.3%) were interested in hearing about HPV vaccine with the name 'cervical cancer vaccine'.

When parents were asked "should boys also receive the HPV vaccine?" the response was negative for the majority of the parents (61.3%). Parents generally do not believe that the vaccine would increase risky sexual behaviors (57.33) and that most of them (73%) believe that STD could be prevented by behavioral education.

Correlational analysis has showed that parents who have received Flu vaccine are more likely to accept HPV vaccine also (p value 0.05). Also parents who have reported having had experience of STDs, cancers (cervix or breast) or abnormal PAP results are also more likely to accept HPV vaccine (p value 0.001). Table 3 shows the parental attitude characteristics.

Table 2: Parental knowledge characteristics with regard to HPV vaccine (N=75)

Parental knowledge characteristics	Frequency	Percentage
Have heard about HPV vaccine		
Yes	60	80
No	15	20
Sources of parental information about HPV vaccine		
TV	26	34.7
Radio	4	5.3
Internet	6	8
Health Journals	15	20
Newspaper	6	8
Doctors	4	5.3
Relatives	15	20
Friends	5	6.7
Conferences	2	2.7
Parental interest in knowing more about HPV vaccine		
Yes	66	88
No	9	12
Perceived level of knowledge about HPV vaccine		
I don't know anything	8	13
I know a little	33	44
I have considerable knowledge	8	13
I know a lot	4	5
I know everything about it	0	0
Information parents want to know about HPV vaccine		
Risks	17	22
Efficacy	14	19
Price	13	17
Number of shots	11	14
Types of HPV vaccine available	26	34
Duration of protection	20	27
Parental concerns about HPV vaccine		
Risks	16	21
Efficacy	20	27
Price	5	7
Number of shots	6	8
Duration of protection	22	29

Table 3. Parental attitude characteristics with regards to HPV vaccine

Parental attitude characteristics	Frequency	Percentage
Willingness to have their daughter vaccinated		
Yes	67	89.3
No	8	10.6
Parental recommendation for the age of vaccination		
Less than 10	10	13.3
10-15	38	50.7
16-20	10	13.3
21-25	12	16
25-30	5	6.7
Parental recommended age for sex education		
Less than 10	1	2
10-15	25	33
16-20	25	33
Above 20	19	25
No response	5	7
Suggested name for HPV vaccine		
Cervical cancer vaccine	37	49.3
Genital warts vaccine	4	5.3
STD vaccine	13	17.3
HPV vaccine	19	25.3
Others	2	2.7
Parental belief about boys receiving vaccine		
Yes	10	13.3
No	46	61.3
Don't know	19	25.3
Parental belief about increase in risky sexual behavior with HPV vaccination.		
Yes	7	9.3
No	50	66.6
Don't know	18	24
Parental perception that HPV could be prevented by behavioral education.		
Yes	55	73
No	5	7
Don't know	15	20

Table 4. Parental practice characteristics (N=75)

Parental practice characteristics	Frequency	Percentage
Girls who have already received HPV vaccine	8	10.6
Mothers who have been tested by cervical PAP smear	16	21.3
Parents who have administered flu vaccine	47	63

Table 5. Correlational analysis between HPV vaccine knowledge and some predictor variables

Variables	Have heard of HPV vaccine	Have not heard of HPV vaccine	p value
Paternal educational level			0.05
Diploma, high school or less	24	10	
College degree or more	36	5	
Parental disease experience			< 0.0001
E Experienced	17	11	
N Not experienced	43	4	
Flu Vaccine administration			<0.0001
Flu vaccine taken	43	4	
Flu vaccine not taken	17	11	

Parental practice level

10.6% of the participating parents reported that they have taken HPV vaccine for their daughters. Only 21.3% of the parents reported that they have undergone cervical pap smear examination. One of the recent vaccines introduced in to the market is Flu vaccine and that it is an optional vaccine. 62.7% of the parents reported that they or their daughters have received Flu vaccine. Table 4 summarizes the parental practice characteristics.

DISCUSSION

In this study we have explored the knowledge, attitude and practice level of UAE parents of adolescent girls with regard to HPV vaccine and cervical cancer screening. In general contrary to our initial assumption that most of the parents have not at all heard of the vaccine, the study shows that education in this regard was effective and most parents at least have heard of the vaccine.

Our results are in line with another study in which 67% of the patients attending health clinics in the United States have reported having heard of HPV⁹.

The fact that most of our participants also reported low level of knowledge about HPV vaccine is in line with many other studies done in various other countries. Pitts and Waller stated that only 30% of women participants had ever heard of HPV¹⁰⁻¹¹. Another study shows that 13% of adolescents in Canada had heard of HPV¹². The study on "University students knowledge and awareness of HPV" in the United States showed that 37% of the university students had heard of HPV¹³. Previous experiences with an abnormal pap smear result was associated with greater knowledge about HPV¹⁴⁻¹⁵, suggesting that HPV-related educational efforts may often occur after women have experienced an adverse consequence of

HPV infection, This finding is observed in our study as well.

Similar to many other studies we have also found that relatively high level of interest in HPV vaccination¹⁶⁻³⁸. The most important reasons for not accepting the vaccine stated by parents include 'I don't know if it is of any benefit' 'Only if my doctor prescribes I will take it' 'They are too young (or kids to receive such vaccines)' 'Love and good behavioral education will prevent them from diseases'.

Majority of parents have recommended the age of 10-15 years as appropriate for HPV vaccination, which is higher when compared to other studies³⁹ and could be due to the fact that Ministry of Health recommendation of the same age prompt parents to choose the same. Taking into consideration that majority of UAE parents believe behavioral education can prevent STDs, the perceived age of sexual encounter was not found to be a determinant factor for them to recommend an earlier age for HPV vaccination.

Another Important correlates to parental acceptability of HPV vaccine is that parents who generally reject vaccination are less likely to accept HPV vaccine. This has been demonstrated in many previous studies⁴⁰⁻⁴¹. Our finding of increased parental acceptance of HPV among those who have received Flu vaccine may indicate the same notion. In study of Liddon et al.³⁸, Parents who reported that their child had received flu shot were more likely to accept HPV vaccine.

In two studies some parents were worried about an increase in promiscuity and risk of other STIs^{16,26}. This finding was not present in our study, taking into consideration the high level of belief in parents that proper education can prevent risky sexual behaviors.

We have identified that majority of parents would like to hear about HPV vaccine with the name: 'cervical cancer vaccine' this is in line with a previous study titled: 'Influence of parent characteristics and disease outcome framing on HPV vaccine acceptability

among rural, Southern US women' that showed that rural women, especially those who are younger, were more accepting HPV vaccine when it was framed as a cervical cancer vaccine²³. This is probably another reason that parents would like to accept HPV vaccine due to the fact that it prevents cervical cancer but not looking at it as a way to prevent an STD.

The most important universally accepted method of early cervical cancer detection is Pap smear, the frequency of which in our study was found to be far below many other populations. The reason for which could be due to lack of enough emphasis or nation wide programs aiming to implement this screening modality.

The low response rate of this study is almost comparable to some previous studies of this kind. The findings of this study cannot be generalized to the whole UAE population, but can give an insight with regards to matters related to preventive practices and attitudes of UAE parents. UAE community being a mixed the authors would suggest further studies in this regard at subpopulations.

Due to high turnover rate of population in UAE study amongst other nationalities would not probably give us the real picture of people's knowledge and acceptance in this country.

CONCLUSION

Majority of participating parents have already heard about HPV vaccine but would like to know more about it. Parents think that recommendation by Ministry of Health is the most important factor for their acceptance of HPV vaccination. Majority do not think that HPV vaccination would increase risky sexual behaviors. Overall, parents are interested and have positive attitudes towards HPV vaccination.

REFERENCES

1. Das BC, Hussain S, Nasare V, et al. Prospects and prejudices of human papillomavirus vaccines in India. *Vaccine J* 2008;26(22):2669-2679.
2. Courtesy of Gardasil. Gardasil – Cervical Cancer Vaccine in UAE Biomedicine News, Published: 1/8/2007. Available from: URL:<http://www.biomedicine.org/medicine-news/Gardasil-u2013-Cervical-Cancer-Vaccine-in-UA->

- 17232-1/. [Retrived:6/2/2009]
3. Koutsky L, Ault K, Wheeler C, et al. A controlled trial of a human papillomavirus type 16 vaccine. *N Engl J Med* 2002;347:1645-51.
 4. Source-Medindia JYT. Gardasil – Cervical Cancer Vaccine in UAE. Medindia, Latest Health News, Drug News, Posted online: 2007 January 08., www.medindia.com/news/view_news_main.asp?x=17333 - 97k. [Retrieved 2008 October]
 5. 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(1):49-52
 6. Humiston SG, Rosenthal SL. Challenges to vaccinating adolescents: vaccine implementation issues. *Pediatr Infect Dis J* 2005;24(6):134-40.
 7. Jacob M, Bradley MA. Human papillomavirus vaccine: what dose the future hold for preventing cervical cancer resource pool settings through immunization programs? *Sex Transm Dis* 2005;32(10):635-40
 8. McNeil C. Who Invented the VLP Cervical Cancer Vaccines? *Journal of the National Cancer Institute* 2006;98(7):433.
 9. Holcomb B, Bailey JM, Crawford K, et al. Adults' knowledge and behaviors related to human papillomavirus infection. *J Am Board Fam Pract* 2004;17:26-31.
 10. Pitts M, Clarke T. Human papillomavirus infections and risks of cervical cancer: what do women know? *Health Educ Res* 2002;17:706-14.
 11. Waller J, McCaffery K, Forrest S, et al. Awareness of human papillomavirus among women attending a well woman clinic. *Sex Transm Infect* 2003;79:320-2.
 12. Dell DL, Chen H, Ahmad F, et al. Knowledge about human papillomavirus among adolescents. *ObstetGynecol* 2000;96:653-6.
 13. Yacobi E, Tennant C, Ferrante J, et al. University students' knowledge and awareness of HPV. *Prev Med* 1999;28:535-41.
 14. Pitts M, Clarke T. Human papillomavirus infections and risks of cervical cancer: what do women know? *Health Educ Res* 2002;17:706-14.
 15. Waller J, McCaffery K, Forrest S, et al. Awareness of human papillomavirus among women attending a well woman clinic. *Sex Transm Infect* 2003;79:320-2.
 16. Lenselink CH, Gerrits MM, Melchers WJ, et al. Parental acceptance of Human Papillomavirus vaccines. *European Journal of Obstetrics & Gynecology and Reproductive Biology* 2008 March;137(1):103-107.
 17. Hausdorf K, Newman B, Whiteman D, et al. HPV vaccination: what do Queensland parents think? *Aust N Z J Public Health* 2007;31:288-289.
 18. Dinh TA, Rosenthal SL, Doan ED, et al. Attitudes of mothers in Da Nang, Vietnam toward a human papillomavirus vaccine. *J Adolesc Health* 2007;40(6):559-63.
 19. Dempsey AF, Zimet GD, Davis RL, et al. Robert Wood Factors that are associated with parental acceptance of human papillomavirus vaccines: a randomized intervention study of written information about HPV. *Pediatrics J* 2006;117(5):1486-93.
 20. Constantine NA, Jerman P. Acceptance of human papillomavirus vaccination among Californian parents of daughters: a representative statewide analysis. *Journal of Adolescent Health* 2007;40(2):108-115.
 21. Brabin L, Roberts SA, Farzaneh F, et al. Future acceptance of adolescent human papillomavirus vaccination: a survey of parental attitudes. *PEDIATRICS J* 2006;118 (6):2280-2289.
 22. Brabin L, Roberts SA, Kitchener HC. A semi-qualitative study of attitudes to vaccinating adolescents against human papillomavirus without parental consent. *BMC Public Health* 2007;7:20.
 23. Sperber NR, Brewer NT, Smith JS. Influence of parent characteristics and disease outcome framing on HPV vaccine acceptability among rural, Southern women. *Cancer Causes and Control J* 2008;19(1):115-118.
 24. Ogilvie GS, Remple VP, Marra F, et al. Parental intention to have daughters receive the human papillomavirus vaccine. *CMAJ* 2007 Dec 4; 177(12):1506-12.
 25. Noakes K, Yarwood J, Salisbury D. Parental response to the introduction of a vaccine against human papilloma virus. *Hum Vaccine J* 2006;2(6):243-8.
 26. Waller J, Marlow LA, Wardle J. Mothers' attitudes towards preventing cervical cancer through human papillomavirus vaccination: a qualitative study. *Cancer Epidemiol Biomarkers Prev* 2006;15(7):1257-61.
 27. Mays RM, Sturm LA, Zimet GD. Parental perspectives on vaccinating children against sexually transmitted infections. *SocSci Med J* 2004; 58(7):1405-13.
 28. Lazcano-Ponce E, Rivera L, Arillo-Santillán E, et al. Acceptability of a human papillomavirus (HPV) trial vaccine among mothers of adolescents in Cuernavaca, Mexico. *Arch Med Res J* 2001;32(3):243-7.
 29. Marlow LA, Waller J, Wardle J. Trust and experience as predictors of HPV vaccine acceptance. *Hum Vaccin J* 2007;3(5):171-5.
 30. Bair RM, Mays RM, Sturm LA, et al. Acceptability to Latino parents of sexually transmitted infection vaccination. *AmbulPediatr J* 2008;8(2):98-103.
 31. Crosby R, Schoenberg N, Hopenhayn C, et al. Correlates of intent to be vaccinated against human papillomavirus: an exploratory study of college-aged women. *Sex Health J* 2007;4(1):71-3.
 32. Baykal C, Al A, Uğur MG, et al. Knowledge an interes of Turkish women about cervical cancer and HPV vaccine. *Eur J GynaecolOncol* 2008;29(1):76-9.
 33. Olshen E, Woods ER, Austin SB, et al. Parental acceptance of the human papillomavirus vaccine. *J Adolesc Health* 2005;37:248-51.

34. Slomovitz BM, Sun CC, Frumovitz M, et al. Are women ready for the HPV vaccine? *GynecolOncol, Can Fam Physician* 2007; 53(12): 2157-2159.
35. Davis K, Dickman ED, Ferris D, et al. Human papillomavirus vaccine acceptability among parents of 10- to 15-year-old adolescents. *J Low Genit Tract Dis* 2004;8:188-94.
36. Olshen E, Woods ER, Austin SB, et al. Parental acceptance of the human papillomavirus vaccine. *J Adolesc Health* 2005;37:248-51.
37. Zimet GD, Mays RM, Sturm LA, et al. Parental attitudes about sexually transmitted infection vaccination for their adolescent children. *Arch PediatrAdolesc Med* 2005;159:132-7.
38. Liddon N, Pulley L, Cockerham WC, et al, parents willingness to vaccinate their children against genital herpes. *J adolescent Health* 2005;37(3):248-51.
39. Brabin L, Roberts SA, Farzaneh F, et al. Future acceptance of adolescent human papillomavirus vaccination: A survey of parental attitudes *Vaccine* 2006;24:3087-94.
40. Marlow LA, Waller J. parental attitude to prepubertal HPV vaccination. *Vaccine* 2007;25:1945-52.
41. Davis K, Dickman ED, Ferris D, et al. Human papillomavirus vaccine acceptability among parents of 10-15 year old adolescents, *J Low Genit Tract Dis* 2004;8:188-94.