

Knowledge and Acceptability of Human Papilloma Virus Vaccine among Health Colleges' Students at King Abdul Aziz University, Jeddah Saudi Arabia, 2018 (A Cross-Sectional Study)

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Abstract

Background: Three types of HPV vaccine were introduced, and they were effective against HPV infection, their efficacy reached 98%. Worldwide, many studies have explored the level of knowledge and acceptability scores of the HPV vaccine. **Objectives:** To measure knowledge and acceptability and their predictors toward HPV vaccination among the final year of health college students at King Abdul-Aziz University in Jeddah, Saudi Arabia, in 2018. **Methods:** A cross-sectional study with a self-administered, well-structured questionnaire involving 300 students from the final year of male and female health colleges (Medicine, Dentistry, Pharmacology, Medical Technology, and Nursing) at King Abdul-Aziz University in Jeddah, Saudi Arabia, in 2018. **Results:** This study showed 34.00% good knowledge and 76.00% high acceptability among health college students. A low level of knowledge about the HPV vaccine among Saudi students (32.80%) in comparison with non-Saudis (66.70%) ($P \leq 0.05$). The acceptability of the HPV vaccine was higher in females (80.80%) and was statistically significant ($P \leq 0.05$). The logistic regression analysis showed that good knowledge level was independently associated with nationality and awareness about the possibility of preventing cervical cancer, while the acceptability level was independently associated with the good knowledge score. **Conclusion:** poor level of knowledge and a high acceptability toward the HPV vaccine offered us a strong push forward to provide the HPV vaccine to the community.

Keywords: knowledge, acceptability, human papilloma virus vaccine, cervical cancer.

Introduction

Human papillomavirus (HPV) is a DNA virus that accounts for more than 170 of known genotypes ⁽¹⁾. It is a sexually transmitted infection typically spread through skin-to-skin contact ⁽²⁾.

Worldwide, cervical cancer is one of the major causes of death among female genital cancers ⁽³⁾. In 2018, the World Health Organization (WHO) ranked cervical cancer as the second most common cancer affecting women in the low developed countries. According to the Information Center on HPV and Cancer 2019, cervical cancer was ranked as the ninth most frequent cancer affecting childbearing women between 15–44 years of age in Saudi Arabia. Annually, 316 new cases of cancer

are diagnosed, and 158 deaths are reported ⁽⁴⁾.

Cervical cancer cases significantly decreased among women who received at least one dose of the vaccine from 53.6% to 28.4% after the introduction of the vaccine against HPV infection in the United States (US) from 2008–2012 in contrast to non-vaccinated women (57.1% to 28.4%) ⁽⁵⁾.

Worldwide, 71 countries had introduced an HPV vaccine (Gardasil) by 31 March 2017 to their national immunization program for girls, and 11 countries had done the same for boys. Three vaccines are currently available and these distinct vaccines protect against two HPV strains (bivalent), four HPV strains (quadrivalent),

or nine HPV strains (nine-valent) and were approved by the US Food and Drug Administration (US FDA) in Osman 2009 ⁽⁶⁾, 2007, and 2014, respectively ⁽⁷⁾. The HPV vaccine is administered intramuscularly in two or three doses and is safe for both males and females from 9–26 years of age ⁽⁸⁾. The vaccine is recommended in immunocompromised patients who are susceptible to acquiring the infection ⁽⁹⁾. The efficacy of the quadrivalent HPV vaccine in the prevention of cervical intraepithelial neoplasia (CIN2+) is 98.2% ⁽¹⁰⁾. The high level of antibodies produced against specific types of quadrivalent vaccine and bivalent vaccine HPV types persists for a minimum of eight or nine years, respectively ^(11,12) and at least five years for the nine-valent vaccine. There were no cases of death reported ⁽¹³⁾.

Worldwide, many studies have explored the knowledge and acceptability of the HPV vaccine. In February 2016, a cross-sectional study was conducted among undergraduate female medical students at Jimma University in Addis Ababa, Ethiopia. The study showed that more than half of the participants (56.2%) had poor knowledge about the HPV vaccine, and a low level of acceptability to receive the vaccine for themselves (49.4%) ⁽¹⁴⁾. In Saudi Arabia, a cross-sectional study was conducted in 2014 among 1400 medical students in the health colleges at Princess Nora Bint Abdul Rahman University; the study showed poor overall knowledge about the HPV vaccine equal to 95.5 % ⁽¹⁵⁾. The knowledge score was associated with different colleges in a Nigerian study ⁽¹⁶⁾ and associated with marital status in Malaysian study ⁽¹⁷⁾, and finally associated with level of awareness about the HPV infection in a Chinese study ⁽¹⁸⁾. On the other hand, the acceptability score among health college students was associated with different health colleges in a Nigerian study ⁽¹⁶⁾, by Olumide et al. the acceptability score was associated with level

of awareness about the HPV infection and knowledge about the preventable nature of cervical cancer ⁽¹⁹⁾, and finally by Adejuyigba et al. showed that acceptability score was associated with good knowledge score ⁽²⁰⁾.

Materials and Method

Study Design Setting and Population:

This was an analytical, cross-sectional study conducted among health college students during a 12-months to measure their knowledge and acceptability toward the HPV vaccine at King Abdul-Aziz University in Jeddah, Saudi Arabia.

• Inclusion criteria:

- o Both gender male and female.
- o Final-year students from different health colleges (Medicine, Dentistry, Pharmacology, Medical Technology, and Nursing) at King Abdul-Aziz University in Jeddah, Saudi Arabia in 2018.
- o Saudi and Non-Saudi Students.
- o Married and Non-Married
- No identifiable information was collected, and all participants provided informed consent prior to answering the questionnaires.

• The Sample Size:

The sample size was calculated using the sample size equation. The previous prevalence of knowledge & acceptability of the vaccine was reported as 78% by a study conducted in China by Fu et al. in 2015 among medical students ⁽²¹⁾, and the significance level was $\alpha=0.05$.

$$n = \frac{Z^2_{1-\alpha/2} P(1-P)}{d^2}$$

$$n = (3.841) \times 0.785 \times (0.22) / (0.0025)$$

n = Minimum Sample Size. $Z^2_{1-\alpha/2}$ Value = Is standard normal variate at 5%, type 1 error [P < 0.05] is 1.96. p = The expected proportion in a population based on previous studies or pilot studies. d = The absolute error or precision – Must be decided by the researcher.

A pilot study of 10% of the sample was conducted for the reliability analysis and to test the applicability of the questionnaire and the accessibility of the study sample.

Sampling Technique:

The survey was conducted based on sample size of 300 medical students. At the beginning the data collected from the following college: Medicine college which contained 347 both sex students, Dentistry college contained 191 both sex students, College of Nursing contained 113 female students, college of Pharmacology which contained 164 both sex students and lastly college of Medical Technology 42 both sex students. The total number of health college students equaled 857, by the proportional allocation percentage which was carried out from each health college included in

the study and the breakdown for it as following; college of Medicine (40.4%) equal to 121 participants, college of Dentistry (22.3%) equal to 67 participants, college of Nursing (13.2%) equal to 39 participants, college of Pharmacology (19.14%) equal to 58 participants, college of Medical Technology (4.90%) equal to 15 participants.

We selected the sample using a systematic random technique by choosing the students from administration lists (name lists) from each college included in the study. We collected the questionnaires and checked for any missing data.

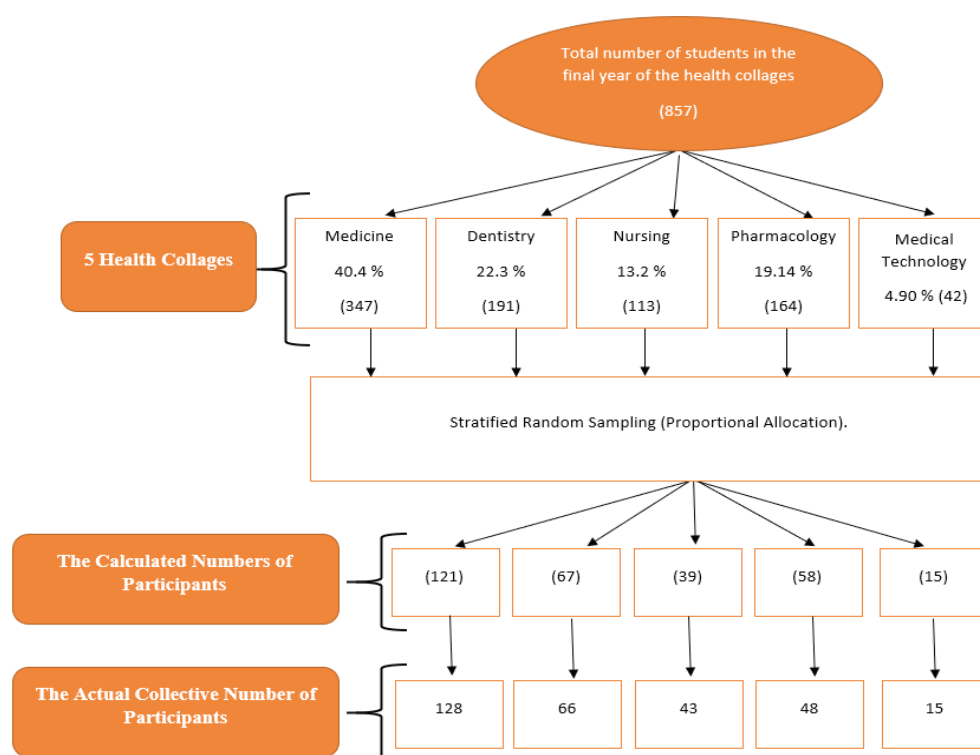


Figure (1): Sampling Technique:

Research Instrument:

This study used a self-administered, well-structured, closed-ended questionnaire for data collection. The questionnaire was reviewed and validated by three experts (two community medicine and one obstetrics and gynecology consultants) and was modified according to the experts' opinions. It was developed using three previously validated and published questionnaires by Pandey et al. 2012⁽²²⁾, Fu et al. 2014⁽²¹⁾, and Al-Shaikh et al. 2014⁽¹⁵⁾.

It was with four sections: 1- Sociodemographic questions included 11 question e.g. their age, gender, college, marital status. 2- Knowledge about HPV infection which include 17 questions, e.g. respondents were asked if they had previously heard about HPV infection, 3- Knowledge about the HPV vaccine which included 23 questions e.g. if they had ever heard about the HPV vaccine to prevent cervical cancer in females. 4 - HPV vaccine acceptability which included 11 questions about the students' willingness to receive the vaccine or to recommend it to their future patients or family.

Twenty-three questions were asked to measure the participants' HPV vaccine knowledge, so the total scores ranged from 0–23. A composite score in percentage was then derived by dividing everyone's score by 23 and then multiplying it by 100. According to Geneti et al. (2016), 50% used as a cut of point to divided our sample into 2 groups (good knowledge group and poor knowledge group) (14). The acceptability score was measured using a Likert-type scoring system, which was categorized into three levels of agree, disagree, and neutral. Any acceptability score above 50% was considered high, while scores below 50% represented a low acceptability level (14).

Data Entry and Data Analysis

The data were coded, entered, and analyzed using the Statistical Package for the Social Sciences (SPSS) software, 22. Qualitative variables were presented using frequencies and percentages, while quantitative variables were shown as the mean and standard deviation. A Chi-squared test was used to and P-values < 0.05 were considered statistically significant. A logistic regression analysis was used to assess the strength of associations.

Results

According to the participants' knowledge scores, they were categorized in the **table (1)** into two groups; (66.0%) had a poor knowledge score, while (34.0%) had good knowledge score. Non-Saudis demonstrated a significantly higher knowledge score regarding the HPV vaccine than Saudis (66.7% versus 32.3%, respectively; ($P \leq 0.05$). Distribution by college specialty showed that medical students' score was the highest percentage (46.1%), followed by nursing (32.6%), dentistry (27.3%), and pharmacology students (22.9%).

The participants were assigned to one of two groups based on their acceptability scores: Of the total participants, 228 (76%) had a high acceptability score, while 72 (24%) had a low score. Based on the acceptance scores, females had a greater percentage of acceptance than males (80.8% versus 69.5% respectively), and the difference was statistically significant ($P \leq 0.05$). Also, there was a significant difference in the acceptability between different specialties ($P \leq 0.05$); the highest percentage of acceptance was observed among nursing students (83.7%), followed by medical (81.3%) and

dentistry (74.2%) students. Moreover, the present study showed that as the knowledge increased, the acceptability also increased ($P \leq 0.05$).

Of the 64% of respondents who had a family member or friend diagnosed with cervical cancer chose the “yes” answer and illustrated a high acceptability level toward the HPV vaccine in comparison to the 45.5% of them who showed a low level of acceptability toward the vaccine ($P \leq 0.05$). Regarding the attitude of the participants about the ability of the HPV infection to cause cervical cancer in females, 82.60% of the participants who answered “agree” demonstrated a higher level of acceptability toward the vaccine in comparison to the 17.40% who showed a low level of acceptability toward the vaccine ($P \leq 0.05$). Participants with a high knowledge score about the HPV vaccine demonstrated a high level of acceptability toward receiving the HPV vaccine (95.1%) in comparison to the 4.9% who showed a low level of acceptability toward the vaccine ($P \leq 0.05$).

Table (2) contained the binary logistic regression, which demonstrated the predictors of knowledge and acceptability level about the HPV vaccine. Good knowledge about the HPV vaccine was independently associated with the participant's knowledge about the information that cervical cancer can be a preventable disease. Participants who answered “yes” were 4.19 times more likely to have a good knowledge level about the HPV vaccine than participants who chose the answer “do not know” (OR = 4.19 [95% CI = 1.97, 8.88]). Followed the participant's nationality, with non-Saudis being 3.99 times more likely to have a good knowledge level in comparison with Saudi students (OR = 3.99 [95% CI = 1.22, 13.00]). It also showed that the knowledge level was a strong predictor for vaccine acceptability, the participants with a high knowledge score about the HPV vaccine were 7.66 times more likely to have a high acceptability toward the vaccine in comparison to poor knowledge score participants (OR = 7.66 [95% CI = 2.83, 20.76]).

Discussion

In the present study, a higher percentage of students were non-married (92.00%), while only (8.00%) were married. Comparable results were found in another study from Ethiopia, in 2016, The study showed a higher percentage of unmarried participants (97.5%), while

only 2.5% were married ⁽¹⁴⁾.

The good knowledge score demonstrated 34% in comparison to 66% of poor knowledge score among the studied participants. The high acceptability score reached (76.00%) in comparison to 24.00% of low acceptability score among the studied participants. In contrast, another study showed (60.4%) of rejection toward the vaccine than (39.6%) of acceptance of it ⁽²⁰⁾.

In the current study good knowledge scores predominantly belonged to students of the faculty of Medicine (46.10%). A different study was conducted in Benin City, Nigeria, that study showed higher good knowledge among students of the Faculty of Medicine (35.8%), Dentistry (9.3%) ⁽¹⁶⁾. In the current study, married students had a higher level of good knowledge (45.8%) than single students (33%). In contrast, a study conducted in Malaysia 2010 showed that single participants had a higher good knowledge (41.5%) than married and divorced students (23.2% and 22.2%, respectively) ⁽¹⁷⁾. Only 36.4% of the participants in the current study who were informed about HPV infections demonstrated good knowledge about the HPV vaccine ($P \leq 0.05$), while 76.5% of the participants in a Chinese study 2014 had heard about HPV infection ⁽¹⁸⁾.

The acceptability rate was higher in the current study among students in the faculty of Medicine (81.3%), followed by the faculty of Nursing (83.7%). In agreement with the current study, another study in Nigeria 2016 the acceptability was higher among students in the Faculty of Dentistry (100%) followed by students of Faculty of Medicine (99.3%) ⁽¹⁶⁾. In the current study, 80.00% of the participants who were aware about the HPV infection demonstrated a high acceptability for the HPV vaccine ($P \leq 0.05$). In contrast, another study in Nigeria in 2015 showed that 71.2% of the participants who had heard about HPV infection having high acceptability toward the HPV ($P \leq 0.05$) ⁽¹⁹⁾. In the running study, 81.9% of the participants who knew that cervical cancer can be a preventable disease had a high acceptability toward the HPV vaccine. In comparison with Olumide et al.'s 2015 study, showed that 75% of the participants who knew about the preventable nature of cervical cancer had a high acceptability toward the HPV vaccine ⁽¹⁹⁾. In the present

study, 95.1% of good knowledge score participants had a high acceptability toward the HPV vaccine ($P \leq 0.05$). In agreement with the current study, another study showed that 55.9% of participants who had a full knowledge score demonstrated a high acceptability toward the HPV vaccine ($P = 0.008$) ⁽²⁰⁾.

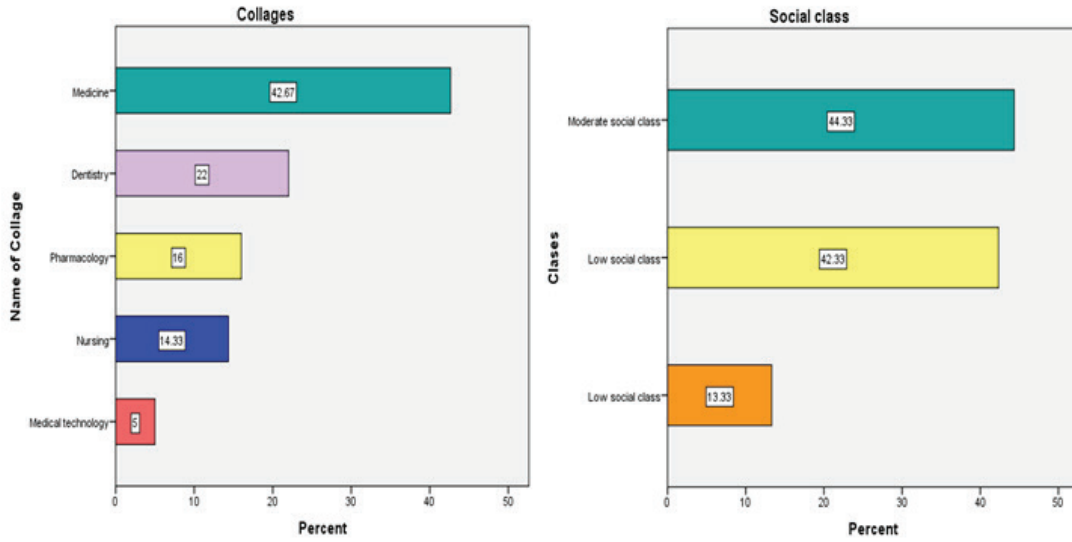
The present study showed significant difference between the desire to receive the HPV vaccine between male and female participants (69.5% and 80.8%, respectively) ($P \leq 0.05$). In parallel, a study in India in 2012 demonstrated that 79.4% of the female students were more willing to receive the HPV vaccine than males 53% ($P < 0.00$) ⁽²²⁾.

The logistic regression analysis demonstrated that the highest predictor for good HPV vaccine knowledge was the participant's knowledge about the information that cervical cancer could be a preventable disease ($R = 4.19$ [95% CI = 1.97, 8.88]) followed by being non-Saudis having a greater likelihood for having a good knowledge level about the vaccine ($OR = 3.99$ [95% CI = 1.22, 13.00]). In contrast, a study conducted in China 2014 demonstrated that being female increased the likelihood of having good knowledge about the vaccine compared to male participants ($OR = 1.39$ [95% CI = 1.11, 1.75]). ⁽¹⁸⁾ Cervical cancer is a female cancer, so women pay attention about it.

The logistic regression analysis in the study revealed that the highest predictor of the participants high acceptability toward the HPV vaccine was the good knowledge score ($OR = 7.66$ [95% CI = 2.83, 20.76]). In comparison, Chinese study in 2014 showed the acceptability toward the HPV vaccine was independently associated with the knowledge score of the participants and having good knowledge score was 2.46 greater of having high acceptability than poor knowledge score ($OR = 2.46$ [95% CI = 1.54, 3.93]). ⁽²³⁾

Conclusion

The current study illustrated that 34% of the final year undergraduate health college students at King Abdul-Aziz University had a good knowledge level about the HPV vaccine and 76% had a high level of acceptability toward the HPV vaccine.



Graph (2): The descriptive data of the studied sample.

Table (1): Factors affecting the knowledge and acceptability level of the studied participants about the Human Papilloma Virus (HPV) vaccine.

Variables	Poor knowledge 198 (66%)		Good knowledge 102 (34%)		Significant test	Low acceptance 72 (24.0%)		High acceptance 228 (76.0%)		Significant test
	No.	%	No.	%	P. Value	No.	%	No.	%	P. Value
Gender:										
Male	86	67.20%	42	32.80%	0.81	39	30.50%	89	69.50%	0.03*
Female	112	65.10%	60	34.90%		33	19.20%	139	80.80%	
Nationality:										
Saudi	193	67.70%	92	32.30%	0.01*	68	23.90%	217	76.10%	0.76
Non-Saudi	5	33.30%	10	66.70%		4	26.70%	11	73.30%	
Marital Status:										
Married	13	54.20%	11	45.80%	0.26	5	20.80%	19	79.20%	0.80
Not Married	185	67.00%	91	33.00%		67	24.30%	209	75.70%	
Residence:										

Cont... Table (1): Factors affecting the knowledge and acceptability level of the studied participants about the Human Papilloma Virus (HPV) vaccine.

Medicine	69	53.90%	59	46.10%	0.00*	24	18.80%	104	81.30%	0.04*
Dentistry	48	72.70%	18	27.30%		17	25.80%	49	74.20%	
Nursing	29	67.40%	14	32.60%		7	16.30%	36	83.70%	
Pharmacology	37	77.10%	11	22.90%		18	37.50%	30	62.50%	
M e d i c a l Technology	15	100%	0	0.00%		6	40.00%	9	60.00%	
Awareness about the HPV infection										
Yes	175	63.60%	100	36.40%	0.01*	55	20.00%	220	80.00%	0.00*
No	15	88.20%	2	11.80%		13	76.50%	4	23.50%	
Do Not know	8	100.00%	0	0.00%		4	50.00%	4	50.00%	
The preventable nature of cervical cancer										
Yes	103	54.80%	85	45.20%	0.00*	34	18.10%	154	81.90%	0.01*
No	19	76.0%	6	24.00%		7	28.00%	18	72.00%	
Do not know	76	87.40%	11	12.60%		31	35.60%	56	64.40%	
A Family Member or Friend of the participant was Diagnosed with Cancer Cervix										
Yes	9	81.80%	2	18.20%	0.23	5	45.50%	6	54.50%	0.02*
No	162	64.00%	91	36.00%		53	20.90%	200	79.10%	
Do not know	27	75.00%	9	25.00%		14	38.90%	22	61.10%	
Attitude toward HPV infection in causing cervical cancer in females										
Agree	124	58.20%	89	41.80%	0.00*	37	17.40%	176	82.60%	0.00*
Disagree	21	80.80%	5	19.20%		11	42.30%	15	57.70%	
Neutral	53	86.90%	8	13.10%		24	39.30%	37	60.70%	
Knowledge Score:										
G o o d Knowledge (≤ 11.6)	-----					5	4.90%	97	95.1%%	0.00*
Poor Knowl- edge (0- 11.50)	-----					67	33.80%	131	66.20%	

Table (2): logistic Regression analysis of the independent factors affecting knowledge and acceptability level about the Human Papilloma Virus (HPV) vaccine among the studied participants.

Predictor	Knowledge Level					Acceptability Level				
	Category	OR	95%	CI	P-value	Category	OR	95%	CI	P-value
Gender	-----					Female	1.31			
						Male	REF	0.67	2.57	0.43
Nationality	Non-Saudi	3.99	1.22	13.00	0.02	-----				
College	Pharmacology	REF			0.93	Medical Technology	REF			0.74
	Dentistry	0.94	0.44	1.98	0.87	Medicine	2.03	0.52	7.97	0.31
	Nursing	0.70	0.32	1.53	0.37	Dentistry	2.11	0.60	7.38	0.24
	Medicine	0.82	0.34	2.01	0.66	Nursing	1.96	0.49	7.89	0.34
	Medical Technology	NC	NC	NC	0.99	Pharmacology	1.43	0.43	4.77	0.56
Awareness about HPV Infection	Yes	REF			0.63	Do not know	REF			0.01
	No	0.44	0.09	2.29	0.33	Yes	1.85	0.38	9.02	0.45
	Do not Know	NC	NC	NC	0.99	No	0.20	0.03	1.45	0.11
Attitude towards HPV infection in causing cervical cancer in female	Disagree	REF			0.08	Disagree	REF			0.33
	Agree	2.12	0.68	6.62	0.19	Agree	2.02	0.71	5.78	0.19
	Neutral	0.83	0.22	3.08	0.78	Neutral	1.29	0.43	3.86	0.65
The preventable nature of cervical cancer	Do not know	REF	-	-	0.01	Do not Know	REF			0.95
	Yes	4.19	1.97	8.88	0.00	Yes	1.12	0.54	2.31	0.76
	No	2.23	0.67	7.43	0.19	No	1.05	0.35	3.17	0.93

Conflict of Interest: Nil

Source of Funding: Researcher

Ethical Clearance: The research project was approved by the ethical committee at King Abdul-Aziz University in Jeddah, Saudi Arabia.

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