

Knowledge, Attitude and Practice toward Human Papillomavirus (HPV) Infections and HPV Vaccination among Primary Health Care Physicians in Makkah Al-Mukarramah, 2019 A Cross-Sectional Study

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Abstract Human papillomaviruses (HPV) are a collection of viruses that causes disease and mostly infection are transmitted through sexual contact. Some HPV such as HPV-16 and HPV-18 to name a few, are the leading cause of deadly carcinomas such as cervical cancer, which is one of the most prevalent cancer causing death to women in Saudi. **Aim of the Study.** This study was conducted to determine the knowledge, attitude and practice toward HPV infections and HPV immunization among primary health care physicians in Makkah. **Methodology.** The study was cross-sectional involving 150 randomly selected physicians from different primary health care centers within Makkah sector for the year 2019. Validated self-constructed survey form was used to gather information on the knowledge, attitude and practice toward HPV infections and HPV vaccination among the participants. **Results.** There was 100% response rate of the participants in this study. In this study results showed that knowledge on HPV and attitudes towards HPV vaccination of the participants are different depending on some demographic characteristics. **Conclusion.** In this particular study, results revealed that primary health care physicians of Makkah Al-Mukarramah in 2019 have different level of knowledge (high, moderate and poor) about Human Papilloma Virus (HPV) infections and related diseases, different attitudes (positive and moderate) toward HPV vaccine and have different practices toward HPV infections and immunization.

Keywords: knowledge, attitude, practice, Human Papillomavirus (HPV), vaccination, primary health care, physicians

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1. Introduction

1.1. Background

One of the most commonly transmitted sexual diseases in the world nowadays, is the Human Papillomaviruses (HPV) [1,2,3,4]. Aside from genital warts, HPV is also one of the leading cause of the major cervical cancers among women worldwide [1-6]. In 2012, the International Agency for Research on Cancer reported approximately 266,000 women died from cervical cancer [7].

In Saudi Arabia, the Ministry of Health (2013) publicized that roughly 89% of cervical cancer in Saudi were associated with HPV infections and that almost 79% were linked to HPV – 16 and 18 types [8]. Some data in 2012 suggests that cervical cancer ranked 8th as the most

prevalent cancer among women 15 to 44 years of age in Saudi Arabia and that annually, there are about >240 new cervical cancer cases being diagnosed, and about >80 deaths occur from it [1-6,8,9]. Aside from cervical cancer, other HPV related cancer such as uterine cervix is the 16th most predominant cause of female cancer deaths and the 12th most dominant cause of cancer mortality in women of Saudi Arabia [8,9].

HPV vaccine has been available in Saudi Arabia since 2010 [10]. In 2014, the MOH portal, Kingdom of Saudi Arabia (KSA) identified that HPV virus vaccination can significantly reduce the HPV infection and as a result would also decline the alarming rate of cervical cancer cases in Saudi [9]. However data from the Saudi population about the level of awareness and knowledge of HPV infection, which cause cervical cancer and attitudes about HPV vaccines are very limited, such as those of Alzahrani and colleagues [11], Hussain and colleagues [10] and Al-Shaikh and colleagues [12].

1.2. Rationale

This study has been conducted due to the following:

1. Importance of Human Papilloma Virus (HPV) vaccination to protect against HPV infections and Cancer.
2. The Health promotion is an essential element of family medicine, as so far, is important to health community.
3. Very limited data assessing the knowledge, attitudes and practices of physicians towards HPV in Saudi Arabia.
4. The researcher has a personal interest in public health.

1.3. Aim of the Study

The aim of this study was to evaluate the knowledge, attitude and practice toward Human Papillomavirus (HPV) infections and HPV vaccination among primary health care physicians in Makkah Al-Mukarramah. The study also aims that results of this research would serve as baseline data and help the existing practices in the prevention against HPV and in increasing public health outcome.

1.4. Objectives

1. To assess the level of knowledge about Human Papilloma Virus (HPV) infections and related diseases among primary health care physicians in Makka.
2. To determine the attitude toward HPV vaccine among primary health care physicians in Makkah Al-Mukarramah, 2019.
3. To evaluate the practice toward Human Papilloma virus infections and HPV vaccination among primary health care physicians in Makkah 2019.

2. Literature Review

2.1. Human Papilloma Virus (HPV) and Some of Its Types

Human papillomaviruses (HPV) are a collection of disease causing viruses. There are more than 100 types of HPV that are transmitted through sexual contact. Some HPV cause some types of carcinomas and genital warts. There are more than 13 species of HPV that are causing cancers of the anus and other reproductive parts such as penis, uterine cervix, vagina, and vulva. [1-4].

2.2. HPV and Cervical Cancer at the Global Scale

According to the Center for Disease Control and Prevention (CDC), HPV is one of the most predominant sexually transferred contamination in the United States. CDC have recorded approximately >79 million people have HPV infection. According to the American Cancer Society approximately, 340,000 to 360,000 people of these have genital warts while approximately 30,000 people have HPV related cancer such as cervical cancer, and that >3,000 people dies from it annually [1-5].

2.3. HPV Vaccination

The vaccine protects against the HPV related diseases for a long time. Gardasil and Cervarix HPV vaccines are the common and being recommended in the market nowadays. The former can protect against HPV related diseases for about 8 years while the latter can give protection for at least 9 years [3,13]. Also, for getting the full benefit of the vaccine, it should be taken before becoming sexually active and exposed to HPV [14].

2.3.1. Brief History of HPV Vaccination

In 2012, there are approximately 45 countries had entered HPV vaccination and majority of these were from the developed countries had entered HPV vaccination [11]. In United States of America (USA), nearly 64% improved adolescent schoolgirls in vaccine-type HPV diseases after the first HPV vaccine in 2006 was approved [15]. Also in Australia, where HPV vaccination encasement was higher than in USA, there is a significant decline observed in vaccine-type HPV diseases [16].

In 2010, HPV vaccines has been available in Saudi Arabia. This has been approved by Saudi Food and Drug Administration safe for women with ages of 11-26 years old. The King Faisal Specialist Hospital and Research Center (KFSH and RC) has allowed this vaccine at routine visits to patients of Family Medicine and Pediatric clinics [10].

2.3.2. Characteristics of HPV Vaccines

The HPV vaccines are assembled on virus-like particles (VLPs) that are made of HPV surface ingredients [3].

2.3.3. Types and Administration of HPV Vaccination

Three types of HPV vaccines namely, the Bivalent HPV vaccine (known as Cervarix), Quadrivalent HPV vaccine (known as Gardasil), and 9-valent HPV vaccine (known as Gardasil-9) are available. Cervarix was intended to fight against HPV types 16 and 18 while Gardasil was designed to suppress against HPV types 6, 11, 16, and 18. Defending against more HPV types such as 6, 11, 16, 18, 31, 33, 45, 52, and 58 are done by Gardasil-9. All HPV vaccines have high efficacy of approximately 100% for protection against of HPV vaccine type-related persistent infection and work best if administered before exposure to HPV [17,18].

2.3.4. HPV Vaccination Side Effects

Side effects frequently complained are arm pain, dizziness, fainting, headache, joint and muscular pain, redness and swelling. This vaccine effects are contraindication to a severe allergic reaction not only to HPV vaccine but also pregnant women and moderately or severely ill [17,20].

2.4. Screening of Cervical Cancer

HPV vaccine are not capable to defend all types of HPV that can cause cervical cancer. Vaccinated women are still recommended to have regular Pap smear exam [20]. The USPSTF recommends that screening for cervical

cancer with Pap smear should be done every 3 years for females with aged 21 to 65 years. This could also be done simultaneously with HPV testing for women age 30 to 65 years every five years. [21].

2.5. HPV and Cervical Cancer Prevention

The WHO suggests a broad approach to cervical cancer prevention. This suggestion involves that are multidisciplinary approaches comprising elements educating the society, immunization, palliative care, treatment, screening, and social mobilization [1,2,3].

2.6. Some Studies on HPV Infection and Vaccination

2.6.1. Local Studies on HPV Infection and Vaccination

In 2017, Alzahrani and colleagues published their cross-sectional study in a Canadian Center of Science and Education. In this study 278 Saudi males and females were involved aged more than 15 years old, selected from the Saudi Airlines medical center in Jeddah, Saudi Arabia. In this study, approximately 4.78% male and 16.91% female of the students were completely aware of the accessibility of HPV vaccine. However, there were 36.76% males and 41.54% females who were not aware on the accessibility of these vaccines. In terms of who wish to get HPV vaccination before married, 90.14% of unmarried female participants responded positively to this while 94.69% of the male participants' supports the opinion to give HPV vaccination to their daughters before getting married [11].

In 2016, another study on knowledge, perception, and associated socio-demographic factors of HPV was published in the Journal of Family & Community Medicine by Hussain and colleagues involving 325 patients (females aged within 11 and 26) as participants within Family Medicine Department, KFSH and RC, Riyadh. This study was conducted from January 2012 to June 2014. Here, participants were Saudi nationals (87.4%), university education (53.5%), and adolescents (65.2%).

In 2014, a research conducted by Al-Shaikh and colleagues was published in Saudi Med Journal. The study was a descriptive cross-sectional involving 1400 students in Health Colleges at PNU in Riyadh, Saudi Arabia from 2013 to 2014. This aims to evaluate the level of knowledge about cervical cancer and acceptance of HPV vaccine. In this study, 95.7% of students were found to have lower knowledge level on the matter. Pap smear as a screening tool was inadequately known to 46.7% of the participants. Moreover, senior and medical students had a higher knowledge rate and approximately 80% of students believe that vaccine price should be not more than 300 Saudi Riyals [12].

2.6.2. International Studies on HPV Infection and Vaccination

2.6.2.1. Studies in Middle Eastern Region

In Sharjah, United Arab Emirates (UAE), an observational cross-sectional study conducted by Saqer and colleagues was published in Asian Pacific Journal of Cancer Prevention in 2017.

In 2014, Tolunay and colleagues conducted a similar study in Turkey and published in Asian Pac J Cancer Prevention. This study involved 228 obstetrician and gynecologist (OBG) and pediatrician specialists. The study was conducted to define the level of knowledge on infection and vaccination of HPV and attitude towards HPV vaccination. Here in this study, 99.6% of the participants agreed that HPV was a prevalent sexually transmitted disease and 33.8% of the participants believed that only women should be vaccinated. The study also revealed that pediatricians have low level of HPV vaccine recommendation (59.4%, $p=0.012$). Also, more than half (59.5%) of the respondents believed that HPV vaccine should be included in the national vaccine calendar. Furthermore, most of the respondents (91.6%) had the opinion that cheaper vaccine prices would encourage more people to get vaccinated [23].

2.6.2.2. Studies in South Asia

In Malaysia, Sheikh and colleagues conducted a cross-sectional study on the knowledge and attitude toward HPV vaccination and published at Australas Medical Journal in 2017. The study involved 629 Malaysian health givers (doctor and nurses). The study tried to evaluate the level of knowledge and attitude toward HPV vaccination among health givers and to compare among the groups in Malaysia. In this study, the researchers found the participants mean knowledge and attitude scores on HPV vaccination were 13.32 ± 2.30 and 9.38 ± 1.45 respectively. It was also found that medical doctors have higher knowledge and attitude scores than paramedical staff [24]. In Delhi, India, Chawla and colleagues did a cross-sectional study involving 590 healthcare professionals in the National Capital Region to assess the knowledge, attitude & practice on HPV vaccination. This study was published in Indian Journal of Medical Research in 2016. In this study, the researchers found that only 47 % of participants' recommended young women to get HPV vaccine, 81% knows the accessibility of vaccines to fight cervical cancer, only 27% of paramedical staff recognized the names of HPV vaccines in the market and 86% of gynecologists had this knowledge. The study also reported that paramedical staff have low knowledge on the causes and symptoms for cervical cancer and HPV vaccination. Another findings in the research was the significant differences in the level of awareness on HPV vaccine between the participants from government and private sectors [25].

In 2013, another similar study in India was conducted by Mehta and colleagues and was published in Indian Journal of Community Medicine. Results in this study found that no students identified the right prevalence of cervical cancer in India, 18% have no idea on HPV vaccination in preventing cervical cancer and 50% believed that immunization encourages a wrong sense of safety. In addition, 50% of the students were uninformed of HPV infection and its relation to cervical cancer and other sexually transmitted diseases [26].

2.6.2.3. Study in Germany

Kolben and colleagues conducted a study involving 998 German Gynecologists to evaluate attitude and knowledge

about HPV and HPV vaccination, especially in boys. This study was published in *Geburtshilfe Frauenheilkd* in 2016. Only 8.2% denied vaccinating their sons while 2.2% denied to immunize their daughters. However, just a few gynecologists gave their daughters and sons HPV vaccine. The lack of cost coverage of vaccination for boys and still not allowable age of vaccination for girls were some of the leading cause for low vaccination identified in the study. [27].

3. Methodology

3.1. Study Design

Cross-Sectional Analytic Study.

3.2. Study Area

This study was conducted in Makkah Al-Mukarramah, which located in the western region of Saudi Arabia. It extends inward 72 kilometers east of Jeddah which contains the seaport and international airport to serving it. Its population in 2010 was nearly 1675000. It is also known as the holiest city for Muslims and a pilgrimage. Makkah contains Kaaba aside from being the direction of Muslims prayer. For the health care establishment, Makkah Al-Mukarramah City has about ten government hospitals from three out seven sectors. It also have 38 out of 85 primary health care centers (PHCC) and 321 PHC physicians providing health care for any patient free of charge (Directorate of Health Affairs, Makkah).

3.3. Study Population

Primary Health Care Physicians in Makkah constitute the target population of the present study. This study was carried out on Primary Health Care Physicians in Makkah in 2019. All those Physicians on duty at the time of the data collection constitutes the study population.

3.4. Eligibility Criteria

Inclusion Criteria

Saudi and non-Saudi family medicine and general physicians in Makkah City during the study period .

3.5. Sample Size

The sample size of this study was calculated using Raosoft software. Participants in this study were from the three PHCC sectors inside Makkah AL-Mukarramah City. Considering the total population of 208 physicians from 3 sectors (Table 1), 50% assumed knowledge of the study problem toward HPV infections and vaccination, a confidence level of 95% and a tolerable error of 5% the calculated sample size (according to the "sample size calculator RAOSOFT") was determined to be 136, by adding about 10% for balance non-responder physicians equal (13.6=14) the total respondents of 150 was reached.

Table 1. Primary Health Care Center and Number of Physicians in Three Sectors of Makkah

Name of sector	Number of PHCC	Number of physicians
AL-Kakiyyah	11	75
AZ-Zahir	14	72
AL-Adel	13	61
Total	38	208

3.6. Sampling Technique

The researcher followed a simple random sampling technique to choose the study participants from the PHCC physicians list, gave each physician code number. After that, using Random Number Generator, the minimum number was 1, and the maximum number was 208, then simple random sampling technique was applied to select 150 PHCC physicians.

3.7. Data Collection Tool

The researcher used a self-constructed questionnaire, which was validated by three consultants. The study questionnaire includes the following parts:

- Socio-demographic and personal characteristics: including age, gender, nationality, marital status, Specialty level, Working experience and residence.
- Assessment the physicians's knowledge about the HPV infections and HPV vaccination.
- Attitude and practice of the participants toward HPV vaccine
- Source of knowledge about the HPV infections and HPV vaccine.

3.8. Data Collection Technique

3.8.1. In PHCC (Female Section)

The researcher has arranged a schedule of PHCC visiting in different days. Day one, the researcher went PHCC, such as, Kudai and AL-Hijra PHCC and went to the female section, then went to general and family medicine clinics. The researcher introduced herself to the physicians working in these clinics, then asked them about their free time from working. Questionnaires was distributed to the participants personally according to their free time and explained the purpose of the study. The participants was given 10 minutes to answer the questions and the questionnaires were collected the same day with appreciation.

3.8.2. In PHCC (Male Section)

In another day, the researcher went to PHCC such as, Kudai and Al-hijra and went to the PHCC directors to introduce herself and asked for permission and secure about the extension number of physicians working in these clinics. The researcher has communicated with the physicians through exertions number of his clinic. Again an introduction herself and the research were done and schedule of the physician about the free time from working was determined. Once willing participants agreed the researcher secured permission from the physician for a

scheduled meeting then the questionnaire was distributed personally according to the physicians' free time. The participant was given 10 minutes to answer the questions and the questionnaires were collected the same day with appreciation.

3.9. Study Variables

3.9.1. Dependent Variables

- HPV infections and HPV vaccination knowledge by Primary Health Care Physicians in Makkah Al-Mukarramah.
- Attitude toward HPV vaccine by Primary Health Care Physicians in Makkah
- Practice on HPV infections and HPV vaccination by Primary Health Care Physicians in Makkah Al-Mukarramah.
- Source of the HPV infections and HPV vaccine information's by Primary Health Care Physicians in Makkah Al-Mukarramah.

3.9.2. Independent Variables

- Age - The researcher used continuous variable.
- Gender - The researcher used nominal variable by "male and female"
- Nationality - The researcher used nominal variable by "Saudi and non-Saudi"
- Marital status - The researcher used nominal variable by "Married, Single, Divorced and Widow".
- Specialty level - The researcher used nominal variable by "general physician, specialist and consultant".
- Residency - The researcher used nominal variable by "Inside Makkah Al-Mukarramah, Outside Makkah Al-Mukarramah".
- Working experience - The researcher used continuous variable for duration of working experience by "number of years".

3.10. Reliability

The researcher assessed the test-retest reliability test on 10% of the sample size (14 PHCC physicians).

3.11. Data Entry and Statistical Analysis

This study was scrutinized using IBM SPSS version 23. A simple descriptive statistics was used to describe the features of the study variables through a form of counts and percentages for the categorical and nominal variables while continuous variables are presented by mean and standard deviations. To identify the level of knowledge, attitude and practice toward HPV infections and HPV vaccination among primary health care, this study used some calculation and conversion. Also this study conducted a reliability analysis with Cronbach alpha as a model to check the relationship on each question. The calculated variables are the following:

Knowledge

- The Human Papilloma Virus causes cervical cancer.

- The Human papilloma Virus causes genital warts.
- The Human Papilloma Virus is transmitted through sexual contact.
- The Human Papilloma Virus and Cervical cancer caused only by multiple sexual partner.
- Is the Pap smear screening for cervical cancer?
- Is the Human Papilloma Virus heal and disappear without medical treatment in most cases?
- Is smoking increases the risk of cervical cancer?
- Is the Human Papilloma Virus can infect female alone?
- Are most patients with human papilloma virus symptomatic?
- Screening for cervical cancer starts at age?
- The Human Papilloma Virus vaccine starts at what age?

All of the question were converted to correct and wrong answers where correct answer is equal to 1 and wrong answer is equal to 0. A simple additive method was used to calculate the knowledge level score. With a minimum score of 0 and maximum score of 11, after the calculation a categorization was done to know the level of each individual cases. Categorization is as follows:

Knowledge Level Scoring:

- 0-3 points = Poor Knowledge
- 4-7 points = Moderate Knowledge
- 8-11 points = High Knowledge

Attitude

- The Human Papilloma Virus infected person is unethical.
- I agree to live with Human Papilloma Virus infected person. (Reversed)
- I have the desire to educate my patients about Human Papilloma Virus related disease. (Reversed)
- I think the community awareness about the Human Papilloma Virus is necessary. (Reversed)
- I am confident that the vaccine will be very effective of preventing HPV infection. (Reversed)
- I am confident that the vaccine will be very effective at preventing cervical cancer. (Reversed)
- I am worried about the long term side effects of the vaccine.
- I am worried that people might think their daughter/relative is sexually active if she is vaccinated.
- I am worried that people might think the vaccination will promote the risky sexual behavior such as unprotected sex.
- I am confident that the vaccine has ability to achieve protection with long lasting immunity. (Reversed)
- I am confident that the vaccine has good safety. (Reversed)
- I am confident that the vaccine is not necessary in our community.
- I am confident that the cervical screening programs are not necessary in our community.
- I am confident that the screening programme for cervical cancer is so good that the HPV vaccine is unnecessary.

All question was scaled based on the answer weight, with a scale of 0 as the lowest and 4 as the highest. Before a simple additive method to know the level of attitude

score, some of the question are converted by reversing the score. After the conversion and simple additive method, a score was calculated with a minimum score of 0 and maximum score of 56 and then a categorization is use as the following:

Attitude Level Scoring:

- 0-18 points = Negative Attitude
- 19-38 points = Moderate Attitude
- 39-56 points = Positive Attitude

Practice

- Periodic exam helps in early detection of Human Papilloma Virus and Cervical Cancer.
- I am advising women visiting my clinic to get screened by Pap smear.
- I am recommending HPV vaccination among female at recommended age in my practice.
- I am recommending HPV vaccinations among male at recommended age in my practice.

Due to low reliability analysis Cronbach alpha value for practice question this study compared the question individually.

3.12. Pilot Testing

A pilot study was conducted on 10% of the sample size (14 PHCC physicians) to test if the study questionnaire is understandable and acceptable, and to check the methodology and the environment.

3.13. Ethical Considerations

- Research committee approval was obtained.
- All necessary official approvals was fulfilled from the Joint Program of Family Medicine and Community Medicine in Makkah Al-Mukarramah.
- An approval from administration, public health was obtained.
- An individual written consent to participate in the study was obtained before data collection from the following:
 - Primary health care centers sectors directors.
 - Family medicine and general physician in primary health care centers.
- All data was kept confidential and was not used except for the purpose of this scientific research.
- At the end of data collection, the researcher has acknowledged the supervisor, facilitator and participants in this study.

3.14. Relevance and Expectations

- This study was expected to provide information's about the knowledge, attitude and practice toward HPV infections and HPV vaccination among primary health care center physicians in Makkah Al-Mukarramah.
- Results can help to put plans for raising the knowledge and attitude toward HPV infections and HPV vaccination in Makkah AL-Mukarramah city.
- To improve the practice of HPV infections and HPV vaccination in Makkah.

3.15. Limitations

Limited available time for research.

3.16. Budget, Fund or Grant

The study was self- funded.

4. Result

Out of the 150 prospective respondents, all of them responded in the survey, giving a 100% response rate.

4.1. Characteristics of the Respondents

4.1.1. Socio-Demographic Characteristics

Demographic characteristics of the sample population (N=150) are shown in [Table 2](#). The age of the participants ranged from 25 to 58 years old with an average of 32.05 ± 7.1 . However, the respondents are younger than 30 years old accounting to 48% which is slightly lower than the average. Nonetheless, 40% of the respondents belonged to 30-39 years old. The least 12% of the respondents belonged to the lowest age bracket of the 40 years old and above. Majority of the respondents also were specializing on Family Medicine (83.3%), general physician (16%) and an OB Gyne (0.7%). In terms on the level of specialty, the respondents are more composed of Residents (65.3%) and more than a quarter of it belong to R3 (28%) and almost a quarter are R4 (24.7%). The lowest percentage (5.3%) of the respondents are composed of consultants. Almost half of the respondents are having less than or equal to five (5) years of working experience (45.3%) and more than a quarter (33.3%) have more than five (5) years but less than 10 years of working experience.

Among the 150 total participants, majority were females (60%), Saudi national (81.3%) and married (66%).

4.1.2. Characteristics of Knowledge of the Respondents

4.1.2.1. Knowledge on HPV

As shown in [Table 3](#), the knowledge of the respondents to HPV showed differences. Nevertheless, a great majority of the respondents have read about HPV (91.3%), have agreed that HPV causes cervical cancer (90.7%) and only a few (~10%) have either said no idea or no idea at all. The number of respondents who've agreed that HPV causes genital warts, transmitted through sexual contact and PAP smear screening is for cervical cancer are almost the same (83.3%, 81.3% and 87.3%, respectively). Again, only less than 10% of the respondents have either no idea or said no at all. In contrast, lower percentages of the respondents did agree that HPV heal and disappear without medical treatment in most cases (55.3%), and that smoking increases the risk of cervical cancer (63.3%). Consequently, a rise to 16.7%-22.7% of the respondents that have either no idea or said no at all were observed. A much lower percentages of the respondents have agreed that HPV and cervical cancer is caused only by multiple

sexual partner (32.7%), HPV can infect female alone (21.3%), and HPV patients are symptomatic (22%) while 50.7%, 62% and 61.3% of the respondents have disagreed, respectively. On one hand, the number of respondents who don't have an idea remained almost the same (16.7%).

In terms of the age the screening for cervical cancer

starts, more than half (68%) of the respondents agreed to do it at 21-65 years old. However, 10.7%-11.3% of the respondents decided that it would be in a much later age 26-65 years old and 30-65 years old, respectively. Again, there are 10% of the respondents that don't have an idea on the matter.

Table 2. Socio-Demographic Characteristics of the study population (N=150)

Demographics	N	Min	Max	Mean	SD
Age	150	25	58	32.05	7.1
Total			Count	%	
			150	100.0	
Specialty	Family Medicine		125	83.3	
	OB Gyne		1	.7	
	General physician		24	16.0	
Level of Specialty	R1		8	5.3	
	R2		11	7.3	
	R3		42	28.0	
	R4		37	24.7	
	Consultant		8	5.3	
	Specialist		20	13.3	
Working Experience	GP		24	16.0	
	less than or equal to 5 years		68	45.3	
	> 5-10 years		50	33.3	
	> 10 - 20 years		28	18.7	
	> 20-30 years		4	2.7	
Age	Less than 30 years old		72	48.0	
	30-39 years old		60	40.0	
	40 years old and above		18	12.0	
Sex	Male		60	40.0	
	Female		90	60.0	
Nationality	Saudi		122	81.3	
	Non Saudi		28	18.7	
Marital Status	Single		44	29.3	
	Married		99	66.0	
	Divorced		7	4.7	

Table 3. Characteristics of Respondents Knowledge on HPV

		Count	%
Total		150	100.0
Did you read about Human Papilloma Virus?	Yes	137	91.3
	No	10	6.7
	I don't know	3	2.0
The Human Papilloma Virus causes cervical cancer.	Yes	136	90.7
	No	6	4.0
	I don't know	8	5.3
The Human papilloma Virus causes genital warts.	Yes	125	83.3
	No	9	6.0
	I don't know	16	10.7
The Human Papilloma Virus is transmitted through sexual contact.	Yes	122	81.3
	No	14	9.3
	I don't know	14	9.3
The Human Papilloma Virus and Cervical cancer caused only by multiple sexual partner.	Yes	49	32.7
	No	76	50.7
	I don't know	25	16.7
Is the PAP Smear screening for cervical cancer?	Yes	131	87.3
	No	8	5.3
	I don't know	11	7.3
Is the Human Papilloma Virus heal and disappear without medical treatment in most cases?	Yes	83	55.3
	No	34	22.7
	I don't know	33	22.0
Is smoking increases the risk of cervical cancer?	Yes	95	63.3
	No	25	16.7
	I don't know	30	20.0
Is the Human Papilloma Virus can infect female alone?	Yes	32	21.3
	No	93	62.0
	I don't know	25	16.7
Are most patients with human papilloma virus symptomatic?	Yes	33	22.0
	No	92	61.3
	I don't know	25	16.7
Screening for cervical cancer starts at age?	"21-65 years"	102	68.0
	"26-65 years"	17	11.3
	"30-65 years"	16	10.7
	I don't know	15	10.0

4.1.2.2. Knowledge on HPV Vaccine

Out of the 150 respondents, only 121 (80.7%) have heard about HPV vaccine. The 11.3% (17) of the respondents did not heard yet about the availability of the HPV vaccine while the remaining 8% (12) of the respondents doesn't have any idea at all. In terms of what age to start the HPV vaccine should start, more than half (58.7%) of the respondents have indicated that it should be at 9-26 years old. Almost a quarter (20.7%) have chosen 15-26 years old and 8.3% said it should be at 18-26 years old. A slight increase on the percentage of the respondents (12.4%) have been observed on this matter (Table 4).

4.1.2.3. Sources of Knowledge on HPV, Infection and Vaccine

Although there are 137 of the 150 respondents who do read about HPV, there are almost 10% of the respondents who don't read. Among the 137 respondents, majority have read about HPV while still in medical schools (60.6%), while 43.1% have read it while in medical conferences and around 10.9% read it through media resources (Table 5).

On the other hand, out of the 150 respondents, 121 have knowledge on the existing HPV vaccine. Similarly, majority of this have heard in medical school (51.2%), others have heard it in medical resources and conferences (42.1%), through media (11.6%) and one of the

respondent learned it from a fellow doctor (Table 5).

4.1.3. Attitude Characteristics of the Respondents towards HPV

Table 6 shows the respondents' attitude towards HPV infection. Almost similar with knowledge the attitudes of the respondents towards HPV infection also showed differences. Out of 150 respondents, 12 (8%) and 34 (22.7%) strongly agree and agree, respectively that HPV infected person is unethical while 30% disagree and 10% strongly disagree about it. Also, more than a quarter (29.3%) have no opinion on the matter. When ask if it's alright to live with HPV infected person, an increased by half was observed to the respondents who strongly agree (14%) and agree (41.3%) while the number of respondents that disagree (14.7%) and strongly disagree (5%) narrowed down. Almost the same number of the respondents from above have no opinion (37%) on the matter.

In terms of educating and raising awareness of the patients and the community regarding HPV and other related diseases, 40%-54.7% of the respondents strongly agree and 34%-40.7% agree, respectively that this is important. On the other hand, there are around 9-13% of the respondents who have decided not to give an opinion on the matter and several few (0.7%-5.3%) either disagree or strongly disagree.

Table 4. Characteristics of Respondents Knowledge on HPV Vaccine

	Count	%	
Total	150	100.0	
The Human Papilloma Virus vaccine starts at what age?	"15-26 years"	25	20.7
	"9-26 years"	71	58.7
	"18-26 years"	10	8.3
	I don't know	15	12.4
Did you hear about availability of the Human Papilloma Virus vaccine?	Yes	121	80.7
	No	17	11.3
	I don't know	12	8.0

Table 5. Sources of Knowledge on HPV and Vaccine

Read about Human Papilloma Virus	Count	%
Medical School	83	60.6
Medical resources or conferences	59	43.1
Media (TV, internet, newspaper, magazine and social media)	15	10.9
Total	137	100.0
Heard about availability of the Human Papilloma Virus vaccine	Count	%
Medical School	62	51.2
Medical resources or conferences	51	42.1
Media (TV, internet, newspaper, magazine and social media)	14	11.6
My doctor	1	.8
Total	121	100.0

Table 6. Respondents Attitudes towards HPV (N=150)

Variables	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
The Human Papilloma Virus infected person is unethical.	12(8.0)	34(22.7)	44(29.3)	45(30.0)	15(10.0)
Periodic exam helps in early detection of Human Papilloma Virus and Cervical Cancer.	69(46.0)	59(39.3)	15(10.0)	6(4.0)	1(0.7)
I agree to live with Human Papilloma Virus infected person.	21(14.0)	62(41.3)	37(24.7)	22(14.7)	8(5.3)
I have the desire to educate my patients about Human Papilloma Virus related disease.	60(40.0)	61(40.7)	20(13.3)	8(5.3)	1(0.7)
I think the community awareness about the Human Papilloma Virus is necessary.	82(54.7)	51(34.0)	9(6.0)	3(2.0)	5(3.3)

4.1.4. Attitude Characteristics of the Respondents towards HPV Vaccine and Cervical Screening

In this particular study, as also shown in Table 7, majority of the respondents strongly agree (36.7%) and agree (48.7%) that vaccine will be very effective in preventing HPV infection while 27.3% and 48% of the respondents have strongly agree and agree, respectively that the vaccine will be very effective at preventing cervical cancer. In this two items, only few respondents disagree (1.3% and 3.3%, respectively) and strongly disagree (0.7% to both items). Nonetheless, there are several few respondents (12.7% and 20.7%) who don't have opinion on the effectiveness of the HPV vaccine and cervical cancer, respectively. Furthermore, there are 19.3% and 51.3% of the respondents strongly agree and agree, respectively that the vaccine has ability to achieve protection with long lasting immunity while 22.7% and 54% of the respondents strongly agree and agree, respectively that the vaccine has good safety.

In validating the respondents' attitude towards these vaccines, reversed questions on the effectiveness were also asked (Table 7). In this study, only 4% of the respondents strongly agree while 16% agree that they are worried about the long term side effects of the vaccine. On the other hand, higher percentages of the respondents were observed to disagree (29.3%) and strongly disagree (7.3%) on this. Noteworthy, also is that there are almost half of the respondents (43.3%) that don't have opinion on this item. Another concerns used to assess the attitude of the respondents towards effectiveness of the vaccine in relation to behavioural and societal impact. In this study, only 3.3% and 31.3% strongly agree and agree, respectively that they are worried that people might think their daughter/relative is sexually active if she is vaccinated while 19.3% and 8% of the respondents disagree and strongly disagree, respectively.

Another reversed questions in assessing consistency of the respondents' attitude towards the HPV vaccination and screening for cervical cancer were asked to the respondents (Table 6). Here in this study, there were 2% and 1.3% of the respondents who strongly agree while 10% and 6% agree that HPV vaccine and screening for cervical cancer, respectively are not necessary in Saudi community. Majority of the respondents however disagree (42.7% and

46%) and strongly disagree (26% and 37.3%) on this.

4.1.5. Characteristics of the Respondents' Practices towards HPV Infection and Vaccination

As medical health practitioners their influence in terms of medical recommendations to patients are recognized. In this study, out of the 150 respondents, 69 (46%) and 59 (39.3%) strongly agree and agree, respectively that periodic exam helps in early detection of Human Papilloma Virus and Cervical Cancer while only 6 (4%) and 1 (0.7%) disagree and strongly disagree, respectively. Practices like advising women visiting clinic to get screened by Pap smear, recommending HPV vaccination among female at recommended age, and recommending HPV vaccinations among male at recommended age were also assessed among the respondents (Table 8).

4.1.6. Knowledge, Attitudes and Practices Reliability

Based on the reliability analysis (Table 9) conducted on this study, results showed that knowledge and attitude of the respondents towards HPV are both acceptable (0.706 and 0.775) at Cronbach's alpha model indicative that the respondents are consistent of their answers in each questions and not redundant (Table 9). However, reliability of the respondents in terms of the practices showed very low consistency.

4.2. Level of Knowledge about HPV and Association to Socio-Demographic Characteristics

Results of the analysis showed that out of the 137 respondents who have knowledge on HPV, there are 6.6% of the respondents who have poor, 38% who have moderate and 55.5% have high level of knowledge. Statistical analysis revealed that the differences on the level of knowledge on HPV among respondents were found to be significant to only two demographic characters (Table 10). Knowledge on HPV of the respondents were found significant according to age (p-value 0.033 at 0.05 level of confidence using One-Way ANOVA test) and working experience (p-value 0.045 at 0.05 level of confidence using Chi-square test)

Table 7. Respondents Attitudes towards HPV Vaccine and Cervical Screening (N=150)

Variables	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
I am confident that the vaccine will be very effective of preventing HPV infection.	55(36.7)	73(48.7)	19(12.7)	2(1.3)	1(0.7)
I am confident that the vaccine will be very effective at preventing cervical cancer.	41(27.3)	72(48.0)	31(20.7)	5(3.3)	1(0.7)
I am worried about the long term side effects of the vaccine.	6(4.0)	24(16.0)	65(43.3)	44(29.3)	11(7.3)
I am worried that people might think their daughter/relative is sexually active if she is vaccinated.	5(3.3)	47(31.3)	57(38.0)	29(19.3)	12(8.0)
I am worried that people might think the vaccination will promote the risky sexual behavior such as unprotected sex.	7(4.7)	51(34.0)	41(27.3)	40(26.7)	11(7.3)
I am confident that the vaccine has ability to achieve protection with long lasting immunity.	29(19.3)	77(51.3)	33(22.0)	9(6.0)	2(1.3)
I am confident that the vaccine has good safety.	34(22.7)	81(54.0)	34(22.7)	1(0.7)	0(0.0)
I am confident that the vaccine is not necessary in our community.	3(2.0)	15(10.0)	29(19.3)	64(42.7)	39(26.0)
I am confident that the cervical screening programs are not necessary in our community.	2(1.3)	9(6.0)	14(9.3)	69(46.0)	56(37.3)
I am confident that the screening programme for cervical cancer is so good that the HPV vaccine is unnecessary.	0(0.0)	9(6.0)	21(14.0)	58(38.7)	62(41.3)

Table 8. Respondents Practices towards HPV Vaccination and Cervical Screening (N=150)

Variables	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
Periodic exam helps in early detection of Human Papilloma Virus and Cervical Cancer.	69(46.0)	59(39.3)	15(10.0)	6(4.0)	1(0.7)
I am advising women visiting my clinic to get screened by Pap Smear.	52(34.7)	69(46.0)	19(12.7)	7(4.7)	3(2.0)
I am recommending HPV vaccination among female at recommended age in my practice.	40(26.7)	71(47.3)	29(19.3)	10(6.7)	0(0.0)
I am recommending HPV vaccinations among male at recommended age in my practice.	16(10.7)	58(38.7)	56(37.3)	17(11.3)	3(2.0)

Table 9. Reliability statistics of Respondents Knowledge and Attitude towards HPV (N=150)

Reliability Statistics	Cronbach's Alpha	N of Items
Knowledge	0.706	11
Attitude	0.775	14

Table 10. Analysis on the level of knowledge of the Respondents Associated to Socio-Demographic Characteristics

Demographics	Total	Knowledge			p-value	
		Poor	Moderate	High		
Total	137	9(6.6%)	52(38.0%)	76(55.5%)	-	
Age	137	28.89 ± 2.3	30.88 ± 6.4	33.71 ± 8.0	0.033 ^a	
Specialty	Family Medicine	117	7(6.0%)	44(37.6%)	66(56.4%)	0.751
	General physician	20	2(10.0%)	8(40.0%)	10(50.0%)	
Level of Specialty	R1	8	1(12.5%)	3(37.5%)	4(50.0%)	0.449
	R2	9	0(0.0%)	1(11.1%)	8(88.9%)	
	R3	39	0(0.0%)	15(38.5%)	24(61.5%)	
	R4	35	2(5.7%)	14(40.0%)	19(54.3%)	
	Consultant	7	1(14.3%)	3(42.9%)	3(42.9%)	
	Specialist	17	2(11.8%)	6(35.3%)	9(52.9%)	
Working Experience	GP	22	3(13.6%)	10(45.5%)	9(40.9%)	0.045 ^b
	less than or equal to 5 years	59	6(10.2%)	24(40.7%)	29(49.2%)	
	> 5-10 years	47	2(4.3%)	23(48.9%)	22(46.8%)	
	> 10 - 20 years	27	1(3.7%)	5(18.5%)	21(77.8%)	
Age	> 20-30 years	4	0(0.0%)	0(0.0%)	4(100.0%)	0.076
	Less than 30 years old	63	3(4.8%)	27(42.9%)	33(52.4%)	
	30-39 years old	56	6(10.7%)	22(39.3%)	28(50.0%)	
Sex	40 years old and above	18	0(0.0%)	3(16.7%)	15(83.3%)	0.128
	Male	52	6(11.5%)	21(40.4%)	25(48.1%)	
Nationality	Female	85	3(3.5%)	31(36.5%)	51(60.0%)	0.373
	Saudi	114	9(7.9%)	43(37.7%)	62(54.4%)	
Marital Status	Non Saudi	23	0(0.0%)	9(39.1%)	14(60.9%)	0.439
	Single	43	5(11.6%)	18(41.9%)	20(46.5%)	
	Married	89	4(4.5%)	32(36.0%)	53(59.6%)	
	Divorced	5	0(0.0%)	2(40.0%)	3(60.0%)	

^a-significant using One-Way ANOVA test @<0.05 level.

^b-significant using Chi-Square test @<0.05 level.

4.3. Attitude of the Respondents towards HPV Vaccine and Association to Demographic Characteristics

In this particular study, analysis revealed that 51.3% of the respondents have moderate attitude while the rest of the respondents which is 48.7% have positive attitude towards HPV vaccination (Table 11).

4.4. Practices of Respondents towards HPV and Association to Demographic Characteristics

There is an obvious differences on the practices of respondents in terms of pperiodic exam in early detection

of HPV and cervical cancer, advising women visiting clinic to get screened by papsmear, recommending HPV vaccination among female at recommended age, and recommending HPV vaccinations among male at recommended age. In terms on the practice of periodic exam in early detection of HPV and cervical cancer among the respondents, significant differences (*p-value* 0.031) at 0.05 level of confidence was observed according to the sex of the respondents .

The practice on recommending HPV vaccination among female at recommended age was found to be significantly different (*p-value* 0.030 using One-Way ANOVA and *p-value* 0.031 using Chi-Square test both at 0.05 level of confidence) depending on the age of the respondents.

Table 11. Analysis on the Attitude of the Respondents Associated to Socio-Demographic Characteristics

Demographics		Total	Negative	Attitude		p-value
				Moderate	Positive	
Total		150	0(0.0%)	77(51.3%)	73(48.7%)	-
Age		150	0.00 ± 0.0	31.99 ± 6.8	32.12 ± 7.4	0.907
Specialty	Family Medicine	126	0(0.0%)	59(46.8%)	67(53.2%)	0.011 ^a
	General physician	24	0(0.0%)	18(75.0%)	6(25.0%)	
Level of Specialty	R1	8	0(0.0%)	5(62.5%)	3(37.5%)	0.075
	R2	11	0(0.0%)	3(27.3%)	8(72.7%)	
	R3	42	0(0.0%)	16(38.1%)	26(61.9%)	
	R4	37	0(0.0%)	18(48.6%)	19(51.4%)	
	Consultant	8	0(0.0%)	5(62.5%)	3(37.5%)	
	Specialist	20	0(0.0%)	14(70.0%)	6(30.0%)	
	GP	24	0(0.0%)	16(66.7%)	8(33.3%)	
Working Experience	less than or equal to 5 years	68	0(0.0%)	32(47.1%)	36(52.9%)	0.051
	> 5-10 years	50	0(0.0%)	26(52.0%)	24(48.0%)	
	> 10 - 20 years	28	0(0.0%)	19(67.9%)	9(32.1%)	
	> 20-30 years	4	0(0.0%)	0(0.0%)	4(100.0%)	
Age	Less than 30 years old	72	0(0.0%)	35(48.6%)	37(51.4%)	0.377
	30-39 years old	60	0(0.0%)	30(50.0%)	30(50.0%)	
	40 years old and above	18	0(0.0%)	12(66.7%)	6(33.3%)	
Sex	Male	60	0(0.0%)	31(51.7%)	29(48.3%)	0.947
	Female	90	0(0.0%)	46(51.1%)	44(48.9%)	
Nationality	Saudi	122	0(0.0%)	60(49.2%)	62(50.8%)	0.271
	Non Saudi	28	0(0.0%)	17(60.7%)	11(39.3%)	
Marital Status	Single	44	0(0.0%)	21(47.7%)	23(52.3%)	0.506
	Married	99	0(0.0%)	51(51.5%)	48(48.5%)	
	Divorced	7	0(0.0%)	5(71.4%)	2(28.6%)	

^a-significant using Chi-Square test @<0.05 level.

5. Discussion

Human papillomaviruses (HPV) is one of the most common sexually transmitted infection [4]. It is also the leading cause of some types of carcinoma such as cervical cancer [1,2,3,4]. In low- and middle-developed countries like Saudi Arabia where deaths of women with cervical cancer caused by HPV-16 and HPV-18 are high [1-6], it is inevitable not to take steps that would provide baseline data in a limited field in order to help in finding solutions to public health concerns.

Physicians do pose a very influential role in public health related concerns because of the nature of their job and exposure to the infected individuals. Basically, how they understand the concern would be translated to their patients. Hence, this study aims to evaluate the level of knowledge, attitudes and practices towards HPV infections and HPV vaccinations among physicians employed in primary health care centers (PHCC) of Makkah for the year 2019. The study involving 150 randomly selected physicians have successfully provided insights as to the level of knowledge of the physicians about HVP infections, attitudes and practices towards HPV vaccinations at least at the Makkah, region. Noteworthy also are the presence of physicians that provided no opinion on certain topics raised in this study. This could serve as an additional information aside from that of Alzahrani and colleagues [8], Hussain and colleagues [13] and Al-Shaikh and colleagues [7], to name a few.

In this particular study, physicians in Makkah at the moment have different level of knowledge about HPV infections and some socio-demographic characteristics

such as age (*p value* = 0.033) and working experience (*p value* = 0.045) were found to contribute to the significant differences. Results here revealed that the older the physician gets, it makes the physician more experienced and knowledgeable about HPV infections. Since the participants are practicing physicians, high level of knowledge about HPV infection and HPV vaccination was expected, nonetheless there are still a few that have poor (6.6%) and moderate (38%) level of knowledge. High level of awareness about HPV infection and HPV vaccination to physicians was also reported by Kolben and colleagues in 2016 [20].

In terms on the attitudes of physicians in Makkah in this period, although they have differences it was positive (48.7%) and moderate attitude (51.3%). The differing attitudes of the physicians was found significantly correlated to the specialty (*p value* = 0.011) they are into. More family medicine physicians (53.2%) have positive attitudes while more general physician (25%) have moderate attitude. This could possibly due to the facts that more exposure of family medicine physicians to HPV related concerns that somehow made them more familiar to this than the general physicians. Differences on the level of knowledge and awareness and attitudes among health care professionals regarding HPV infection and other related diseases as well as vaccination were also reported in several studies [18,19,20,21].

Also, participants in this study showed differences in their practices towards HPV infections and HPV vaccinations. This differences were significantly correlated to sex (*p value* = 0.031), level of specialty (*p value* = 0.005), nationality (*p value* = 0.046), age

(*p* value = 0.030 and 0.031). Female physicians are more proactive than male physicians in terms of early detection of HPV and cervical cancer probably due to the fact that more cases of cervical cancers observed to women than men. More non-Saudi nationals and more R2 level of specialty physicians are advising patients to get screened for Pap smear. Again, this could be due to more exposure of R2 to patients requiring related test that made them practice this so often compared to other levels of specialty. Noteworthy also is that more Saudi national physicians that did not provide opinion on the matter. This could be an indication that there are still physicians that are not open or not knowledgeable to this practices. In terms on the practice of recommending HPV vaccination to female patients, surprisingly younger physicians are more practicing this compared to older physicians. Consistently, this was also true to the practice of recommending HPV vaccination to male patients. HPV vaccines was developed around 2006 and made available in Saudi Arabia in 2010 [13]. Younger physicians may have been more oriented to this updates in medical school than the more experienced physicians.

6. Conclusion

Based on the results of the study, physicians in primary health care centers of Makkah Al-Mukarramah, Saudi Arabia in 2019 have different level of knowledge from high to moderate to poor about Human Papilloma Virus (HPV) infections and related diseases, different attitudes from positive to moderate towards HPV vaccine and have different practices toward Human Papilloma virus infections and HPV vaccination. This differences were dependent on some demographic characters of the participants.

7. Recommendations

The differences in the level of knowledge about HPV infection and other related diseases among physicians who participated in this study warrants the need of regular continuous updating of knowledge on physicians related diseases with public health concerns such as HPV and cervical cancer. This can be done probably through mandatory attendance to seminars or conferences especially those that have poor and moderate level of knowledge. Since this study was only limited to Makkah Al- similar study may be conducted also to other regions of Saudi Arabia to have a wider coverage and sufficiently represent the Saudi population. In this way, data on the knowledge, attitudes and practices obtained here may be compared to other physicians in other regions.

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