



TURKISH REPUBLIC OF NORTH CYPRUS
NEAR EAST UNIVERSITY
HEALTH SCIENCES INSTITUTE

**ASSESSMENT OF KNOWLEDGE AND BEHAVIOR OF THE
STUDENTS TOWARD HUMAN PAPILLOMAVIRUS AND
VACCINATION IN A PRIVATE UNIVERSITY**

DAINA CHARNELLE FOUANG

MASTER'S DEGREE
IN DEPARTMENT OF NURSING

SUPERVISOR
ASSIST. PROF. DR. SERAP TEKBAŞ

NICOSIA

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DECLARATION

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Title of Dissertation: Assessment of knowledge and behaviour of the students toward human papillomavirus and vaccination in a private university.

Supervisor: Assist. Prof. Dr SERAP TEKBAS

Year: 2020

I hereby declare that this thesis study is my study, I had no unethical behaviour in all stages from the planning of the thesis until writing thereof, I obtained all the information in this thesis in academic and ethical rules, I provided reference to all of the information and comments which could not be obtained by this thesis study and took these references into the reference list and had no behaviour of breaching patent rights and copyright infringement during the study and writing of this thesis.

Date:

Signature:

ACKNOWLEDGMENT

First and foremost, my praises go to Almighty God for giving me the strength, good health, peace of mind throughout my research work to complete the research successfully.

I would also express my special gratitude honour to my wonderful, highly intelligent and most supportive supervisor, Assist Prof. Dr Serap TEKBAS, who had provided patient advice, support and guidance throughout the research process.

ABSTRACT

Objective: The purpose of this research was to evaluate the student's knowledge, behaviours and status of the students about HPV infection and vaccine.

Materials and Methods: This cross-sectional study was carried out among international students of law and engineering faculties of Near East University. Data was collected through an online questionnaire developed by the researcher based on the literature review, which consists of four parts: demographic criteria, characteristics, behaviors of the students about HPV infection and vaccination, knowledge about HPV infection and knowledge about the HPV vaccine. This study included 213 participants.

Results: The average age of the participants in our study was 22.05 ± 2.31 and 19.2% of them were vaccinated against the Human Papilloma Virus. 62% of the participants were sexually active and 34.3% had heard of Human Papilloma Virus before. When the knowledge scores of the Human Papilloma Virus and Human Papilloma Virus vaccine were evaluated, more than half of the students had low knowledge scores on the virus (59.15%) and vaccine (51.17%). The knowledge score about the virus was affected by sexual activity, early sexual intercourse, class level, economic status, and marital status.

Conclusions: Students do not have enough knowledge about the risks factor of HPV infection and its vaccine, their behaviour can expose them to HPV infection. To reduce the risk of infection and increase awareness it is important to implement a strategy as the organization of the seminar to awareness university students about HPV infection and vaccination, add a course for sexual education.

Keywords: Knowledge, behaviour, human papillomavirus, human papillomavirus vaccination.

ÖZET

Amaç: Bu çalışma Yakın Doğu Üniversitesi'ndeki öğrencilerin human papilloma virüs enfeksiyonu ve aşısı hakkındaki bilgi düzeylerinin ve davranışlarının değerlendirilme amacıyla yapılmıştır.

Gereç ve Yöntemler: Kesitsel tipteki bu çalışmanın örneklem grubu Yakın Doğu Üniversitesi'nin uluslararası hukuk ve mühendislik fakülteleri öğrencileridir. Veriler, demografik kriterler, Human Papilloma Virüs bilgisi ve Human Papilloma Virüs aşısı bilgisi olmak üzere üç bölümden oluşan literatür taramasına dayalı olarak araştırmacı tarafından geliştirilen çevrimiçi bir anket yoluyla toplandı, Bu çalışmada 213 katılımcı vardı.

Bulgular: Çalışmamızda katılımcıların ortalama yaşı $22,05 \pm 2,31$ idi ve % 19,2'si Human Papilloma Virüse karşı aşılanmıştı. Katılımcıların % 62'si cinsel olarak aktifti ve % 34,3'ü Human Papilloma Virüsü daha önce duymuştu, Human Papilloma Virüs ve Human Papilloma Virüs aşısı bilgi puanları değerlendirildiğinde öğrencilerin yarısından fazlasının virus (%59.15) ve aşı (%51.17) konusunda bilgi puanlarının düşük olduğu saptandı. Virüs ile ilgili bilgi puanı, cinsel aktivite, erken cinsel ilişki, sınıf seviyesi ekonomik durum, medeni durumdan etkilenmekteydi

Sonuçlar: Öğrenciler HPV'nin risk faktörü ve aşısı hakkında yeterli bilgiye sahip değildir, Davranışları onları HPV enfeksiyonuna maruz bırakabilir. Üniversite öğrencilerinin enfeksiyon riskini azaltmak ve farkındalığını artırmak için HPV enfeksiyonu ve aşılama konusunu içeren cinsel eğitim programları hazırlanmalıdır.

LIST OF CONTENTS

THESIS APPROVAL CERTIFICATE	i
DECLARATION	ii
ACKNOWLEDGEMENT	iii
ABSTRACT	iv-vi
LIST OF CONTENTS.....	vii
LIST OF ABBREVIATIONS AND SYMBOLS.....	1
CHAPTER ONE	1
1. 0 Introduction	1
1.1. Definition of the Problem	2
1.2. Knowledge and behaviors about HPV and vaccination.....	3
1.3. Aim of study	5
1.4 Research Questions.....	5
CHAPTER TWO.....	6
2. 0 General Information	6
2.1. Global statistic of HPV	6
2.2. Natural history of HPV	7
2.3. The symptom related to HPV infection.....	10
2.4. Disease-related to HPV infection	11
2.5. The HPV infection and Factor associated with the HPV infection.....	12
2.6. Transmission of HPV.....	14
2.7. Nurse role in the prevention of HPV infection.....	15
CHAPTER THREE.....	22
3. 0 MATERIAL AND METHODS	22
3.1. Study Design	22

3.2. Study Setting	22
3.3. Study population and sampling.....	22
3.4. Data collection.....	24
3.4.1. Questions form.....	24
3.4.2. Data form application.....	25
3.5. Evaluation of research Data.....	25
3.6. Ethical Consideration	27
CHAPTER FOUR.....	28
4.0 RESULTS	28
CHAPTER FIVE.....	49
5.0 DISCUSSION	49
5.1. Discussion of the HPV infection knowledge.....	50
5.2. Discussion of the vaccine knowledge.....	54
CHAPTER SIX.....	62
6.0 RESULTS AND RECOMMENDATIONS.....	62
6.1 Results	63
6.2 Recommendations	65
REFERENCES	66
APPENDICES.....	81
Appendix A(Questionnaire).....	81
Appendix B (Ethical approval)	83

LIST OF ABBREVIATIONS AND SYMBOLS

ANI: anal intraepithelial neoplasia

WHO: World Health Organization

2vHPV: bivalent HPV vaccine

4vHPV: quadrivalent HPV vaccine

9vHPV: monovalent HPV vaccine

CIN: cervical intraepithelial neoplasia

HPV: human papillomavirus

IARC: International Agency for Research on Cancer

NEU: Near East University

STD: sexually transmitted disease

STI: sexually transmitted infection

HIV: human immune-deficient virus

DNA: deoxyribonucleic acid

LIST OF TABLES

Table1: Distribution of descriptive characteristics	29
Table2: Characteristic of the students about HPV and vaccine	30
Table3: The knowledge about HPV infection and risk factors	32
Table4: Distribution of the correct answer rate to the questions on HPV infection knowledge	34
Table5: Level of knowledge of the student regarding HPV infection	35
Table6: Correlation between the HPV infection Knowledge score and socio-demographic variables	36
Table7: The correlation between the HPV knowledge and the characteristic of the students	37
Table 8: The relation between the score about HPV knowledge behaviours of the students	38
Table 9: Knowledge of student about HPV vaccine and safety	40
Table 10: Distribution of the correct answer rate to questions on HPV Vaccines knowledge	41
Table11: The level knowledge of the student regarding the HPV vaccine	42
Table12: Correlation between the HPV vaccine knowledge score and the socio-demographic variable.	43
Table13: Correlation between the HPV vaccine knowledge score and behaviours variable	44
Table14: Comparison of the scores of the vaccine knowledge between the socio-demographic variable	45
Table15: Comparison of the score of HPV vaccine knowledge between the variables	46
Table16: Correlation between the score of HPV infection knowledge and HPV vaccine knowledge	47
Table 17: The student's information source's regarding HPV infection and vaccine (n=213)	48

LIST OF FIGURES

Figure 1: The natural history of HPV

Figure 2: Cervical cancer

LIST OF APPENDIXES

Appendix A. The questionnaire

Appendix B. Ethical approval, Institutional Reviews Board (IRB) of Near East University

CHAPTER ONE

1.0 Introduction

Among sexual disease, Human papillomaviruses (HPV) of family Papillomaviridae are the most common viral infections of the reproductive that affected women and men. Generally, the HPV affects the cutaneous and mucosal epithelium, by that way the virus is transmitted through mucous membranes genital skin, bodily fluid infected and also during sexual intercourse including oral sex. HPV can further cause cancers or genital warts on the different part of the body like the cervix col, vulva, vagina, penis, anus, tongue, and tonsils (Turiho, et al., 2015). The HPV is a family of the virus, according to the International Cancer Research Agency there are 200 HPV varieties identified which have been characterized by two groups such as malignant cancers or benign cancer. There are 12 high-risk types of HPV which can induce cancer in both men and women. Besides in 70-80% of the cases, cervical cancer is caused by HPV 16 and 18, however, it is the second cancer type with a high mortality rate in the world. The study made by Arbyn, et al. (2019), showed that between 185 countries assessed there were approximately 570 000 cases of cervical cancer and 311 000 deaths; cervical cancer was among the three cancers affecting women younger than 45 years in 146 (79%) of those 185 countries. Thus, HPV infection is not the problem of a specific country even if in the developing country the prevalence is highest. Indeed, a study conducted in Turkey has shown that among 2,234 women 850 (38.05%) were HPV DNA positive. In 2013 the incidence of HPV was estimated to 5.3 per 100,000 women and 1.0 per 100,000 men per year (Oz, et al., 2018). Men having sex with men as compared to heterosexual men and women are more exposed to the infection (Simonidesová, et al., 2018).

Among the general population, the rate of high-risk HPV (HR HPV) is around 2.2% to 7.2%. There was 40% of penile cancer in the results of the study carried out by Cai, et al., (2018) and the incidence in some study of anal cancer among the men was 45.9 per 100,000 men (Machalek, et al., 2012).

The HPV infections are associated with different risk factors, the treatment of this infection based on symptoms and regular screenings. The most common treatments for invasive cervical cancer are surgery and radiation therapy the others are chemotherapy and biological therapy (Monteiro, et al., 2018). The World Health Organization (WHO) encourages the public to vaccinate against HPV in many countries there are three prophylactic HPV vaccines. However, the way to prevent HPV infection is to provide information to the people about behaviours and vaccines to reduce the infection rate (Monteiro, et al., 2018).

1.1. Definition of the Problem

According to the World Health Organization WHO, the people most affected by HPV are young girls and men between 18-35 years with a prevalence of 21.8% and 18.7% young people are not sufficiently informed about HPV (WHO, 2017). In Africa, the incidence of high-risk HPV infection varied between 2.5 -75.5 per 100,000 women (Onowhakpo, et al., 2016). In the head of this African country, Statistics about HPV in 2018 showed that the incidence rate among all women in Swaziland is 75.3, Tanzania 72.9 Zimbabwe 66.4 Zambia 62.3 Malawi 59.1, Burundi 57.4 and Uganda 54.8 (Bruni, et al., 2019). The African countries are more affected by the HPV infection, due to the bad economic situation affecting lifestyle and lead to the exposure to HPV infection (Bruni, et al., 2019). Despite the fact, there are many methods recommended and implemented by W.H.O to avoid and reduce the prevalence of HPV.

The reasons for this high prevalence can be explained by the presence of barriers for implementation or utilization of preventive methods, in an instance of this study carried out in Cyprus among 178 medical students in the university, the result showed that given the fact that the students were in the health sciences department, their knowledge, and awareness about the prevention of cervical cancer were somehow shortcomings (Farazi, et al., 2019).

1.2. Knowledge and behaviors about HPV and vaccination

The primary prevention method of HPV infection is based on the provided awareness just as the risk factors of infection, which will help in a change of exposure behaviours; also, by associating with the HPV vaccine that will lead to protection against HPV more effectively (WHO, 2019). However, the sexual way is the main way of transmission of HPV so it is advisable to use a condom for people who are already sexually active and bound down to less sexual partners, for the adolescent, it is important to avoid early intercourse. Regular consultation is also very important to have good protection; nevertheless, early intercourse among single women lead to early oral contraception for a long period which represents a risk factor of HPV infection, smoking is a frequent habit among students, making them vulnerable to contraction of HPV infection. (Anne-Carole, et al., 2010). The vaccination is effective when all these risk factors are respected, knowledge and behaviours are the keys to avoiding and reduce this HPV infection (Monteiro, et al., 2018). But according to the study conducted in Turkey among college students aged 18-30-year-old, only 26.6 % of this student had heard of about the HPV vaccine, and 45.1 % of the students were ready to receive the HPV vaccination (Oz, et al., 2018). Furthermore, according to a study conducted in Italy by Giuseppe, et al (2008) among 1348 adolescent girls, 23%

of whom have never heard of HPV and the results of this study showed that the perception scores of the students were: 5.8 and 6.5 for the risk of contracting an HPV infection and developing cervical cancer respectively. However, the research of Cinar, et al., (2019) at the university in Turkey showed that only 16.8% of university students have ever heard of HPV; the percentage of students not having any knowledge of HPV infection is high, and only 1.5% of them was vaccinated.

In the general approach to avoiding an infection disease, each individual has to know how it is transmitted so that he/she can know how and which methods can be used to prevent but a previous study about the knowledge and behaviour toward HPV among nursing student in the Izmir University of Turkey showed 98.1% of student there were not vaccinated with an HPV vaccine. In another side, 23% of them, during their last sexual intercourse have not used condoms (Bal-Yılmaz, et al., 2018). In the same way, the survey in Cyprus among foreign and Turkish students of the university in the health science department has shown that they had moderate levels of knowledge and awareness about HPV. Indeed, the median score of knowledge was 23.32 out of 33 for HPV infection; the score on cervical cancer was 8.12 out of 13 and for HPV vaccine was 9.25 out of 14 similarly on cervical cancer results. However, the comparison between the score young and older students revealed that the average rates were 6.76 for students aged 18–22, in particular older students, and 9.44 for the students aged 23–28, and ultimately, the average rates were 6.76 for younger students and it was 9.44 for, finally, it was 10.25 for the students between 29-38 years old (Farazi, et al., 2019). According to the previous study among the students, health departments students have high knowledge about HPV compared to students in non-health department and all students have exposure behaviours. Their knowledge had no

considerable impact on their behaviours about the risk factor of HPV infection; which represents, nowadays the most common viral infection of the reproductive that affecting mostly the young people (Charalambous, et al., 2020). Thus, how will be the behaviours and knowledge of the student in departments studying the program which doesn't relate to the health in Near East University? Determination of Near East University (NEU) students' knowledge and behaviour towards human papillomavirus and vaccination may help to recognize gaps in the students' knowledge, risky behaviors or symptoms of eventual HPV infection and vaccinal status, it may also lead to improving HPV understanding and prevention, and decreasing the occurrence of HPV infection.

1.3. Aim of the Study

The purpose of this research was to evaluate the student's knowledge, behaviours and status of the students about HPV infection and vaccine.

1.4 Research Questions

Study questions include the following;

1. What are the behaviors of students about HPV infection and vaccine?
2. What is a score of the knowledge of the students about human papillomavirus infection?
- 3) What is a score of the knowledge of the students about human papillomavirus vaccination?

CHAPTER TWO

2.0 General Information

2.1. Global statistic of HPV infection

HPV infection is the most common sexual disease in the world, its overall incidence is 160 to 289 per 100,000, and the median incidence of annual anogenital warts is estimated at 137 per 100,000 in men and 120.5 per 100,000 in women. Thus, 30 million people are infected by this virus, its prevalence can vary from 3 to 20% in the general population and distribute by age, the maximum is between 20 and 25 years then decreases after 30 years, 25 to 50% in women of less than 25 years and 5 to 15% in those over 35 years (WHO, 2019). The infection is asymptomatic and more than 60% of primary infections followed within five years of first intercourse. In the most cases, the predominant localization of the multiples papillomatosis is on the genital organ with a rate of 50.5%; make self-observation of genital warts is difficult most of the time in 65% of cases; the patients can observe the external genital warts in 52% for women and 79% for men (Khan, et al., 2019). Otherwise, 70% of cervical cancer is caused by genotypes 16 and 18, they are both also responsible for 50% of high-grade cervical intraepithelial neoplasia (CIN2/3), and 25% of low-grade cervical intraepithelial neoplasia (CIN1) (Khan, et al., 2009). For Low-risk genotypes, they are also responsible for another disease, such as genital warts specifically through HPV-6 and HPV-11 particularly in 90% of cases (Lwangil, et al., 2019).

Furthermore, an American study has shown that a history of genital warts peaks is situated among women between 25–35 years old and also among American men between 35–44 years old (Pierre, et al., 2014).

In France, the annual number of new cases is 20,261 per 100,000 inhabitants in women (15-26 years) and 23,027 in men (20-30 years), 3-5% of the population will present the lesions. The prevalence ranges from 13% to 16% in women and 15% and 20% in men. The prevalence of HPV6 = 68% and types 11 = 16% out of 473 patients infected with HIV 108 (23%) have genital warts, there are around 2000 new cases of anal cancer per year in France (Van, et al., 2019)

In TOGO, in 2009 it was estimated in 12 years of 642 cases (59.94%) of genital warts. In the Central African Republic, in 3 years it was an estimated 104 cases of papillomatosis (Nondo, et al., 2014). There are three types of genital warts but the most observed in the majority of the case, it is acuminous genital warts with a rate of 44.8% and flat warts and with a rate of 29.2% (Leung, et al., 2018). The immune-depression is important to associate factor for instance the prevalence of HPV-HIV co-infection is 31.7%. Prevalence is high in people with HIV; prevalence is increasing in all countries. Co-infection with several genotypes occurs in 20 to 40% of cases (Van, et al., 2019).

2.2. The natural history of HPV

HPV is a virus constituted of deoxyribonucleic Acid (DNA) which is particularly resistant to cold, detergent, and drying. In 1933, his DNA has been isolated by Shope and Hurst from cottontail rabbit papillomavirus (CRPV) in a rabbit room, the purpose of this isolation was to fund the link between HPV and the cutaneous papilloma on rabbits' witch viral infection (Hancer, et al., 2018). Over time, HPV has been discovered as the origin of benign epithelial tumours: cutaneous (warts) and mucous (condyloma) papilloma. There are more than 200 types of HPV, about 120 of which are identified and sequenced (WHO, 2019). Researchers have used numbers for

designating them, according to their order of discovery. Problems related to the HPV may be the source cause of cancer and genital warts, affecting both women and men without distinction in particular on the genital part. We can break it down into three main groups:

- Skin types HPV: HPV-1, 2, 3 ...
- HPV of skin and genital types with low carcinogenic potential: HPV-6 and 11, responsible for genital warts
- Cutaneous and genital HPV with high carcinogenic potential High Risk - Human Papillomavirus (HR-HPV): HPV-16 and 18 especially, but also 31, 33...

2.2.1 Genital warts and HPV infection

Through sexual exposures, during the first sexual activities with an infected partner, an individual can acquire the HPV infection, this is frequently produced in adolescents and young adult women at the highest risk of acquisition (Gravitt et Winer; 2017). After the penetration into the body through his ADN viral, HPV infects the cell of epithelium and creates an epithelial invasion, the virus infects the basal keratinocyte. However, the infection can be inactive or latent, in spite that the virus is present in the mucous membranes or the skin, it cannot manifest visible symptoms or lesions (Woodman, et al., 2007). Generally, in 90% of cases of newly acquired HPV infections, it becomes undetectable within 1–2 years (Goodman, et al., 2015); it explains the fact that during the clearance time in the vast majority of cases, the immunity induced in response to infection with HPV makes it possible to spontaneously get rid of the virus (Suzanne, et al., 2009). After this period the symptoms can start to show by genital warts when the type of HPV infecting the cell is low carcinogenic potential (6 and 11 in 80% of the case) it also leads to the apparition

of different type of genital warts on various genital parts such as anal and penile in males and cervix col, vaginal, vulvar, and anal in the female or oral (Gypsyamber, et al., 2009). Genital warts can disappear without treatment according to the status of the immunity (Holman, et al., 2013).

When the clearance time is long, the risk that the infection will persist is high, that is why the immune-deprived people eliminate the papillomavirus less easily, which explains the sensitivity of people living with HIV to cancers caused by HPV (Cai, et al., 2018). Because according to Ferenczy (1995) patients with low-risk oncogenic HPV can be infected at the same time with high-risk HPV which can cause subclinical lesions associated with intraepithelial neoplasia and anogenital cancers the majority of lesions associated with warts are low-grade lesions (CIN 1) (Gravitt, et al., 2017).

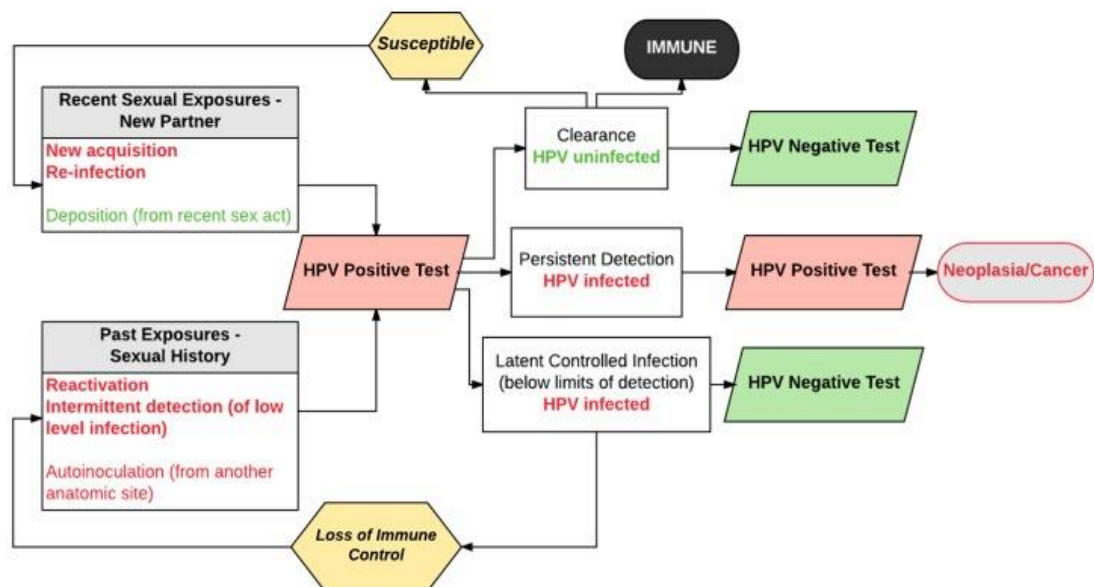
2.2.2. Cancer and HPV infection

After the cell infection, the virus can either replicate itself by taking advantage of the proliferation of the host cell or persist latently in the episomal form of free viral DNA or integrate into the genome (Cai, et al., 2018). Generally, in that case, it is because the individual did not develop the immunity required to eliminate the virus, and then HPV infection becomes persistent and active in the mucous membranes leading to cellular abnormalities, specifically in the vulnerable area of the cervix or anus, called the transformation area (Maucort-Boulch, et al., 2010). If the individual is infected by one or more types of the high carcinogenic potential HPV constitutes of both HPV-16 and 18 especially, but also 31, 33; it induces an oncogenic risk. In this case, the viral replication gives a specific cytopathogenic effect on keratinocytes and then causes the appearance of koilocytosis (Moscicki, et al., 2012). The cells which have been infected undergo morphological modifications, detectable during a smear sample, and then they

regroup to form lesions in the form of spots that can be recognized during a visual examination of the cervix under a microscope (colposcopy) and which can be biopsied (Suzanne, et al., 2009).

These lesions are called dysplasia, CIN (cervical intraepithelial neoplasia) or AIN (anal intraepithelial neoplasia), depending upon the degree of severity of the cellular modifications, they can evolve CIN or AIN of grade 1, 2 or 3 that may be clinically detectable in screening specifically low grade squamous intraepithelial lesions usually, the time of transition is 1–2 years and in some cases, this LSIL can resolve without intervention (Moscicki, et al., 2012). After these precancerous, lesions may be associated with high-risk HPV. This evolves and becomes cancerous HSIL (high grade squamous intraepithelial lesion) and then finally leading to cancer (Anne-Carole, et al., 2010).

Figure 1: The natural history of HPV



Gravitt P. et al, *Viruses*. 2017

2.3. The symptom of related to HPV infection

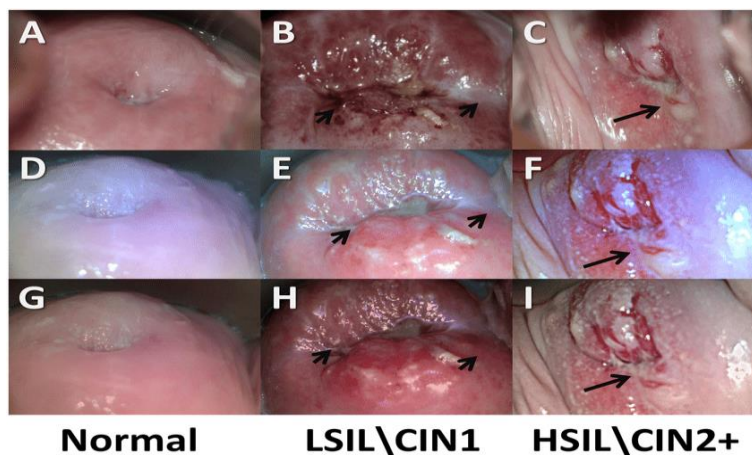
In general approach, symptoms associated with the HPV infection are inconsistent, usually, women suffering from cervical cancer might feel pains during the sexual activity, can have unusual vaginal bleeding after sex, between periods, after menopause, or after a pelvic exam and unusual vaginal discharge (Cai, et al., 2018). However clinical manifestations of genital human papillomavirus infection can be devised into two groups: low-risk infections group (causing genital warts) and high-risk infections group (causing mostly cervical cancer and anal cancers) (Moureau-Zabotto, et al., 2017).

2.4. Disease-related to HPV infection

2.4.1 Cervical cancer

Among cancer caused by HPV, the one with high prevalence is cervical cancer in women and anal cancer in men, early cervical cancer typically do not cause visible signs for 15-20 years or can take longer to develop. The most symptoms when the women have a CIN or cervical cancer are: vagina bleeding, pain, bleeding during intercourse (Gibson, et al., 2019).

Figure 4: Cervical cancer



Lam, C, et al.. *PloS one*. 2015.

2.4.2. Anal cancer

Anal cancer is caused by the HPV-16 and 18 in the majority of cases, and this last year, studies showed that the incidence of anal cancer, has been multiplied by 4 in the previous thirty years, going from 1.5 to 6 cases per 100,000 people and its increase follows that of STIs. The risk of high-grade neoplasia turning into invasive carcinoma seems significant. The general symptoms of anal cancer are bleeding, pains, and the feeling of a ball. Precancerous lesions now are an important health problem thus the early screening is necessary (Moureau-Zabotto, et al., 2017).

Table1: The Different type of HPV and disease

<i>MANIFESTATION</i>	<i>HPV TYPE</i>
Anal intraepithelial neoplasia, anal squamous cell cancer	16, 18
Cervical adenocarcinoma	16, 18, 45
Cervical intraepithelial neoplasia, cervical squamous cell cancer	16, 18, 26, 31, 33, 35, 39, 45, 51, 52, 53, 56, 58, 59, 66, 68, 82
Genital warts (condyloma acuminata)	6, 11, 40, 42, 43, 44, 54, 61, 72, 81,
Oropharyngeal squamous cell cancers	16, 18
Penile intraepithelial neoplasia, penile cancer	16, 18
Respiratory papillomatosis	6, 11, 16
Vaginal intraepithelial neoplasia, vaginal squamous cell cancer	16, 18
Vulvar intraepithelial neoplasia, vulvar squamous cell cancer	16, 18

Brianti, etal, *New Microbiol*, 2017.

2.5. The HPV infection and Factor associated with the HPV infection

The HPV infection is responsible for genital warts and cancer among men and women and is transmissible by the sexual pathway. These infections are asymptomatic in the beginning and take in average 2-5 year to manifest on infected people, the time to manifest the symptoms is impacted by the level of immunity, this infection is associated to many factors (Jordá, et al., 2020). The risk factors of the HPV infection are age, early intercourses, poor genital hygiene, anal or oral intercourse, tobacco, multiple sexual partners, oral contraception, multiparty, history of sexually transmissible disease, low socioeconomic (Segondy, 2013).

2.5.1. The risk factor of HPV

The HPV infection is a health problem all over the world, it's associated or risk factors regarding this infection turn around the behaviour of individuals thus, the risk factor of HPV infection are:

An early sexual activity: teenagers have more risk to be infected by the HPV during their first sexual intercourse (Gregory, et al., 2010). Some culture can lead to the explosion to this infection especially through the early marriage found in the Africa countries (Zechariah, et al., 2014).

The multi-sexual partnership: the majority of individuals infected have more than two sexual partners. The sexual practices such as anal intercourse increase the infection risk (Woodman, et al., 2007).

Sexually transmitted disease (STD): having the sexually transmitted disease is a risk factor, for instance, chlamydia has shown that women with the history of chlamydia have more chance to develop cervical cancer (Taebi, et al., 2018).

Among the women in the age of procreation: Contraception pills can be a risk factor of HPV when it is taking longer than 5 years; and multiple pregnancies (>5).

Co-infection with the human immunodeficiency virus (HIV); Iatrogenic immune-suppression (transplant recipients, chemotherapy) (Almobarak, et al., 2016).

Tobacco: The men who smoke more than 10 cigarettes in 24h are twice more likely to have genital warts than nonsmoking men. About the women who smoke more than 20 cigarettes in 24h compared with those who smoke less than 10 cigarettes have an increased likelihood of persistent HPV infection (Khan, et al., 2019). There is a persistence of disease when the women with grade 3 vulvar intraepithelial neoplastic continue to smoke after treatment is 30 times more likely Previous sexually transmitted diseases such as herpes.

2.6. Transmission of HPV

The HPV enters the body through a small tear in the skin caused by a cut or abrasion, transmitted by sexual and non-sexual pathway.

- Sexual transmission

Contamination occurs mainly through direct contact during sexual intercourse. The risk of contamination after intercourse is 60-70% Anal and genital warts can be transmitting between the penis and the vagina or anus. Intimate contact between healthy skin and an infected area of skin, or during sexual intercourse oral, when sharing the sex object (Vasilios, 2019). Even though the causes of the HPV are still unknown, there are still associate factors, HPV is acquired during the start of sexual life. According to statistics, 70% of women will come into contact with the virus during their sexual life. The risk of HPV infection among sexually active people is 80

to 85%, Men or women might be at higher risk of HPV infection or related diseases but during the intercourse, the risk of transmission after sexual contact with an infected person is significant from woman to man: 50-90% compared to the opposite direction: 50%. (Azucena, et al., 2018). The prevalence of early marriage is high in Africa even though early sexual activity is one of the risk factors of HPV infection; however, the prevalence of HPV is high around the Africa country. The prevalence of early marriage is high in Africa, although early sexual activity is one of the risk factors of HPV infection; Indeed, younger people account for the majority of study the more exposure groups, utilization of condom reduce the risk of transmission during the intercourse, but there is low utilization of condom among young people. A study among these groups has shown that only 46% of them agree that the condom can reduce the transmission (Bruni, et al., 2019).

- Non-sexual transmission

Perinatal transmission: Laryngeal contamination in the newborn during childbirth.

They can also be transmitted by the smoke released during the destruction of genital warts with an electrosurgical unit or with the CO2 laser. Exceptionally, objects of sexual pleasure, poorly infected examination equipment.

Self-contamination is also possible from common warts (especially children) or especially genital lesions, causing local multiplication of lesions (Anne-Carole, et al., 2010).

2.7. Nurse role in the prevention of HPV infection

According to the WHO, there is a preventative method for HPV infection and cancer: primary, secondary, and tertiary prevention HPV infection are the key of that preventative approach and control are:

- The vaccination: HPV vaccination of people according to age and dose.
- The Screening and treatment of pre-cancers: screening test and treatment on pre-cancer
- The treatment of cancers: accessibility to adequate treatment in goal to survive
- Palliative care: to a patient with advanced cancer, while managing pain and giving to them access to opioids are necessities.

2.7.1. Nurse role in the primary prevention of HPV

The sensitization is the first strategy of prevention, educate and inform the population against the risk factor and transmission of the HPV is crucial to avoid its prevention. In the individual approach to each patient, the nurse should make a cultural and the lifestyle evaluation of the patient to identify the risk factor in their behaviour. Awareness is necessary because most of the young and adult people don't know about HPV (Dakenyo, et al., 2018). According to the WHO, primary prevention consists to give the various types of vaccine to a target group girls and boys, of 9–14 years of age, the HPV vaccine is most effective when the person has not gotten sexual intercourse (David, 2020). That why nurses should contribute and encourage improving vaccine delivery strategies while collaborating with an organism in charge of adolescents. The nurse should organize the strategy of delivering a vaccine for the target group especially in the school for an adolescent (Patel, et al., 2016); Such as the organization

of the seminary with a student and the parents about the risk factor, transmission, and sexual education. This is important because the first education passes through parents (Zechariah, et al., 2014).

2.7.1.1. The vaccine against HPV infection

Worldwide, for more than 10 years since HPV vaccination have been implemented, more than 270 million doses of vaccine have been distributing around the world (WHO, 2019). Indeed, 350 million doses of the HPV vaccine have been used through the worldwide but only in 14 countries it was given to both sex and only the girls in 70 countries besides, the vaccine is free only in 56 countries, and need the money to take it so that the poor people get access to it (Vasilios, 2019). The vaccine is not only for the women but also for the men. for more effectiveness of the vaccine, it is recommended to take a vaccine before starting sexual activity to get the assurance not to be affected; It is taken with three doses and the only recognized side effect of the HPV vaccine occurred after the injection such as: where the shot was given pain, redness, or swelling, and dizziness or fainting Nausea Headache; however, most vaccine reactions (side effect) are minor or transient (Vasilios, 2019).

WHO recommended getting vaccinated in adolescence ages 9-14-year-old in particular before sexual activity begins because at this condition the risks to have been in contact or be exposed to the HPV virus is not high (Loke et al., 2017). But with modernization, it is difficult to find the young people less than 15 years old that never get intercourse. Even after the vaccine, the risk zero is not excluded. That is why vaccination should be combined with good sexual behaviours (Ratanasiripong, et al., 2013). The cohort's studies on the HPV vaccines were intended for coupled with low

acceptance and uptake rate of the HPV vaccines, however, there have been numerous studies to find reasons for the low acceptance and uptake of the HPV vaccine such as vaccine potency and its potential side effects, the knowledge, behaviours, and attitudes parent, young adults and health care professionals, barriers to acceptance and uptake among race and ethnicity. Most studies showed that misinformation and stigma about vaccines, cultural or language are the main the barriers to taking the HPV vaccine developing country (Riaz, et al., 2020; Jordá, et al., 2020). Then Africa represents the continent with more financial problems, culture, and religion, the stigmatization of vaccines in most African countries is still an actuality due to misinformation majority of people having poor knowledge and awareness concerning HPV infection and vaccine (Lwangil, et al., 2019). But data from developing countries around the world show high effectiveness of vaccines in protecting against HPV infection (Costa, et al., 2020); improving the strategy for screening test have saved lives of millions of women who have already been exposed to HPV and has a high probability to develop cervical cancer the next 20 years (Maine, et al., 2011).

➤ **Types of the vaccine against HPV**

There are three main types of the vaccine against HPV infection all over the world

- Cervarix this vaccine has been started to use for the prevention of HPV types 16 & 18 also called the bivalent vaccine had created since 2007.
- Gardasil or the quadrivalent HPV or 4HPV vaccine, since 2006, more than 210 million doses of this kind of vaccine have been distributed worldwide, after the injection of prevention by 4HPVvaccine, it has been demonstrated there is a disappearance of genital warts after 4 and 7years in both women and men (Suzanne, et al., 2009).

- Gardasil9 or the pentavalent HPV or 9vHPV vaccine is against nine HPV types (6, 11, 16, 18, 31, 33, 45, 52, 58,) it is available in many. this vaccine can be administered to girls and boys as well as adults and there is no age limit to take a 9HPV vaccine, it protects against cancer and genital warts, but for more effectiveness, it is important that to make the vaccine at least 1 year before having first sexual intercourse to avoid the risk been infected by HPV before vaccination (Cinar, et al., 2019). 9-26 years old: genital warts and cervical cancer; in this age group the immune system of young people is maximum sensitization and antibodies provide up to 90% protection against the HPV infection. The results of the study in Cyprus showed that after vaccination with 9 HPV the most common side effect was 13.2% headache, at the injection site it was 84.8% pain (Vasilios, 2019).

2.7.2. Nurse role in secondary prevention of HPV

Secondary prevention consists of screening tests and treatment because to prevent the evolution of precancerous lesions early detection and treatment is it the only way. But according to the WHO in 2012, around a billion women between 30 and 49 years old, have never been screened even once in their life despite the importance of screening.

➤ Screening test

The main screening test about diseases related to HPV infections was:

- Visual inspection with Acetic Acid (VIA)

On the areas with lesions of HPV infection, the nurse applies the acetic acid HPV lesions, when it turns white that means a test is positive. This technic is effective for helping to show flat lesions. Thus, after the colposcopy and biopsy which made at an infected part and sends to the laboratory.

- Pap test:

With the help of equipment, the nurse, or doctor from the cervix or vagina collects a sample of lesions and sends for laboratory analysis.

- HPV testing for high-risk HPV types

DNA tests or HPV tests have made to screening and identify the HR-DNA of the HPV varieties associated with genital cancer after the Pap test.

- According to (WHO; 2012) except for women infected by HPV, women younger than 30 years of age should not undergo screening.

- For screening, the prioritized women are those between 30–49 years old.

- The frequency of screening interval is more than 5 years and if HPV test use is more than 10 years.

- When women or men have cervical or anal cancer in high HIV prevalence countries, offered HIV testing and counselling it is an obligation.

➤ **The treatment of disease related to HPV infection**

- **Genital warts**

Among curative treatments of genital warts, there are three types of methods: chemical treatments (self-applied cytotoxic - podophyllotoxin, fluorouracil - or non-self-applied - podophyllin, trichloroacetic acid), immunomodulatory treatments (imiquimod) and physical destructive or ablative treatments (cryotherapy, laser, electrosurgery or excision) (Anne-Carole, et al., 2010).

- **Cancer**

When an individual has an abnormal screening result of HPV, he will be referred to colposcopy for assessment and if necessary, treatment to prevent abnormalities progressing into cancer.

In some cases, when a patient who's cervical or anal screening cytology shows low-grade changes, he has to make an HPV test performed on their smear, to eliminate and control the oncogenic HPV type. However, if the risk to develop high-grade is moderated that means high-risk HPV test is negative; then, the patient is discharged to routine screening recall. In case of the positive HPV test result, the patient is directly referred for the colposcopy; if cytology shows a high-grade abnormality an HPV test will be not done before referred for colposcopy (Gregory, et al., 2010). After the treatment of intraepithelial neoplasia or pre-cancer, a nurse would encourage the women to change their lifestyle to control their weight, and avoiding tobacco consumption (Schlumbrecht, et al., 2014); follow a patient to make sure that the patient makes the test routine: the patient has to follow-up smear tests at six months, after one year and finally annually for the next nine years before being returned to the regular screening program (Moureau-Zabotto, et al., 2017). An HPV test has been added to the first six-month smear test called the test of a cure because evidence has practice shown it is more sensitive at detecting CIN or AIN than when the cytology is used alone. If this HPV test is negative during this period, the likelihood of further CIN is low and the woman will be recalled in three years. But if the HPV test is still positive, immediately the patient will be referred for colposcopy assessment, even if the cytology is normal (Beshers, et al., 2015).

2.7.3. Tertiary Intervention

- Ablative surgery, radiotherapy, or chemotherapy

At this point, a nurse should provide psychological support to the patient and encourage the patient to adhere to the therapy meeting and change the lifestyle (Schlumbrecht, et al., 2014). The treatment of cervical and anal cancer is done by the association of radiotherapy often with chemotherapy for the eradication of cancer cells, its treatment is very effective. According to evidence-based -practice when the diagnosis doing early the prognosis is good; the 5-year survival among the entire grade (1-2) of anal cancer is 70 to 80%. The 5-year survival for cancer of the anus stage 1 or 2 is 80% in grade 3 cancer it is around 59 to 80%.

In the case of cervical cancer, hysterectomy is necessary (Maucort-Boulch, 2019).

- Palliative care: In the cases of a patient with advanced cancer for pain management, getting access to opioids is necessities (Nondo, et al., 2014). In a state of cancer, for patients with life-threatening, the nurse should be sure to respect the administration of medicine for relief from physical pain suffering and provide the psychological support through of cultural and spiritual resource of the patient (WHO, 2019).

CHAPTER THREE

3.0 MATERIALS AND METHOD

3.1. The study designs

This study was conducted with a cross-sectional study design.

3.2 The study site

3.2.1. Location Description

Near East University is the oldest and biggest private university in the northern part of Nicosia, North Cyprus' capital. Near-Eastern University has 20 faculties consisting of 220 departments and programs, eight schools with approximately 218 programs in the field of graduate and post-graduate studies, and 3 high schools, 28 research institutes. There are more than 26,000 students from more than 100 countries, is continued by around 1000 international students. NEU contain engineering and law faculties that interested us among those innumerable programs offering the undergraduate and postgraduate programs, based on the language of training we can diversify them through English-taught and Turkish-taught programs. Thus, the English programs are multicultural because they are students from more than 40 countries nearly 50 per cent of them come from neighbouring countries and abroad. It consisted of a total of 13 divisions covering different engineering fields. Indeed, in the spring 2020 semester, in the faculty of the law, there were around 100 international undergraduates' students registered in English training courses, and in the Engineering faculty, there were around 151 undergraduate students.

3.3 Study population and sampling

➤ Sample size determination

Power analyzing method has been used to determine the sample size among 251 students register in engineering and law course while using the following formula:

$$n = \frac{N * X}{X + N - 1}$$

Where: $X = (z_{\alpha/2}^2 * p(1-p)) / MOE^2$

n= sample size,

p= proportion of sample

MOE= margin of error

N= Population size

$z_{\alpha/2}$ = The critical value of the normal distribution at an $\alpha/2$ (for a confidence interval level of 95%, α is 0.05 and the critical value is 1.96)

Thus, N=251, p= 0.5, MOE= 0.05, and $z_{\alpha/2} = 1.96$

$$X = \frac{1.96^2 * 0.5(1 - 0.5)}{0.05^2}$$

$$X = 384.1 \quad \text{and} \quad n = \frac{251 * 384.16}{384.16 + 251 - 1} \quad \text{and} \quad n = \frac{100265.76}{644.16}$$

Then: $n = 152$

The main purpose underlying power analysis is to help the researcher determine the smallest sample size that is suitable to detect the effect of a given test at the desired level of significance. Thus, our ideal sample size should be not less than 152, given the 95% confidence level where the margin of error is 5%.

3.4. Data collection

In our study, among around the 21 faculties of NEU, we excluded all faculties (05) of the medical area (medicine, pharmacy, dentist, nursing and health sciences). And

among 16 faculties in non-medical areas, we selected by random two among these non-medical faculties, specifically, we conducted this study among international students of engineering and law faculty.

- We have collected 25 questionnaires by email and 188 by WhatsApp and none face to face
- Students in engineering were 145 and 32 of them refused to participate, the others did not return the survey fiche we collect 113 students (77%)
- Concerning students in law, there were 106 and 6 of them have refused to participate we collected 100 (94.4%) returns.
- A total number of students 251 in law and engineering department, but 38 students did not return us.
- As a result, 213(85%) of students constitute the sample group of our study.

Inclusion criteria

So, we have included in this study students who:

- ✓ Speak and understand English.
- ✓ Are in undergraduate of faculty of either engineering or law
- ✓ Agree to participate in the study

Exclusion criteria:

We have excluded from this study, students who:

- ✓ Do not want to participate in the study.
- ✓ Do not speak and read English.

3.4. Questions form

We have used a special questionnaire elaborate to carry out this study this questionnaire has been constituted by the searchers of this study. While based on the recommendations and results of the previous studies of Farazi, et al., (2019) in Cyprus; in Turkey by Cinar, et al., (2019) and Bal-Yılmaz, et al., (2017); In Nigeria by Makwe, et al., (2012), of Karen, et al., (2008) and systematic review by Patel, et al., (2016). About the knowledge and attitude of the nurse students about HPV and vaccination. Our questionnaire was focused on four parts: Socio-demographic characteristics (05), some characteristic of students about HPV and applying of vaccine (07), knowledge of HPV (20), and knowledge of HPV vaccination (9). However, 'I don't know', 'yes', and 'no' constituted the answers' options to the questions about HPV infection and HPV vaccine. There was one question concerning the source of information and this question has been not scored.

3.4.2 Data form application (Questionnaire)

Data were collected online because with the COVID-19 pandemic it was impossible to apply it face to face, from April to July 2020.

The questionnaires were administered by research on students who agree by email and WhatsApp groups of courses: law (2 groups) and engineering (5 groups).

- We were added in the group, by sending a request to the administrator of each WhatsApp group.
- After adding, we have written in the groups to explain the topic by giving adequate information about the research, its aim and objective, ask permission to send the individual message, and ask the choice of the reception of the survey (email or WhatsApp).

3.5. Evaluation of research data

All data set was analyzed using SPSS version 18.0 software. The methods used to analyze the data include:

Descriptive statistics to find the percentages, frequencies, means and standard deviation, and other variables valid for the research and Transform option has been used to recode in addition to the score.

Thus, to find the correlation between two numerical variables or between numerical and categorical dichotomy variable, Pearson correlations tests have been used in the case of parametric test and spearman's correlation have been considerate in the case of non-parametric test.

Between the continuous variable and categorical variable with more than two values, One-way Anova has been used in the case of parametric test, but in the case of the non-parametric test, the test used was the Kruskal Wallis test.

In the first section of our study, the Cronbach's Alpha is 0.780 this value is higher than >0.06 which mean our 20 items have relatively high internal consistency there is the correlation between our questions in this study, in the second section of our study the Cronbach's Alpha is 0.780 this value is higher than >0.06 which mean our 9 items have relatively high internal consistency there is the correlation between our questions in this study. The chosen level of significance was when the p-value is less than 0.05

3.5.1. Measure of the score

In part 2 of the questionnaire, each answer indicate knowledge about HPV infection then the following questions numbered: 1,2,3,5,6,8,9,11,12,14,16,17,18,19 the correct answer to the questions is "yes". In these questions, 1 point was given for yes answers.

Another part of the questions numbered: 4,7,10,13,15,20 the correct answer to the questions is "no". In these questions, 1 point was given for yes answers; the maximum score that participants can get in this part was 20. The score of knowledge was categorized in: 0-7= low level of knowledge; 8-14= middle knowledge level; 15-20= high level of knowledge. In the last section of our questionnaire, each question indicating the knowledge of the student about HPV vaccines and in the following questions numbered: 1, 2, 4, 5, 6, 8, and 10 the correct answer to the questions is "yes". In these questions, 1 point was given for “yes” answers. Another part of the following questions numbered: 3, 9, the correct answer to the questions is "no". In these questions, 1 point was for yes answers. The maximum score that participants can get from this form is 11, it was categorized in: 0-3= low level of knowledge; 4-6= middle knowledge level; 7-9= high level of knowledge.

3.7. Ethical considerations

The Institutional Review Board (IRB) from Near East University has delivered to us the Ethical approval (Appendix 2).

Permission from the deans of law and engineering faculties has been obtained.

Permission of the administrator of each WhatsApp group has been obtained to add us to the group after the presentation and explanation of the topic.

All students' consent was obtained to ensure the student to participate in the study and provide their voluntary participation, and we collected data in a confidentially, reliable, and valid way.

CHAPTER FOUR

4.0 RESULTS

In our study, 213 students participated, their mean age was (22, 05±2,319), and the youngest participants were 18, and the oldest was 33. We aimed to evaluate the knowledge of the students about the HPV infection and we found that the maximum score of the HPV infection knowledge recorded by the students was 16 and the lowest was 0, the mean score on this section of our study was (6, 08±4, 17). The highest score recorded from the HPV vaccine knowledge by the participants is 9 and the lowest score is 0 and the mean score is (3, 52±2,181). In general, there were 29 countries and the majority of students were respectively from Nigeria 34.7%, 12.5% Zimbabwe, 7.98% Congo, 7.5% Cameroun.

Table 1 Distribution descriptive characteristics (n=213)

Descriptive characteristics		n	%
Gender	Female	81	38,0
	Male	132	62,0
Religions	Christian	113	53,6
	Muslim	100	46,4
Economic situation	Low than expenses	85	39,9
	Equal to expenditure	106	49,8
	More than expense	22	10,3
Social security	No	98	46,0
	Yes	115	54,0
Marital status	Married	12	5,6
	couple/boy-girlfriend	104	48,8
	Single	97	45,6

Table 1 shows part of the demography frequency of participants. In this study, there were more male students (62 %) than female students (38%). However, 53.6% of the student in this study were from the Christian religion and 46.4% were from the Muslim religion. And, financial status is showing that the majority of the respondents were of the middle class, whose economic situation is described by an income equal to expenditure represented 49.8% of the students. In the other fraction, we observe an income lower than expenses, which represents 39.9 %, and then, only the remaining 10.3% of student have an income more than the expense. Majority of student had a social security 54%. Concerning the marital status, the majority of students has a boy or girlfriend in 48.8 % of the cases, and 45.8 % were single.

Table 2. Characteristic of the students about HPV and vaccine (n=213)

Risky behaviours of the students		n	%
Active Sexually	No	132	62
	Yes	81	38
Groups of the first age of intercourse	[11-15]	35	20.1
	[16-18]	74	42.5
	[19-23]	65	37.4
Smoking	Never	162	76.8
	Rarely	23	10.9
	Often	11	4.3
	every time	17	8
Talk to parents of sexual matters	No	160	75.11
	Yes	53	24.9
Go to the doctor for genital warts	No	180	84,5
	Yes	33	15.5
Have genital warts	No	173	81.2
	Yes	40	18.8
Been vaccinated (HPV)	No	172	80.8
	Yes	41	19.2

Table 2 shows the results for the descriptive statistics regarding risky behaviours and status of the students about HPV infection and vaccine, however, in 62% of the case, the students were sexually active. However, the mean age of the first intercourse among 174 who had already the mean age of the first intercourse was 17, 59(\pm 2,609) year old and the minimum age was 11 and maximum was 23 years old, majority 74

(42.2%) of the students have started sexual activity between [16-18year-old] There are 39 (18.3%) students who have never had intercourse in their life.

Concerning tobacco consumption or smoking, 76.8% of students are not smoking. Parental communication on sexual issues was not common in this sample, since the majority of students had no sexual communication with their parents at 75.1%.

Furthermore, just 15.5 % of these students have been to the genital warts specialist giving that 18.8% of students has genital warts so infected by HPV.

Vaccine status review reveals that only 19.2 % of students were vaccinated against HPV and 80.8 % of students were not vaccinated.

Table3. The knowledge about HPV infection and risk factors (n=213)

HPV Knowledge	I don't know		Yes		No	
	n	%	n	%	N	%
heard of HPV infection	48	22.5	73	34.3	92	43.2
HPV infection has a screening test	130	61.0	50	23	33	18
HPV types 16 and 18 cause the majority of cervical cancer and pre-cancerous cervical lesions	146	68.5	46	21.5	21	10
HPV has always symptoms	132	62.0	27	13.7	54	25.3
HPV is transmitted through sexual contact	121	56.8	71	33.3	21	9.9
Starting sexual activity at a young age is a risk factor for HPV.	128	60.1	69	32.4	16	7.5
HPV infection haven't any treatment	133	61.9	20	9.4	60	28.7
HPV infection sometimes has no symptoms	133	62.5	25	13.5	55	24
Multiple sexual partners are a risk factor for HPV	113	53.1	20	9.5	80	37.3
HPV infection causes genital warts only in women	113	53.1	87	40.8	13	6.10
There is a diagnostic test to determine HPV	132	62.0	60	28.2	18	8.5
HPV can cause cancers of the anus, vulva, vagina, penis and oropharynx	146	68.5	46	21.6	20	9.9
There are no ways to protect against HPV infection	111	52.1	17	8.0	85	39.9
The vaccine protected from HPV infection.	132	62	61	28	20	10
HPV isn't transmitted infection	130	61.0	16	7.5	66	31.0
Sexual contact with an HPV partner is a risk factor for HPV.	121	56.8	86	40.4	6	2.8
Proper use of the condom reduces the risk of genital warts.	115	54.0	86	40.4	12	5.6
HPV is transmitted to both men and women	113	53.1	84	39.4	13	7.5
Smoking a risk factor for HPV	132	62.0	46	21	35	17
All types of HPV cause cancer.	139	65.3	33	15.5	41	19.2

Table 3 shows the frequency of each option of the answer; this frequency of answers about HPV knowledge of risk factors and transmission are based on 20 items.

Although there was only 34.3% of the students who have already heard about HPV infections. However, the majority of students picked option was “I don’t know” to answer the questions on HPV. Thus, 68.5% of students used I don’t know to answer the question if “HPV can cause cancers of the anus, vulva, vagina, penis, and oropharynx”.

In the option “no” the most frequent and wrong questions was “Sexual contact with a partner affected is a risk factor for HPV” with 40.4% and 43.2% of students never heard of HPV infection, 39.9% of students indicated that there are no ways to protect against HPV infection

Approximately 40.4% of the students in this study agreed that there is a way to get protected against HPV, and 39.4% of them were sure that HPV can infect both men and women; a fraction of 33.3% student has indicated HPV is transmitted by sexual pathway and 37.1 % knew that a multi-sexual partner is a risk factor of infection.

Table 4. Distribution of the correct answer rate to the questions on HPV infection knowledge.

HPV Knowledge	n	%
I heard of HPV infection	73	34.2
HPV infection has screening test	48	22.5
HPV types 16 and 18 cause the majority of cervical cancer and pre-cancerous cervical lesions	46	21,6
HPV have always symptoms	52	24.4
HPV is transmitted through sexual contact	71	33.3
Starting sexual activity at a young age is a risk factor for HPV	69	32.3
HPV infection hasn't any treatment	60	28.2
HPV infection sometimes has no symptoms	25	11.7
Multiple sexual partners are a risk factor for HPV	20	9.38
HPV infection causes genital warts only in women	13	6.1
There is a diagnostic test to determine HPV	60	28.1
HPV can cause cancers of the anus, vulva, vagina, penis and oropharynx	46	21.6
There are no ways to protect against HPV infection	85	39.9
The vaccine protected from HPV infection	60	28.1
HPV isn't transmitted infection	66	30.9
Sexual contact with an HPV partner is a risk factor for HPV.	86	40.4
Proper use of the condom reduces the risk of genital warts.	86	40.4
HPV is transmitted to both men and women	84	39.4
Is smoking a risk factor for HPV	46	21.5
All types of HPV cause cancer.	39	18.30

Table 4 presents the results of our third part especially the total point on each question related to the HPV infection knowledge recorded by 213 students.

Globally, the rates of good answer on each question are less than 50% in this section; but the question with the highest rate of positive answer related to the question on risk

factor of HPV, recorded by the student was 40.4%, corresponding to the fact that sexual contact is a risk factor but only 9.38% of students knew that multiple sexual partners are a risk factor; secondly, 39.4% knew HPV is transmitted to both men and women.

However, the question with the lowest rate where the students have 1 point is about if the HPV infection can cause genital warts only in women, there were only 6.1% of all participants knew that the HPV can cause genital warts to both males and females. The majority of the student doesn't have the right information and knowledge about HPV infection.

Table5. Level of knowledge of the students regarding HPV infection (n=213)

HPV Level of knowledge	N	%
low level [0-7]	126	59.15
middle level [8-14]	84	39.45
high level [15-20]	3	1.40
Total	213	100,0

Table 5 demonstrates the level of knowledge the student had about the HPV infection, however, 126 (59.15%) of the participants have a low level of knowledge and around 84 (38.49%) have the middle level of knowledge in spit those low level among the student there were 3 (1.40%) of the students who have a high level of knowledge. The big fraction of students in this study had a low level in general about HPV infection.

Table 6. Correlation between the HPV infection knowledge score and socio-demographic variables (n=213)

Socio-demographic Variable		HPV infection Knowledge score	r	P*
		Mean ± SD		
Gender	Female	6.29±4.31	-0.031	0.650
	Male	5.96±4.09		
Religion	Christian	6.44±4.09	-0.098	0.153
	Muslim	5.62±4.20		
faculties	Engineering	6.22±4.45	-0.034	0.613
	Law	5.93±3.85		
Social security	Yes	6.2±3.78	0.028	0.675
	No	5.95±4.61		
Age	18-20	6.18±3.82	0.002	0.965
	21-25	6.13±4.29		
	26-33	5.5±4.42		

Spearman correlation test* Correlation is significant at the 0.01 level (2-tailed) *. Correlation is significant at the 0.05 level (2-tailed). r: coefficient of correlation, p: Value.

Table 6 shows the correlation between the score about HPV knowledge and socio-demographic characteristic of the students, there was no significant correlation (P>0.05)

Table7. The correlation between the HPV knowledge and the characteristic of the students

Characteristics about HPV and vaccination		HPV infection Knowledge score	r	P*
		Mean \pm SD		
Active Sexually	Yes	5.16 \pm 4.13	0.176	0.010*
	No	6.65 \pm 4.11		
smoking	Yes	6.19 \pm 4.18	-0.0142	0.836
	No	6.05 \pm 4.20		
Have genital warts	Yes	7.17 \pm 3.78	0.125	0.068
	No	5.83 \pm 4.23		
Go to the doctor for genital warts	Yes	7.34 \pm 4.15	0.129	0.05
	No	5.85 \pm 4.14		
vaccinated (HPV)	Yes	6.86 \pm 4.64	0.086	0.207
	No	6.82 \pm 4.62		
Talk to parents of sexual matters	Yes	6.86 \pm 4.64	0.96	1.62
	No	5.83 \pm 3.99		

* Spearman Correlation test. Correlation is significant at the 0.01 level (2-tailed) *. Correlation is significant at the 0.05 level (2-tailed). r: coefficient of correlation, p: Value.

Table 7 shows the correlation of the score about HPV knowledge and the behaviours of the students, we found significant p-values after these tests. Indeed, we found a statistically significant strong positive correlation between ($r = 0.1746$, $P = 0.010$) the score of HPV infection knowledge and the sexual activity of students. The mean score of sexually active students is lower (5.16 ± 4.13) than the mean score of students that are not sexually active (6.65 ± 4.11); the high knowledge score is associated with the non-sexual activity.

Table 8. The relation between the variable and HPV infection Knowledge (n=213).

Variables		The score of HPV infection knowledge			
		Mean \pm SD		χ^2	P*
Class level		6.08\pm1.71		7.993	0.046
first	second	7.02\pm 3.11	4.95 \pm3.82	9.937	0.02
second	third	4.95 \pm 3.82	5.87 \pm 4.19	1.247	0.26
Third	Fourth	5.87 \pm 4.19	7.02 \pm 3.11	0.408	0.503
Economic status		6.089 \pm 4.17		14.094	0.001
Low	Equal	7.33 \pm 4.036	5.13 \pm 4.02	14.026	0.000
Equal	More	5.13 \pm 4.02	5.86 \pm 4.3	0.733	0.390
Marital status		6.84\pm4.87			0.003
Married	Boy-girl friend	6.41 \pm 3.14	7.028 \pm 4.11	0.323	0.569
Single	Boy-girl friend	5.04\pm4.14	7.028\pm4.11	10,766	0.001
Married	Single	6.41 \pm 3.14	5.04 \pm 4.14	2.3	0.129
Age of early intercourse		6.21 \pm 4.01		7.874	0.02
11-15	16-18	5.17 \pm 3.87	5.69 \pm 3.79	0.635	0.46
16-18	19-23	5.69 \pm 3.79	7.36 \pm 4.10	5.047	0.025
19-23	11-15	7.36 \pm 4.10	5.17 \pm 3.87	5.95	0.015

Kruskal Wallis test: chi-square.

Table 8 shows the relation between the class level and the score of knowledge of the students towards the HPV infection using the Kruskal Wallis test. The level of the class statistically impacts the score of the knowledge of students; there is a statistically significant difference ($\chi^2=7.993$; P=0,046) of knowledge score between the class levels, calculation of interaction shows that 3.7% of the variability of the knowledge score depends on the class level. Students are likely to get high knowledge depending on their class level; then, a Post-hoc analysis shows that the mean rank score of the

student in level 1 is statistically significantly ($p=0.02$) higher than for the mean score of students in level 2. So, the students in level 1 have 4.68% of chance to have a higher score of knowledge than the student in level 2.

However, the p -values of the correlation between the economic situation and score of Knowledge ($p=0.000$) is less than a significant level of 0.05. Thus, there is a statistically significant association between the score of HPV infection Knowledge and the economic situation of the participants. a Post-hoc analysis shows that the mean score (7.33 ± 4.03) of the students with an economic situation low than the expense is statistically significant ($p=0.02$) higher than the mean score of the student who has income more than expense (5.86 ± 4.33). The calculation of interaction between the categories of the economic situation shows that students with the low economic situation have 6.68% of chance to have a high score in the knowledge of HPV infection than the students with the high economic situation.

Thus, there is a statistically significant association ($p=0.003$) between the score of HPV infection knowledge and the marital status of the participants. A Post-hoc analysis shows that the mean scores the participants who have a boy or girlfriend (7.028 ± 4.11) are statistically significantly ($p=0.02$) higher than the mean score of the married student (5.86 ± 4.33). The calculation of interaction between these, show that students in the couple have 6.68% of the chance to have a high score in the knowledge of HPV infection than single students. There is also a statistically significant difference ($=7.84 P= 0.02$) between the score of HPV infection knowledge and the age of the first intercourse when the age is up to 18 years old the score of knowledge increase. The mean score (5.69 ± 3.79) of HPV knowledge of the students with the first age of intercourse between 16-18 year old is statistically significantly ($\chi^2 =5.047 p=0.025$) lower than the mean score (7.36 ± 4.10) of students with the age of first intercourse between [19-23] year old. The means score (5.17 ± 3.87) of HPV infection knowledge of the students with the first age of intercourse between 11-15 year old is statistically significantly ($5.95 P=0.015$) lower than the mean score (7.36 ± 4.10) of those who are between [19-23] year old.

Table 9. Knowledge of student about HPV vaccine and safety (n=213)

HPV Vaccines Knowledge	I don't know		Yes		No	
	n	%	n	%	n	%
I heard about the HPV vaccine	76	35,7	55	25,8	82	38,5
HPV vaccines are more effective if given to people who have never had sex.	140	65,7	50	23,5	23	10,8
HPV vaccine is'nt effective in preventing cervical cancer	144	67,6	17	8,0	52	24,4
The HPV vaccines offer protection against cervical cancers	146	68,5	48	22,6	19	8,9
The HPV vaccine offers protection against genital warts	145	68	52	25	16	7
HPV vaccine is needed	104	48,8	96	45,1	13	6,1
HPV vaccine produces a stronger immunological response in adolescents aged 9-14 years.	140	65	49	23,4	24	11,6
The HPV vaccine can be used in both men and women.	129	60,6	69	32,4	15	7,0
The HPV vaccines offer protection against all sexually transmitted infections	110	51,6	87	40,8	16	7,6

Table 9 shows the frequency of each option of the answer; this frequency of answers about knowledge of HPV vaccine is based on 9 items.

Only 25.5% of the student had already heard about the HPV vaccine, in the option “yes” the most predominate and true answer question is “HPV vaccine can be used in both men and women.” with respectively the rate of 32, 4% (69), this represents the rate of student who knows that HPV vaccine can be used by men and women. 45,1% (96) of the students had indicated the HPV vaccine is a need.

Concerning option of “I Don't Know”, the most frequent question was if an “HPV vaccine is effective in preventing cervical cancer or protected against cervical cancer

and genital warts” with respectively the rate of 68.1%, 67, 6% and 68.5% so most of the student don’t know about the safety of HPV vaccine. This because in our study most of the answer options of the students as I don’t know, thus in the option “no” 38, 5% of the students indicated they have never heard of HPV vaccine”.

Table 10. Distribution of the correct answer rate questions on HPV vaccines knowledge.

HPV Vaccines Knowledge	n	%
I heard about the HPV vaccine	55	25.8
HPV vaccines are more effective if given to people who have never had sex.	50	23.4
The HPV vaccine isn't effective in preventing cervical cancer	52	24.4
The HPV vaccines offer protection against cervical cancers	48	22.5
The HPV vaccine offers protection against genital warts	52	24.4
The HPV vaccine is needed	96	45.07
HPV vaccine produces a stronger immunological response in adolescents aged 9-14 years.	49	23
The HPV vaccine can be used in both men and women.	69	32,4
The HPV vaccines offer protection against all sexually transmitted infections	16	7.5

Table 10 shows the total points on each question related to the HPV vaccine knowledge recorded by each of the 213 students in this study.

Globally, the rates of 1 point on each question are less than 50%. Indeed, the question with the highest rate of 1 point within this question about whether the HPV vaccine is needed: there are 96 (45.07%) participants who affirmed that vaccine is needed; the second-highest rates is a question about which gender the vaccine can be used by, so

69 (32.4%) of the students have affirmed the HPV vaccine can be used by both male and female and those students are recorded 1 point on this question.

The question with the lowest rates of good answers is about the fact whether the HPV vaccine can protect against all sexually transmissible infections. Therefore, there are only 16 (7.6%) students who knew this question was false and recorded 1 point on these questions.

Table 11. The level of knowledge of the student regarding HPV vaccine (n=213)

Level of HPV vaccine knowledge	n	%
low level [0-3]	109	51.1
middle level [4-6]	84	39.5
high level [7-9]	20	9.4
Total	213	100,0

Therefore, table 11 shows the level of knowledge of the student about the HPV vaccine. there are 109(51.1%) students who have a low level of knowledge (0-3) and around 84(39.5%) have the middle score level of knowledge (4-6), in spite the predominance of a low-level knowledge among the student, there are 20 (9.38%) students who have a high score level of knowledge between (7-9). The majority of the students have a low knowledge related to the HPV infection.

Table12. Correlation between the HPV vaccine knowledge score and Socio-demographic variable (n=213)

Socio-demographic Variable		HPV vaccine Knowledge score Mean \pm SD	r	P*
Gender	Female	3.81 \pm 2.12	-0.105	0.124
	Male	3.34 \pm 2.2		
Religions	Christian	3.62 \pm 2.1	-0.049	0.476
	Muslim	3.41 \pm 2.28		
Faculties	Engineering	3.32 \pm 2.21	0.094	0.168
	Law	3.74 \pm 2.13		
Social security	No	3.01 \pm 2.19	0.224**	0.001
	Yes	3.95 \pm 2.0		
Age	18-20	3.60 \pm 2.34	-0.028	0.683
	21-25	3.57 \pm 2.08		
	26-33	2.66 \pm 2.49		

Spearman's correlation

Table12 shows the relation between the score about HPV knowledge and each socio-demographic characteristic of the students. There was a statistically significant correlation ($r=0.224$ $P=0.001$) between social security and the score of the HPV vaccine Knowledge. Students with social security (3.95 \pm 2.0) have more chance to have a light score of the HPV vaccine than students without social security (3.01 \pm 2.19).

Table13. Correlation between the score of HPV vaccine knowledge and behaviours variable (n=213)

Behaviours Variable		HPV vaccine Knowledge score	r	P*
		Mean ± SD		
Active Sexual	Yes	3.18±2.11	0.120	0.07
	No	3.72±2.20		
Tabaco consummation	Yes	3.44±2.06	0.014	0.830
	No	3.52±2.20		
Having genital warts	No	3.25±2.13	0.253*	0.000
	Yes	4.67±2.03		
Go to the doctor for genital warts	No	3.37±2.19	0.159*	0.02
	yes	4.33±1.94		
Been vaccinated (HPV)	No	3.59±2.22	-0.073	0.288
	Yes	3.19±1.96		
Talk to parents of sexual matters	Yes	3.44±2.04	-0.02	0.765
	No	3.54±2.23		

***spearman's correlation test**

*****Correlation is significant at the 0.01 level (2-tailed). **Correlation is significant at the 0.05 level (2-tailed). r: coefficient of correlation, p: Value.**

Table13 shows the relation between the score about HPV vaccine knowledge and behaviours of the students.

Indeed, we found a statistically significant weak positive correlation between ($r = 0.253, p = 0.00$) the score of HPV vaccine knowledge and the fact to have genital warts by students.

The mean score of the students who don't have the genital warts is significantly lower (3.25 ± 2.13) than the mean score of students having genital warts (4.67 ± 2.03), we can say the high knowledge of vaccine is associated with the fact to have genital warts.

In the same logic, we found a statistically significant weak positive correlation between ($r = 0.159, p = 0.02$) the score of HPV vaccine knowledge and the fact to have a medical consultation by the students.

The mean score of the students who have been in medical consultation is significantly lower (3.37 ± 2.19) than the mean score of students who do not go to the doctor (4.33 ± 1.94). So, the score of HPV vaccine increase with the fact the subject has or is going to the medical consultation.

Table14. Comparison of the mean score of HPV vaccine knowledge between the socio-demographic variable (n=213)

Socio-demographic variables		The score of HPV vaccine knowledge		
		Mean \pm SD		P
Class level		3.52 \pm 2.108		0.18
first	second	4 \pm 1.85	3.06 \pm 2.05	0.09
Second	Third	3.06 \pm 2.05	3.37 \pm 2.22	0.445
Third	Fourth	3.37 \pm 2.22	3.810 \pm 2.40	0.971
Economic situation		3.52\pm2.18		0.003
Low	Equal	4.32\pm2.10	2.94\pm2.11	0.000
Equal	More	2.94 \pm 2.11	3.18 \pm 1.86	0.856
Low	More	4.32\pm2.10	3.18\pm1.86	0.044

*One-way ANOVA test

Table 14 shows the difference of the knowledge score among the students in each socio-demographic characteristic and behaviours towards the HPV vaccine using ANOVA test. The mean score of students on the subgroup of the economic situation was (3.53 ± 2.18) and the p-value of the economic situation and score of knowledge ($p=0.003$) is less than a significant level of 0.05. Thus, there is a statistically significant difference between the score of HPV vaccine Knowledge and the economic situation of the participants. A Post-hoc analysis shows that the mean score (4.32 ± 2.10) of the students with an economic situation where the income is lower than the expense is statically significant ($p=0.00$) higher than the mean score of students where the income is equal than expense (2.94 ± 2.11). The calculation of interaction between these, show that students with the low economic situation have 9.3% of chance to have the high score about the knowledge of HPV vaccine than the students having a high economic

situation. On another side, there is also a statistically significant difference between the mean score of the students with the economic situation where income is low than expense (4.32±2.1) and the students with income more than expense (3.18±1.86). Students in low economic situations are likely to have higher knowledge about the HPV vaccine than students in a good financial situation.

Table15. Comparison of the mean score of HPV vaccine knowledge between the variables (n=213).

Socio-demographic variables		The mean score of HPV vaccine knowledge			
		Mean ±SD		χ^{2**}	P
Marital status		3.52±2.18		18.255	0.000
Married	Boy-girl friend	4.14±2.10	3.33±2.3	001564	0.211
Single	Boy-girl friend	2.87±2.076	4.14±2.102	18.113	0,000
Married	Single	3.33±2.3	2.87±2.076	0.598	0.439
Age of early intercourse		3.62±2.14		12.27	0.002
11-15	16-18	3.45±2.45	3.09±2.02	0.302	0.583
16-18	19-23	3.09±2.02	4.30±1.93	11.805	0.001
19-23	11-15	4.30±1.93	3.45±2.45	4.478	0.034

****Kruskal Wallis test**

Table15 shows the relation and difference of the knowledge score among the students in each socio-demographic characteristic and behaviours towards the HPV vaccine using the Kruskal Wallis test.

Thus, the resulting test shows the existence of a moderate statistically significant ($\chi^2=18.255$, P= 0.00) difference between the score of HPV vaccine Knowledge among different types of the marital status of the participants. A Post-hoc analysis shows that the mean score of participants who are married (4.14±2.102) are statistically significant (p=0.00) higher than the mean score of single students (2.87±2.076). The calculation of interaction between these shows that married students have 18.55% of chance to have a higher score knowledge about HPV vaccine than single students.

In this part, there is no statistically significant difference between the mean score of the students having boy or girlfriend and the married students.

There is also a statistically significant difference ($\chi^2=12.27$ P= 0.002) between the score of HPV vaccine knowledge and the age of the first intercourse when the age is up to 18 years old the score of knowledge increase. The mean score (3.09 ± 2.02) of the knowledge about HPV vaccine of students who have the first sexual intercourse between 16-18 year old is statistically significant ($\chi^2 = 11.805$ P=0.001) lower than the mean score (4.30 ± 1.93) of students with the age of first intercourse between [19-23] years old. The means score (3.45 ± 2.45) of the knowledge about HPV vaccine of students who have the first sexual intercourse between 11-15 year old is statistically significant (4.478 P=0.034) lower than the mean score (4.30 ± 1.93) of those who have between [19-23] year old.

Table 16. Correlation between the scores of the vaccine knowledge and the HPV knowledge of the students (n=213)

The score of the knowledge	Mean \pm SD	R	P*
Knowledge on HPV infection	6,08 \pm 4,17	,522**	,000
Knowledge on HPV vaccine	3,52 \pm 2,18		

*Pearson correlation test

**Correlation is significant at the 0.01 level (2-tailed). r: coefficient of correlation, p:

Value

Table 16 shows the relation between HPV knowledge and HPV vaccine knowledge of the students, the result shows that there is a statistically significant strong positive correlation ($r = 0.522$, $P < 0.05$) between HPV Knowledge and HPV vaccines knowledge of the participants. So, when the mean score of HPV knowledge increases the score of the HPV vaccine also increases and vice-versa. The more the level of knowledge on HPV infection is low, the lower the knowledge on the HPV vaccine.

Table 17. The student's information source's regarding HPV infection and vaccine (n=213)

HPV source of information	N	%
Doctor	28	13.14
nurse/midwife	8	3.75
Family	38	17.84
Tv	19	8.92
Internet	113	53.05
From teacher	7	3.28

Table 17 shows the different sources of the provenance of the student knowledge about HPV and its vaccine, therefore, the main source of the information of the students was respectively internet 113(53.05 %) the most second source was family 38 (17.84%) and only respectively 28 (13.14%) and 8 (3.7%) of the students were informed by the doctor or nurse. Only 7 (3.28%) of the students declare the teacher as informer about the HPV infection.

CHAPTER FIVE

5.0 DISCUSSION

Prevention of HPV infection included vaccination and avoiding of the risk factor passing by the medical or sexual education. This study revealed that majority of students may have exposure behaviours to HPV infection because the majority of the students were sexually active (62%), had never talked with their parents about the sexuality (75.6%) (Table 2). In Africa society, sex education is still considered like taboos and intercourse before getting married is not approved mostly in the Islamic religion (Hamdi, 2018). In our study, most students have never gone to a doctor (84.5%) (Table 2). Despite this predominant risky behaviours, majority of the participants were not vaccinated against HPV infection (80.8%); HPV vaccine in African countries is not accessible, the systematic review studies noticed that only six countries among all the sub-Saharan African countries had the qualifications to practice HPV vaccination nationwide (Perlman, et al., 2014). (Almobarak, et al., 2016). A Zambian study reported that the vaccine was implemented through selection as certain schools do not have permission in the vaccination program because they were not registered (Nyambe, et al., 2012). Low rate of vaccinated but the light percentage of sexual activity mean that our participant is in risk, this risk can be reduced if intercourse they can use a condom, unfortunately, an African data showed that more educated people are susceptible to use less condom during intercourse (Zuilkowski, et al., 2012).

5.1. Discussion of the HPV infection knowledge

In this study, few students had already heard about HPV infection (34.3%) (Table3). This result is similar with a study conducted in Nigeria among students showed only 17.7% of participants had ever heard of HPV infection, this can be explained by the fact that majority of our participants were from Nigeria, our result was also similar to that of Ugandans that 88.2% of the participants had been reported to have never heard of HPV (Mukama, et al., 2017).

Hence, in developing countries, there is lack of medical awareness and health care, this could be attributed to the program of study as knowledge of HPV in the medical area is high. For example, a study conducted among medical university students in Cyprus showed 88.5% of them had heard of HPV infection previously (Farazi, et al., 2019) . Also, in our study, the most picked options in the questionnaire about the knowledge of HPV infection was “I don’t know” (68.5%) (Table 3) which was about if the HPV infection can cause cancers of the anus, vulva, vagina, penis, and oropharynx. This result is different compared to a Chinese study where 46.6% of the participants knew that HPV cause cervical cancer (Almobarak, et al., 2016). The second highly picked option was “no” (43.2%) which represented in our study the proportion of students who never heard of HPV infection. Therefore, it has been found in our study that the major things students know about the risk factor of HPV infection was the proper use of condoms can reduce the risk of transmission. Only (40.4%) (Table 3) affirmed that sexual contact with an HPV partner is a risk factor for HPV which represented the highest rate of the correct answer in this study, this result was similar to a study which showed the most correct answer about a risk factor of the HPV infection (Hoque, et al., 2013). In the current study, only (39.4 %) (Table 3) of students

knew that HPV infection is transmitted to both men and women and only 39.9% of student affirmed to knowing possible methods of protection against HPV infection, even if it has been proving that majority of the students don't know that HPV is a sexually transmissible disease (Mabelele, et al., 2018). It was found in our study that the least correct answer was obtained from the question; if HPV infection causes genital warts only in women (6.1%) (Table 3). These results were in concordance with the previous study, although being male is a significant predictor for earlier sexual acts and sexual activity or behaviours exposing to HPV infection (Osazuwa-Peters, et al., 2019). Male students may think that they do not need to protect themselves and change the exposure behaviors because of the HPV infection cannot affect them. Based on this statement, important attention should be given to men during awareness programs by health professionals (Gypsyamber, 2009). Also, the second item with a lowest correct answer concerned if multiple sexual partners is a risk factor (9.1%), this result was similar to that of a Cameroonian study which showed that majority of the participants didn't know if sexual intercourse with an infected partner is a risk (Nkfusai, et al., 2019). So, the students ignored that having more sexual partners increased the risk of infection because there is a high probability to be in contact with an infected partner.

The highest percentage of a positive response in this study was found on the item related to the risk factor of HPV especially if sexual contact with someone infected is a risk factor (40.4%) (Table 4). Although this percentage represents the highest rate of our study, it is low compared to the standard mean (50%), the sexual path is one of the main ways of HPV transmission; things ignored by the majority of young people, the lack of knowledge is the main cause of exposure behaviours found here (MY, et al., 2019). The sexual behaviours are the main predictors, the actor of sexually

transmissible disease which has always been a huge health problem of young people (Kapiga, et al., 1995).

Our results showed that the mean score knowledge out of 20 of about the HPV infection was low ($6,08 \pm 4,17$), the majority of the participants had a low level of knowledge (51.17%) (Table 5). This result was the same with to the results from Hanley, et al showing that the mean scores out of 13 were 2.74 ± 3.22 the knowledge of his participants about HPV was also extremely poor (2014). But the funding of others the studies among students studying in the medical area showed the high level of Knowledge like in the study of Farazi, et al. (2019). This difference can be since most of the respondents are from developing countries and are not medical students. Besides, the result of a study comparing the HPV knowledge among in medical program and other program showed that proportion of correct responses about HPV infection of the medical school students significantly high than the students of the other faculties (Charalambous, et al., 2020).

We found that high knowledge about HPV is associated with the non-sexual activity, there was a difference between the mean score of HPV the knowledge among sexually active student and non-sexual active, our result was different from previous research which showed a similarity of the mean score of HPV infection knowledge among those engaging in sexual activity and those without sexual activity (Farazi, et al., 2019). Hence, students who are not sexually active are more attentive to information about sexual infection before becoming sexually active.

In our study, the score of HPV infection knowledge was significantly affected by the age of the first intercourse. When the age of first intercourse is up to 18-year-old the score of knowledge increase (Table 8). This was similar to what was found in a Turkish

study where sexual intercourse was a significant factor of increasing awareness about HPV infection (Durusoy, et al., 2019). The virgin people in mature age usually find the necessary information about the sexual infection to see how they can prevent their self in case they want to be sexually active. Early intercourse is a risk factor of HPV infection as the results of a previous study indicated that prevalence of high-grade squamous intraepithelial lesions (HSILs) is high among women who had their first intercourse onset 13-16 years old (Caldeira, et al., 2017). The student had early intercourse because of the low knowledge and lack of sexual education (Valentino, et al., 2016).

In our study, the level of the class impacted significantly the score of the knowledge of students (Table 8). There was a statical significant difference in knowledge score between the class levels. In our study, student of the first year has a significant probability to get a high score of knowledge than students in the second year of school and no significant difference observed between the second year with the third year and third year with the fourth year. The results of Staples, et al., correlates to the result of our study as elderly individuals are more probable to be found in higher class level. Furthermore, a study conducted in the developed country found that 77% of students over 21years old have more probability to uptake a Pap test (2018). We can explain this result by the fact that in our case, majority of students coming from (Africa) and in Cyprus the sexual education course offered by the university is optional as well as no sponsored government screening Pap test (Boonstra, 2015); The study of Charalambous, et al. showed that there was no observable difference in mean scores knowledge about HPV infection across the class level of the students (2020).

The economic situation of participants involved in this study impacted their score of HPV infection knowledge, having a higher monthly income was revealed to be +associated with the high level of knowledge about the HPV infection (Table 8). This result was similar to research in the study of (Mukama, et al., 2017) .

Furthermore, medical consultation which is the best way for people to learn about HPV in developing countries is not readily accessible because the medical charges are high and there is little or no support from the government (Christodoulou, et al., 2019). Given the low economic status of the people, the cheapest and quickest way to find relevant information about an infection is the internet (which was the main source of information in our study 53.8%). A study revealed that people within the low economic class know the importance of Pap test when compared to people within the high economic class and the majority of them declared that if the screening test was free, they will undergo it (Javaeed, 2019). Implementation of a screening program of cancer permit awareness about risk factor but in most developing countries the Pap test is not free (Shetty, et al., 2019).

In our study the score of HPV infection knowledge is impacted by the marital status, of the participants, students that are couples are more likely to have a high score in the knowledge of HPV infection than single students (Table 8). This may be since married students may have been to the hospital at least one-time in their life for a gynaecology consultation. However, the studies have shown that married women are more likely to be willing to undergo a Pap test (Touch, 2018) (Bansal, et al., 2015). Our result was different from that of previous studies where it was shown that marital status has no relationship to the level of knowledge about the HPV infection (Mapanga, et al., 2019), (Schlumbrecht, et al., 2014), (Hanley, et al 2014).

5.2. Discussion of the vaccine knowledge

To prevent HPV infection effectively it is important to combine both the strategy of avoiding the risk factor and receive a correct dose of HPV vaccine before having first intercourse; in our study, a few proportions of students (25.8%) had ever heard about the HPV vaccine (Table 9). This result was the same with the survey in Cameroon which showed that only 7% of the women had already heard about the HPV vaccine (Dakenyo, et al., 2018). But this result was different from the result previous studies in conducted in developed countries showed a higher percentage of participants who have already heard about the HPV vaccine such as in Italy (80.4%) (Matranga, et al., 2019), and in South Carolina (90.6%) (Kasymova, et al., 2019). However, this rate is high compared to data based on a previous study in countries with a low or mild economic situation like in Turkey (40.8), (Cinar, et al., 2019) because the Turkish government do not have a Pap screening program (Ozyer, et al., 2013). This difference can be explained by the fact that in developed countries, the awareness program is implemented and supported by the government and more advanced, compared to developing countries (Gamaoun, 2018).The primary prevention of HPV infection begging through the knowledge or awareness that leads or impacted willing of vaccine and permits reduction of the HPV infection risk (Pierre, et al., 2014). In this current research, the most picked option for the question about the knowledge of HPV vaccine was “I don’t know” (68.5%) (Table 9) which concerned if “HPV vaccine is effective in preventing cervical cancer or protects you against cervical cancer and genital warts” and before the first intercourse; most students don’t know the importance and the rule of HPV vaccine this can explain the low frequency of students who are vaccinated.

In this research, the highest rate of the score where the students got positive score about the questions on the HPV vaccine was if the HPV vaccine is needed (45.7%), the main reason of willing HPV vaccine is linked with their perception of a probability for them to develop HPV infection in the future (Jeannot, et al., 2019) . The vaccine was needed and they want to protect themselves if even they don't know what is it for, but not all the students had the willing to take it, maybe because of some factor like religion and culture which can affect their decision (Ilter, et al., 2010), one of a reason it also the women belief that HPV vaccine has a side effect on fertility (Koç, 2015). Also, a study among medical students showed a significant association between the program and the intention to receive the HPV vaccine (Shetty, et al., 2019). But the knowledge about HPV vaccine doesn't always guarantee that people can accept the vaccine because another study showed that 48.54% of nursing students unvaccinated declared unwillingness to receive the vaccine (Swarnapriya, et al., 2015). And another study showed that there were only 82% of medical students who have declared they can recommend the HPV vaccine to their friend or family and 40 per cent of them said they were unhappy in educating patients on the HPV vaccine because the HPV vaccine could induce side effects. (Afonso, et al., 2017).

The second item with the highest rate of the correct answer was about HPV vaccine can be used for both men and women (32.4%) (Table10). Our result was similar to the result of a study that showed clearly that 69.7% of participants didn't know between men and women who the vaccine was meant and among the participant those who answered, the majority said the vaccine women only (Cinar, et al., 2019). Although this represents our second-highest rate it is low, our result can confirm the theory affirming that men can consider themselves unaffected by the HPV infection

(Rathfisch, et al., 2015); a study showed that women are more interested to take the vaccine compared to the men (Monteiro, et al., 2018). Another study showed that women had a significantly high knowledge of HPV and vaccination than men (Drokow, et al., 2020).

In our study, almost all students have come from lower-middle-income countries the high prevalence of cervical cancer in Africa makes women the priority group who have received the HPV vaccine, in some African country the free HPV vaccine is available for only girls (Chido-Amajuoyi, et al., 2019) . However, the vaccinal coverage still reduces compared to developed countries (Turner, et al., 2018) . And the knowledge of students and young people about HPV in the study is adequate (Sherman, et al., 2018).

However, in our study, the majority (92.5%) of students thought the HPV vaccine can protect them from all types of sexual infection and wish to receive the vaccine (Table10). An African study showed that the willing of the vaccine depending on the accessibility to the HPV vaccine and 92% of participant declared if there was an HPV vaccine available, they will take it (Azucena, et al., 2018). Having an antecedent of STI among the parents and adolescents is a predictor of the intention of receiving a vaccine against an STI (Zimet, et al., 2005).

The lack of knowledge relates to HPV vaccine among our participant is high, it has been found the category of the low level of HPV vaccine knowledge was predominant (51.1%) in our study (Table11). This result was different from research in Cyprus among medical students were 61% of participants had a high score (Farazi, et al., 2019). This can be explained by the fact that the curriculum course of our participants doesn't contain the course related to the HPV hence, which are the origin of a high rate

of the right information in another study (Edina, et al., 2020). The predominance of African students here should explain the low level of knowledge since the systematic analysis found that all noted low levels of knowledge, three reported no knowledge, and two reported moderate knowledge among 16 studies investigating knowledge of cervical cancer in sub-Saharan Africa, HPV infection and HPV vaccine (Perlman, et al., 2014). Besides, noted that Chinese women have also in general a low level of knowledge regarding HPV (Tang, et al., 2019).

In this study the social security impacted the score of the HPV vaccine knowledge, students with social security had more chance to have a light score of the HPV vaccine than students without social security (Table12). This was close to previous study results, which found that 78.06 per cent of participants reported that the key reason why they were not vaccinated even after receiving the HPV medical education program was due to the high cost of the vaccine (Joshi, et al., 2020). In developed countries, access to the HPV vaccine or medical consultation is dependent on financial status, and most of our participants do not have social insurance, vaccination and medical care can be difficult for foreign students to benefit from because of language or of the cost medical care, as vaccination depends on the status of migrant or citizen. (Lin, et al., 2019).

We found that the highest recorded score on HPV vaccine knowledge was associated with the fact of having genital warts (Table13). This can explain by fact that the student going to the consultation or internet to found the answer about their genital warts. Also, the score of HPV vaccine increase with going to the medical consultation. This can be explained by the fact that during their going to the hospital the doctor or nurse can provide them with awareness about the HPV infection (Costa, et al., 2020). Rathfisch,

et al found that 74.1% women who had ever heard from HPV infection were willing to get the vaccine (2015).

The score of HPV vaccine Knowledge was impacted by the economic status of our participants (Table14). Students in low economies were more likely to have high knowledge about the HPV vaccine than students having a good financial situation. This can be explained by the fact that the people who know that they don't have enough money are not able to go to the hospital and uptakes the vaccine because it's not free. So, knowing their financial situation they take all precaution (information) to know how to avoid the infection. the vaccine cost is one of the main barriers to receive the vaccine in the majority of studies (Holman, et al., 2013) .

Our study demonstrated that the marital status of the participants impacted on the score of HPV vaccine knowledge, the participant who married are more likely to have more HPV vaccine knowledge than the single students (Table15). This can be linked to the fact that married people have been already to the hospital may be for prenatal consultation or before getting married, and a study proved that married women make the PAP smear test mostly than single women (Dakenyo, et al., 2018). But WHO recommended taking the vaccine before getting sexually active (WHO, 2019).

We found a relation between HPV Knowledge and HPV vaccines knowledge of the participants (Table16). When the scores of HPV infection are low the score of the HPV vaccine is low when is high the other is also high. Our result was similar to the result of a previous study showing that knowledge of HPV infection predicted the knowledge and willing of HPV vaccine (Dönmez, et al., 2019). Awareness about the HPV leads to the changing of exposure behaviours and obtain the HPV vaccine. The finding was similar to the result of (Daniel, et al., 2019).

In this current study majority of the participants have been informed through the internet (53.05%), and only 3.75% were informed by the nurse (Table 17). The previous study where the majority of participant got low knowledge about HPV infection and vaccine, was because they have been informed by the internet (Dakenyo, et al., 2018). Compared to a study where students got enough knowledge about HPV the main source of information was education (Widjaja, 2019) Thus, in our study, there were only 3.28% of students informed by the teacher but in other studies, it has been found in the many others studies that education and training in school impacted the behaviours of students toward the HPV vaccine (Evans, et al., 2020) (Chanprasertpinyo, et Rerkswattavorn., 2020; Koç, 2015). The internet is not the right source of information about HPV because it cannot change the place of medical awareness by a professional (Swarnapriya, et al., 2015); A study had shown that 61.1% of women who took HPV vaccine was because it has been recommended by their doctor (Shaikh, et al., 2019). Uptakes a Pap smear among the students is conditioned by the quality of information receive (Almobarak, et al., 2016). The best and appropriate source of HPV knowledge or awareness is professional healthcare because they have enough knowledge which can be used to counsel the people about HPV and applied their role of potential immunizers (Daniel, et al., 2019). The efficacy of the medical education has been proved through experimental research which showed a statistically significant change observed at post-test (after application of education) as compared to pre-test scores (Ford, et al., 2020) The information should be following with complementary interventions as specific education for increased knowledge about HPV infection and vaccine, the HPV knowledge or awareness impacted the

intention to uptake the vaccine but cost of the HPV vaccine can still be one of main barrier (Leung, et al., 2019).

Conclusion

Our study aimed to evaluate the knowledge and behaviours of the students toward HPV infection and vaccination conducted among international student who more than ten countries were present. These findings can be considered as international, we found that international students in this sample need to be warned and informed about HPV infection because HPV is the most prevalent sexual transmissible disease in the world.

We found that the students have low knowledge about HPV infection and vaccine. However, they present low protectant behaviours even though they can be impacted by the religion and culture, the exposure or risk behaviours of HPV infection are caused by the lack of knowledge about this infection and this leads to the negligent of importance or taking of vaccine. If after more years, those students persist with their exposure behaviours to HPV infection they can probably be infected by the HPV in future. In summary, HPV is a dangerous infection-causing huge damage in the world, especially in developing countries. It is high prevalence among young people necessary to improve the primary prevention methods and it is crucial to reduce this prevalence otherwise shortly it will continue to increase. Indeed, Nurse should provide enough knowledge about the risks factor of HPV for change exposure behaviours and encourage the vaccination that are the best methods to avoid these , among the young people because they are most exposed to the HPV. So, determine the barriers that affect the implementation of primary prevention are crucial in the fight against HPV.

CHAPTER SIX

6.0 RESULTS AND RECOMMENDATION

6.1 Results

Our study aimed to evaluate the knowledge and behaviours of the student toward HPV infection and Vaccination, based on the research questions of this research, the following conclusions are reached;

1. There is low and limited knowledge of the students about HPV in all section of our study, knowledge gaps of international students about the HPV vaccine
2. Most of the students presents the exposure behaviour of risk to be infected by the HPV but only 19.2% were vaccinated against HPV and 62% were sexually active knowing the majority of them are single (Table2).
3. Only 34.2% of students have ever heard about HPV and only 9.4% knew sexual intercourse with multiple partners as the risk factor of the HPV infection and 40.8% of the students think that the genital warts are concerned only the women. The first most thing that students do not know whether HPV can cause cancers of the anus, vulva, vagina, penis, and oropharynx with 68, 5% of the rate. 39.4% affirmed there is a way to protect (Table3). The mean score of knowledge about HPV infection is (6.08±4, 17), however, 59.15% of the participants have a low level of knowledge (0-7) and around 39.45% have the middle level of knowledge (8-14); The mean knowledge score for HPV infection is (6.08±4, 17), but 59.15 per cent of participants have a low level of knowledge (0-7) and around 39.45 per cent have a medium level of knowledge (8-14); considering the low level among students, 1.40 % have a high level of knowledge (15-20) (Table5).
4. There is a highly significant ($p < 0.005$) link between the risky behavior of students or their socio-demographic indicators with the HPV infection level of knowledge such as sexual activity, early intercourse, class level, economic status and marital status of students (Table6-8).

5. In this study 25.8% of student who has ever heard about the HPV vaccine, there were 7.5% of students knew the HPV vaccine cannot protect from all sexual infections, only 45% of them affirm the HPV vaccine is the need and only 32.4% declare it can be used in both male and female people(Table9). Majority of them have low and limited 109(51.2%) knowledge about the HPV vaccine and around 84(39.4%) have the middle score level of knowledge (4-6). There were few 20(9.4%) students who have a high score level of knowledge between (7-9), the mean score for this section is (3, 52±2,181) (Table11).

6. There is a statistically significant ($p < 0.005$) correlation between the behaviours of the students or their social-characters with the score of HPV vaccine knowledge recorded by the students such as the fact to have genital warts, go to the medical consultation, state of their economic situation, and their marital status (Table12-15).

7.The relation between HPV knowledge and HPV vaccine knowledge of the students has been shown here through the statistically significant and strong positive correlation ($r = 0.522$, $P < 0.05$). Found between HPV knowledge and HPV vaccines knowledge of the participants. The level knowledge of the students on HPV infection impacts their level knowledge on HPV vaccine (Table16).

8. The main source of information about HPV is the internet (53.05%); only 3.75% were informed by the nurse or midwife about the HPV infection (Table17).

6.2 Recommendations

Based on the findings of the study, the followings are recommended:

1. The university to organize in English of the seminar for awareness international students about HPV infection.
2. The university, should be added a sexual health course in departments other than health, as a compulsory course and this course should include HPV and HPV vaccine topics.
3. The immigration should add Pap test among requires medical exam test during the

process of establishing the student residence permit in Cyprus.

4. The nurse or medical students, of Near East University should organized each year a campaign for sexual education among the students.

5. The ministry of health of Cyprus in collaboration with the ministry of education should implement the strategies to make the HPV vaccine and screening test free and accessible.

6. Determine the reason why some international students do not express the need for vaccination.

7. The knowledge about the HPV vaccine is higher among people among students with a low economic situation compared to the students with a high economic situation, we recommended to conduct a study about the behaviours of the people with the low economic situation regarding HPV infection.

8. To international students of the engineering and law department of the Near East University, we recommend avoiding the risk factors of HPV infection.

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APPENDICES

Appendix 1:

Questionnaire:

I. Socio Demographic Character

1. What is your gender Female Male
2. What is your country?.....
3. What is your religion? Christian Muslim Traditional religion
4. How old are you? -----
5. What is your department?
Law Engineering
6. What is your class level? 1 2 3 4
7. What is your economic situation?
Income is lower than expenses
Income is equal to expenditure
Income more than the expense
8. Do you have social security? Yes No
9. What is your marital status? Married In couple/ boyfriend Divorced

II. Characteristic of behaviors and status about HPV and vaccine

1. Are you sexually active? Yes No
2. What is your first sexual intercourse age?.....
3. Are you smoking? Never Rarely Often Every time
4. Do you talk to your parents about sexual matters? Yes No
5. Did you go to the doctor for a genital wart? Yes No
6. Do you have genital warts? Yes No
7. Are you vaccinated? Yes No

III. HPV Knowledge			
	I don't know	Yes	No
1. I heard of HPV infection			
2. HPV infection has screening test			
3. HPV types 16 and 18 cause the majority of cervical cancer and pre-cancerous cervical lesions			
4. HPV have always symptoms			
5. HPV is transmitted through sexual contact			
6. Starting sexual activity at a young age is a risk factor for HPV.			
7. HPV infection haven't any treatment			
8. HPV infection sometimes has no symptoms			
9. Multiple sexual partners are a risk factor for HPV			
10. HPV infection causes genital warts only in women			
11. There is a diagnostic test to determine HPV			
12. HPV can cause cancers of the anus, vulva, vagina, penis and oropharynx			
13. There are no ways to protect against HPV infection			
14. HPV infection can be treated.			
15. HPV isn't transmitted infection			
16. Sexual contact with an HPV partner is a risk factor for HPV.			
17. Proper use of the condom reduces the risk of genital warts.			

18. HPV is transmitted to both men and women			
19. Is smoking a risk factor for HPV			
20. All types of HPV cause cancer.			
21.. What is your source of information about HPV? Doctor <input type="checkbox"/> nurse/midwife <input type="checkbox"/> My family <input type="checkbox"/> friend <input type="checkbox"/> Internet <input type="checkbox"/> TV <input type="checkbox"/> From school <input type="checkbox"/> Other			
IV. HPV Knowledge			
1. Have you ever heard of HPV vaccine	I don't know	Yes	No
2. Is the HPV vaccines are more effective if given to people who have never had sex?			
3. Is HPV vaccine not is effective in preventing cervical cancer			
4. Is the HPV vaccines offer protection against most cervical cancers			
5. Is the HPV vaccines offers protection against genital warts			
6. Is HPV vaccine is needed?			
7. HPV vaccine produces stronger immunological response in adolescents aged 9-14 years.			
8. Can HPV vaccine be used in both men and women?			
9. The HPV vaccines offer protection against all sexually transmitted infections?			

Appendix 2:

Ethical approval from the university

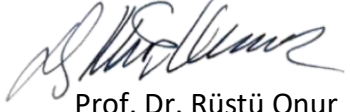


YAKIN DOĞU ÜNİVERSİTESİ
BİLİMSEL ARAŞTIRMALAR ETİK
KURULU

ARAŞTIRMA PROJESİ DEĞERLENDİRME RAPORU

Toplantı Tarihi : 28.05.2020
Toplantı No : 2020/79
Proje No : 1098

Yakın Doğu Üniversitesi Hemşirelik Fakültesi öğretim üyelerinden Yrd. Doç. Dr. Serap Tekbaş'ın sorumlu araştırmacısı olduğu, YDU/2020/79-1098 proje numaralı ve **“Assessment of Knowledge and Behavior of The Students of Toward Human Papillomavirus and Vaccination in Near East University”** başlıklı proje önerisi kurulumuzca online toplantıda değerlendirilmiş olup, etik olarak uygun bulunmuştur.



Prof. Dr. Rüştü Onur

Yakın Doğu

Üniversitesi Bilimsel

Araştırmalar Etik Kurulu

Başkanı

CURRICULUM VITAE

NAME, SURNAME:	DAINA CHARNELLE FOUANG
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Educational Level

YEAR	GRADE	UNIVERSITY	FIELD
Feb. 2019 to the present	Master student	Near East University	Nursing: women health and gynecology
2014-2017	Bachelor	Université Des Montagne (UDM)	Heath sciences: reproductive health/midwifery
2006-2014	Baccalaureate /Advanced level examination	Government high school of Bafia- Cameroon	Mathematics and earth sciences

Foreign Languages	Reading comprehension	Speaking*	Writing*
English	Good	Good	good
French	Very good	Very good	Very good

Computer Knowledge

Program	Use proficiency
Ms Office	Very good
SPSS	good