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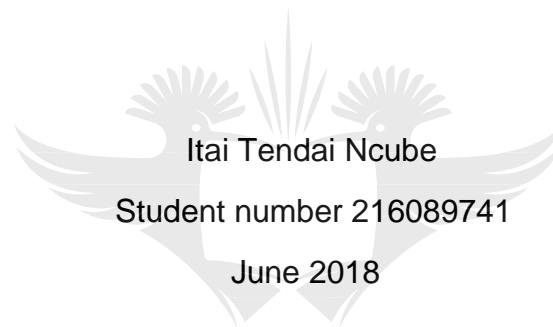
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**Assessment of Awareness, Knowledge, Attitude towards the Human Papillomavirus Infection and Vaccine Acceptability among University of Johannesburg Students.**

A full research Dissertation presented to the  
Faculty of Health Sciences, University of Johannesburg,  
In fulfilment for the Master's degree in  
Biomedical Technology

By



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**DEDICATION.**

I dedicate this work to my daughters Christina, Lynda, Chloe and Zoe. Whose love and admiration provides me the strength to keep challenging myself.



## **ABSTRACT.**

**Background:** The Human Papillomavirus (HPV) is one of the most common types of sexually transmitted infections (STIs) in South Africa. Increasing evidence suggests that HPV is implicated in 99.7% of cervical cancer cases worldwide. In South Africa, the highest infection rates of HPV are found in sexually active women under the age of 25 years. The burden of cervical cancer is compounded by the high prevalence of human immunodeficiency virus (HIV) and a lack of a cervical screening programme. Risk factors include sexual debut at an early age, smoking, previous history of sexually transmitted infections (STIs) and multiple sexual partners. College students are often perceived as being at high risk due to peer pressure, which often leads to risky sexual behaviour. Given the high burden of HPV infection and cervical cancer deaths in South Africa, there is a need to educate and raise awareness of HPV infection and the HPV vaccine among young adults under the age of 25 years. This study was undertaken to assess the awareness, knowledge, attitude towards HPV and vaccine acceptability among the University of Johannesburg students.

**Methods:** A cross-sectional survey involving 150 conveniently selected University of Johannesburg students was conducted from July to October 2017. The respondents were selected proportionally from each of the four campuses of the University of Johannesburg. A self-administered structured questionnaire was utilised to collect information on socio-demographic factors, sexual behaviour, awareness and knowledge of HPV infection as well the vaccine, the willingness to recommend HPV vaccine and preferred source of information about HPV. The Pearson Chi-square test or Fischer exact test were used comparative analysis between factors that influenced HPV awareness. Sociodemographic and behaviour characteristics of the respondents are presented in graphs, charts, frequencies, percentages and standard deviation. Logistic regression analysis was used to identify factors independently associated with being aware of HPV.

**Results:** HPV awareness was poor, with 32.7% (49) of the students reported to have heard about HPV. Of these, 38 of the students knew that HPV is the cause of cervical cancer and 66 (44%) were aware that they could be easily infected with HPV. Only 18.7% of participants knew of the HPV vaccine and 33.3% of these knew that the vaccine protected against cervical cancer. Female participants were three times more likely to be aware of HPV (adjusted odds ratio [aOR]: 2.92; 95% CI: 1.09-7.84,  $p=$

0.033) than male participants and non-Black Africans were eleven times more likely to be aware of HPV than Black Africans (aOR: 11.4; 95% CI: 1.47-87.8, p=0.020). Having zero or one sexual partner in the past year was associated with being more knowledgeable about the HPV vaccine and these respondents were more likely to recommend the HPV vaccine to family and friends (p= 0.045). The Internet (63.3%), radio (61.3%) and Facebook (58.7%) were identified to be good platforms for raising the awareness and knowledge of HPV.

**Conclusion:** Awareness and knowledge of HPV was poor among the university students, highlighting the need for continued efforts to raise awareness about HPV and the HPV vaccine. Social networking sites such as Facebook, the Internet and media such as radio can be useful platforms for imparting knowledge and enhancing awareness of HPV and its vaccine.



## **ACKNOWLEDGEMENTS.**

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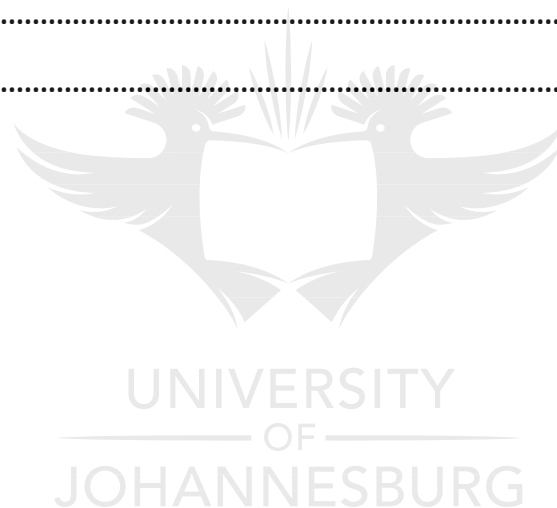
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## **LIST OF ABBREVIATIONS.**

ADA: Art Design and Architecture.

ASIR: Age Standardised Incidence Rate.

CI: Confidence Interval.

DoH: Department of Health.

EBE: Engineering and the Built Environment.

Edu: Education.

EFS: Economic Financial Services.

ICC: Invasive Cervical Cancer.

HIC: High Income Countries.

HIV: Human Immunodeficiency virus.

HR: High Risk.

HPV: Human Papillomavirus.

HSC: Health Sciences.

HSV: Herpes simplex virus.

LR: Low Risk.

LMIC: Low and Middle Income Countries.

LSIL: Low Grade Squamous Intraepithelial Lesions.

ORs: Odds Ratios.

aORs: Adjusted Odds Ratios

Pap smear: Papanicolau smear

UJ: University of Johannesburg.

SD: Standard Deviation.

SNS: Social Networking Sites.

STIs: Sexually Transmitted Infections.



WHO: World Health Organization.



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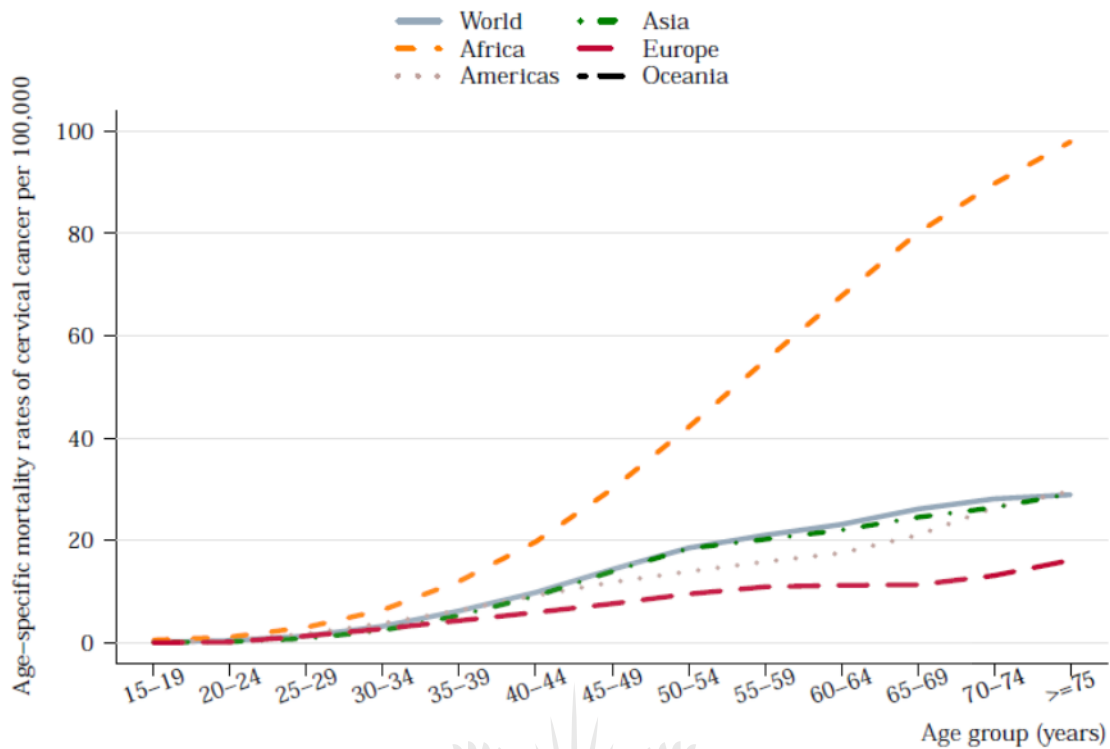
## **CHAPTER 1**

### **1.1 Introduction.**

The Human Papillomavirus (HPV), is one of the most common sexually transmitted infections (STIs) of the reproductive system in both men and women (Schiffman *et al.*, 2007). The human body, however clears 98% of the HPV virus and only 2% of HPV infection persists to progress to precancerous lesions which can progress to cancer even though most infected individuals do not exhibit signs and symptoms for a considerable time (Bosch *et al.*, 2002). Persistent infection with HPV may result in disease such as cervical cancer and penile cancer (Schiffman *et al.*, 2007; Chiang *et al.*, 2016). There are more than 100 types of HPV that have been identified, the types are categorised into the Low risk (LR)/non-oncogenic and High risk (HR)/oncogenic groups (Ferlay *et al.*, 2015; Bosch *et al.*, 2002). The Low risk group (type 6 and 11, etc.) are responsible for genital warts and the High risk group (type 16 and 18, etc.) are responsible for precancerous lesions, which if left untreated may result in cancer (Ferlay *et al.*, 2015; Schiffman *et al.*, 2007). Infection with HPV is associated with oropharyngeal and anogenital cancers and other conditions in both men and women (Ho *et al.*, 1998; Moodley *et al.*, 2006; Schiffman *et al.*, 2007).

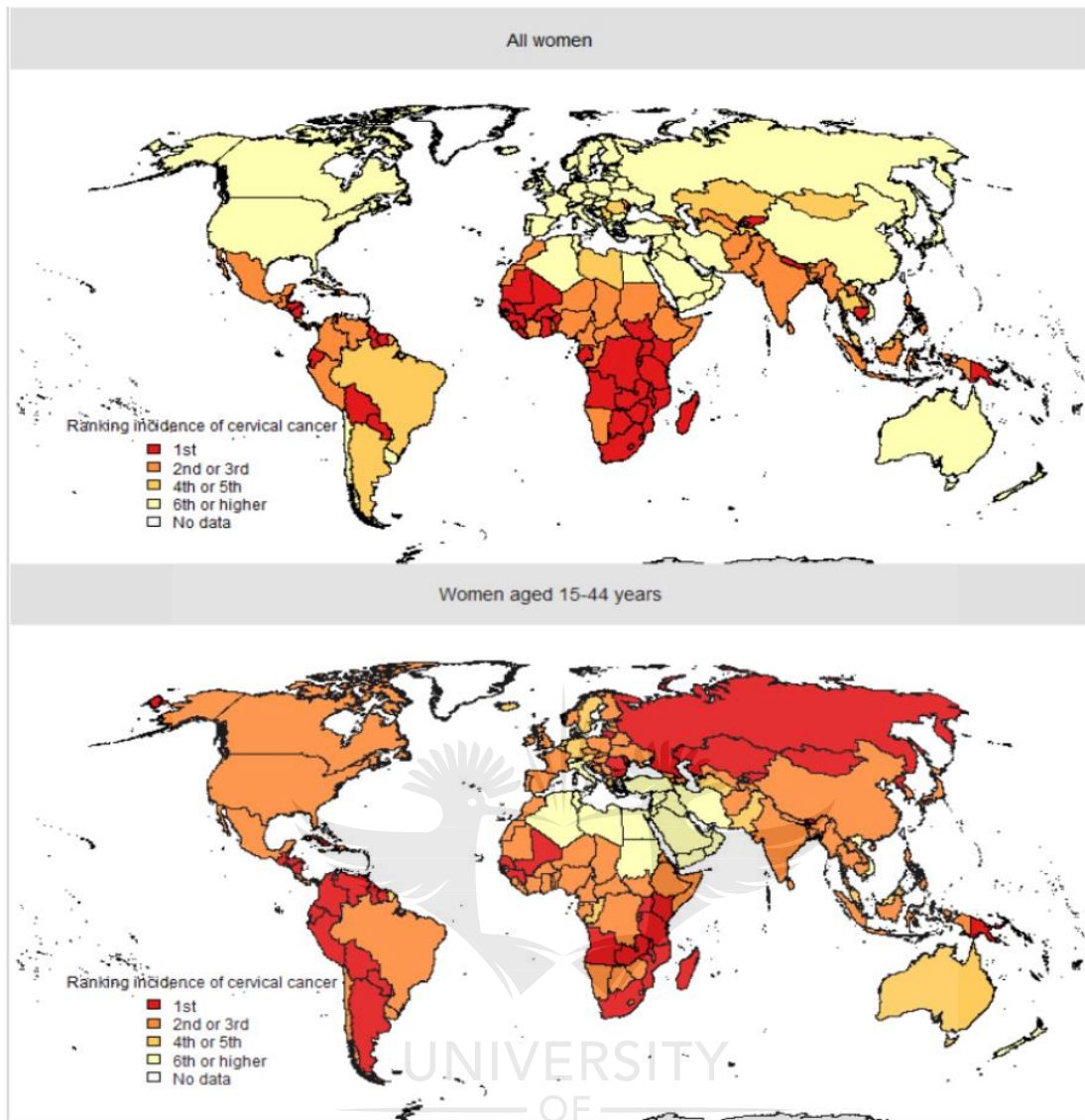
### **1.2 Literature review.**

Poor awareness and inadequate resources for the testing and prevention of HPV related diseases is one of the main reasons why invasive cervical cancer (ICC) has a high prevalence in the low and middle income countries (LMIC) (Kawonga and Fonn 2008, World Health Organization (WHO), 2010, Mupepi *et al.*, 2011). This is compounded by the lack of structural resources and personnel to screen patients which leads to low awareness of HPV as a cause of cervical cancer, oesophageal cancer and other anogenital cancers (Kawonga and Fonn, 2008; Jordaan, 2017).



**Figure 1: Showing Age specific mortality rates of cervical cancer per 100.000. (Used with permission from Bruni *et al.*, (2017) Appendix 7).**

HPV has been identified as the main cause of cervical cancer, which is the second most common cancer in women (WHO 2010). In 2012, there was an estimated 527,600 new cases and 265,700 associated deaths worldwide (Ferlay *et al.*, 2015). HPV prevalence in Africa is 21%, and cervical cancer prevalence in sub-Saharan Africa is high (Ferlay *et al.*, 2015). The age standardised incidence rate (ASIR) indicates that 38.2/100,000 women annually will develop cervical cancer (Denny, 2010). This is also influenced by the high prevalence of HIV infection (Clifford *et al.*, 2016). More than 85% of cervical cancer deaths are in low and middle income countries and the average chance for a woman to die from cervical cancer before age 75 is three times higher in LMIC than in high income countries (HIC) (Figure 1) (Ferlay *et al.*, 2015).



**Figure 2: Showing global incidence of cervical cancer for all women and women aged 15-44 years. (Used with permission from Bruni *et al.*, (2017) Appendix 7).**

Globally Sub-Saharan Africa has one of the highest prevalence of cervical cancer in women aged between fifteen to forty-four years of age (Figure 2) (Bruni *et al.*, 2017). This high incidence of cervical cancer is fuelled by sexually transmitted infections (STIs) and/or HIV. In particular, previous South African studies demonstrated that there was an estimated 6.4 million people living with HIV in 2012 (HSRC, 2012), 17% of women attending antenatal clinics had had at least one urogenital tract infection and between 49% to 90% of women attending family planning clinics had at least one STI (PhamKanter *et al.*, 1996; Clifford *et al.*, 2016).

In a cohort study on 6555 women between the ages of 35-65 years, of which 782 were HIV seropositive (i.e. HIV prevalence was 11.9%), it was shown that participants with

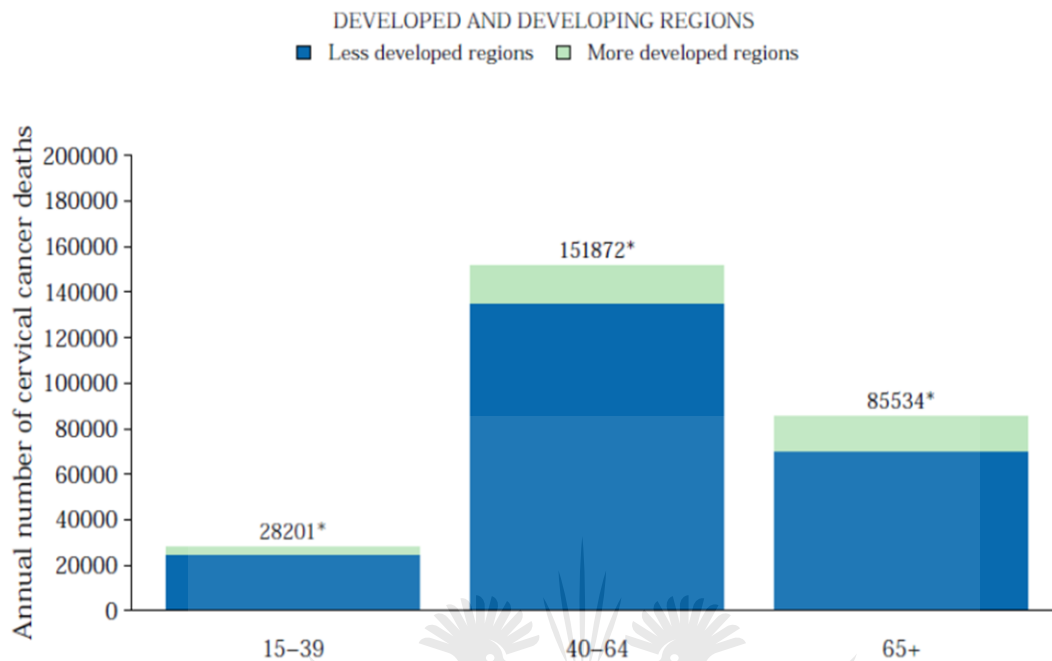
HIV infection were more likely to have another STI compared to HIV negative women (Wang *et al.*, 2011). The study also found that women who seroconverted to HIV positive had a 49.1% prevalence of HPV infection (Wang *et al.*, 2011). It is important to note the likelihood of being infected with HPV is dependent on the number of sexual partners and unsafe sexual practices. Research shows that the prevalence of STIs and HIV is as a result of early sexual debut (i.e. before 16 years of age) and having more than five lifetime sexual partners (Lopez and McMahan, 2007, Wang *et al.*, 2011). Another study conducted on women between the ages of 18-35 years deduced that the rate of new HPV infection was 2.9% per month, the highest rates being observed for HPV types 16, 39, 84 and 51 (Giuliano *et al.*, 2000). The observed results were also dependent on whether the women in the study had had more than one new male sex partner in the recent past (Giuliano *et al.*, 2000). These findings suggest that many people are making risky sexual decisions and are probably not aware of the implications.

The issue of having HIV and HPV coinfection leads to an increased risk of developing Low Grade Squamous Intraepithelial Lesions (LSIL) as stated by Wang *et al.*, (2011) and Clifford *et al.*, (2016) in their respective studies. Wang *et al.*, (2011) found that women who were HIV negative at the beginning of their study and subsequently seroconverted during the course of the study had an increased risk of developing low grade cytological abnormalities. This was attributed to mucosal immune dysfunction because of the early stage of HIV infection possibly influencing HPV related diseases. Similarly both Moodley *et al.*, (2006) and Clifford *et al.*, (2016) concluded that HIV is an important enhancer of HPV induced carcinogenesis. This finding is very important for Sub-saharan African countries that are home to the majority of the global population of HIV positive women. The aforementioned researchers further found that HPV 16 was the most frequently detected type among HIV positive women with ICC (42.5%) followed by HPV 18 (22.2%), HPV 45 (14.4%) and HPV 35 (7.1%) respectively.

Other co-factors that have been linked to cervical cancer development include smoking, the use of intrauterine devices and long term use of oral contraceptives (Vail-Smith and White 1992, Ho *et al.*, 1998). The general population on a day-to-day basis



uses these products; however, most women that use these products are not aware of their link to cervical cancer.



**Figure 3: Annual number of cervical cancer deaths between less developed and developed regions. (Used with permission from Bruni *et al.*, (2017) Appendix 7).**

Persistent infection with High Risk HPV and coinfection with HIV appears to be the reason behind the high incidence rate of ICC in the LMIC, leading to high frequency of mortality (Jordaan, 2017). The differences in the number of deaths reported for the LMIC compared to high income countries is notable (Figure 3). This highlights that LMIC are lacking in awareness campaigns and strategies to reduce the burden of HPV related diseases. Most LMIC have poor mortality records, thus cases of HPV related deaths are being underreported (Ferlay *et al.*, 2015). The underreporting of HPV related deaths may explain the lack of urgency in implementing policies and programmes to raise awareness and screening for HPV related diseases in LMIC.

In South Africa, cervical cancer is the second most common cancer among women. In 2014 there were 5735 new cases of cervical cancer with 3027 associated deaths, and the incidence of cervical cancer is reported to be between 21.97 and 23.15 per 100 000 South African women as compared to the global average of 15.8. Even with high mortality and morbidity rates, South Africa still lacks an effective well implemented

population-wide screening program (Department of Health (DoH), 2014, National Cancer Registry, 2014, Jordaan, 2017).

In South Africa, another well-documented problem which exacerbates the acquisition of HPV, leading to the development of ICC, is a lack of informed health workers, infrastructure and medical equipment especially in government hospitals, Jordaan, (2017) who found that majority (73.0%), of doctors work in the private sector supports this. The doctor to population ratio in South Africa is 0.77 per 1000 patients and 45.1% of nurses are responsible for 80% of the population's primary health care (Jordaan, 2017). These issues probably explain why there is a lack of awareness and knowledge of HPV and its related diseases. South Africa commenced a population based free pap smear screening programme in the year 2000 among women aged 30-50 years but have not achieved the projected 70% coverage rate among target women. To achieve maximal coverage of screening programmes in the country, public enlightenment campaigns about HPV infection and its associated cancers among young adults are of essence.

In a study conducted on women between the ages of 18-23 years in KwaZulu Natal, South Africa, the study found that the prevalence of HPV was 76.3% which further supports this supposition, other factors that influences prevalence are HIV and teenage pregnancies (Ebrahim *et al.*, 2016; Masilo and Makhubele, 2017). The same study by Ebrahim *et al.*, 2016 also found that infection with multiple and single HPV genotypes was 56.3% and 20.1% respectively. This suggests that an urgent intervention strategy is needed in South Africa, as the situation is serious. This is especially true for the population group who are more likely to make risky sexual decisions (i.e. college students/young adults), as research has highlighted that condom use is low (49.5%) and women who do not live with their partners had a high prevalence (54.5%) of HR HPV infection (Lopez and McMahan, 2007; Ebrahim *et al.*, 2016).

Men and women in their twenties, especially those between the ages of 20-24 years have been found to be at high risk of HPV acquisition, with much of this high rate of infection being found among college students (Lambert, 2001, Steben and Duarte-Franco 2007). College students are usually lacking in knowledge about HPV, cervical cancer, cervical cancer screening methods, types of HPV and vaccine types available

(Lambert, 2001; Rashid *et al.*, 2016; Mulatu and Motma, 2017). Knowledge, attitude and practices exhibited by college students are important factors for vaccine uptake. Research on female college students highlighted that 84% of female participants were motivated to vaccinate against HPV if the recommendation came from a medical practitioner and if the HPV vaccine protected against both genital warts and cervical cancer (Chikandiwa and van Wyk, 2013). These findings are presenting an opportunity to get medical practitioners involved in promoting the HPV vaccine; however, it will only be focusing on one side of the coin. Males who are vectors of infection need to be surveyed to understand how to get them vaccinated. This is very important, as it will ensure that the fight against new HPV infections can be won because there are many factors that can prevent vaccination for males such as stigma.

Stigma was found to be a barrier to HPV vaccination among college men as a result of religious beliefs (i.e. having sexual relations before marriage) and testing positive for HPV DNA (Cuschieri *et al.*, 2006; Waller *et al.*, 2007). Jones *et al.*, (2016), supports this; their results pointed out that ethnicity, province of residence and being unaware that the HPV vaccine is offered for males enhanced stigma levels. In South Africa, the government commenced free HPV vaccination for public school girls aged 9-12 years, in the year 2014 (DoH 2014). The bivalent and quadrivalent vaccines are being offered to young girls aged 9-12 years (Botha *et al.*, 2015). However due to lack of awareness of HPV and its vaccine, there are misconceptions and negative attitudes from health workers and parents about the HPV vaccine (Allie and Moodley, 2012). Vaccinating before sexual debut is more efficacious, better understanding of HPV, its transmission could possibly help with lowering stigma levels. This can lead to more people getting vaccinated and/or getting tested for HPV to allow for vaccination and prevent the acquisition of HPV (Cuschieri *et al.*, 2006).

Some High-income countries recognised that males must be aware and protected against HPV infection and its related cancers. In addition, sexual transmission of HPV from male to females can increase the risk in females. HICs currently vaccinate both male and female against HPV. However, in South Africa, males are currently not being vaccinated. Thus, the present study is important to know the knowledge, attitude and practices of males to vaccination, in anticipation for a change in national policy to include HPV vaccination for males.

The perceived susceptibility to HPV is also a factor to the acquisition of HPV, as this links directly with the health belief model. The health belief model is directly influenced by the likelihood of acquiring a disease or infection, the severity of the disease, perceived vaccine benefits and barriers, and cues to action (Chikandiwa and van Wyk, 2013). Studies of college age students suggest that majority of students do not feel at risk of acquiring an HPV infection. This directly affects their health belief and their willingness to vaccinate against HPV because of poor knowledge on HPV acquisition, other diseases linked to HPV and the importance of vaccination (Lopez and McMahan, 2007; Chikandiwa and van Wyk, 2013; Barnard *et al.*, 2017). Sexual abstinence education is not effective in reducing the likelihood of college students having sex (Lopez and McMahan, 2007). This is because students rely on their peers for information about sexual relations more than they do from older adults for example parents and/or priests. It is of paramount importance that innovative ways to educate young and older adults alike about the risks of having multiple sex partners be implemented to highlight the likelihood of HPV infection acquisition (Lopez and McMahan, 2007; Ngidi *et al.*, 2016).

Another study which interviewed college students between the ages of 18-26 years, suggested that factors that lead to prevalence of STIs as a result of risky sexual behaviour were peer pressure, poor communication between students and parents, desire for love, social status and the shortcomings of abstinence programmes (Ngidi *et al.*, 2016). These factors also indicate a need for intervention efforts that can help reduce the prevalence of not only HPV but other STIs as well. This can be achieved by raising awareness of STIs and providing platforms that can allow students to interact with health workers on a one to one basis. Social networking sites (SNS) can be utilised as platforms that can allow for dialogue between health workers and students (Zhang *et al.*, 2015). This will allow factually correct information to be provided and questions to be answered on matters regarding sex education, while at the same time highlighting the consequences of risky sexual behaviour.

### **1.3 Rationale for the study.**

Sub-Saharan Africa has a high prevalence of cervical cancer with women between the ages of 15-44 years the most affected. There is also a high mortality rate in LMIC that is compounded by the prevalence of HIV. The prevalence of HIV leads to the occurrence of cervical cancer to decrease by ten years among HIV positive women, which makes it important to educate young adults who are at increased risk of HIV and HPV in South Africa. Early onset of sexual intercourse increases the acquisition of HPV infection together with the number of sexual partners (Wang *et al.*, 2011). HPV is a health issue of concern, with little or no information circulating among the population group, which is usually affected by HPV (i.e. college students/young adults). This study was aimed at determining whether university students were aware of HPV and its risk factors, whether they had sufficient knowledge to allow for increased understanding and perception of HPV, thus preventing misconceptions about HPV. It will add to the existing body of facts, the knowledge, attitude and practices of males in South Africa to HPV and the HPV vaccine. The study also focused on finding better ways of providing information about HPV so as to alleviate the current situation of poor knowledge and high infection rates as suggested by previous research (Lopez and McMahan, 2007; Chikandiwa and Van Wyk, 2013).

### **1.4 Study hypothesis.**

Inadequate awareness and knowledge on the subject of Human Papillomavirus (HPV) leads to misconceptions, poor knowledge and understanding of the risk factors associated with HPV and its related disease.

**1.4.1 Null hypothesis (Ho):** Awareness and knowledge of HPV infection and vaccine is high among the university students.

**1.4.2 Alternative hypothesis (H1):** Awareness and knowledge of HPV infection and vaccine is low among the university students.

### **1.4.3 Aims and Objectives.**

This study was undertaken to assess the awareness, knowledge, attitude, towards the Human Papillomavirus and vaccine acceptability among the University of Johannesburg students.

The specific objectives of this study were:

- To assess awareness of HPV and its related disease.
- To assess knowledge of HPV and attitude towards HPV vaccination.
- To identify factors associated with knowledge, awareness and attitude of HPV infection and vaccine uptake.
- To identify the best source of information for increasing knowledge and awareness of HPV infection and its vaccine.



## **CHAPTER 2**

### **Methodology.**

#### **2.1 Study design.**

This quantitative comparative cross sectional study was conducted at the University of Johannesburg (UJ) on all four campuses: Soweto campus, Auckland Park Bunting Road campus, Auckland Park Kingsway campus and the Doornfontein campus. Quota sampling was utilised such that participants were proportionately allocated to each of the four campuses based on the number of enrolled student (see section 2.4 below). The convenient sampling technique was utilised by selecting every second consecutive consenting student leaving the library and/or Primary Health Centre. Participants were made aware of the study by the use of study advertisements and by word of mouth.

#### **2.2 Study setting and population.**

The study was conducted at the University of Johannesburg. Participants were both male and female students from UJ regardless of faculty and academic year of study. UJ enrolled about 40,608 students in 2017 (Appendix 9) and offers a range of undergraduate and postgraduate programmes. There are eight faculties: Art, Design and Architecture, Economic and Financial Sciences, Education, Engineering and the Built environment, Health Sciences, Humanities, Law and Science. The University is multicultural, comprising of Africans, Coloureds, Whites, Indians and Asians. Most students were from Johannesburg and surrounding areas. Some students lived with their parents, and some lived in rented accommodation, while most lived in residences provided by the University.

#### **2.3 Eligibility criteria.**

Inclusion criteria: all students within the 18-35 year age range attending at the University of Johannesburg were asked to participate in the study.



## 2.4 Sample size Calculation.

**Table 1: Number of enrolled students per campus in 2017.**

Campus	No. of enrolled students	Percentage	Sample per campus
Soweto campus	9734	<b>0.24</b>	<b>36</b>
Auckland Park Bunting Rd campus	6665	<b>0.16</b>	<b>25</b>
Auckland Park Kingsway campus	11219	<b>0.28</b>	<b>41</b>
Doornfontein campus	12990	<b>0.32</b>	<b>48</b>
Total	40608	<b>1.00</b>	<b>150</b>

Participants for the study were both male and female students registered at UJ in 2017 (n=40608). The number of enrolled students was obtained from the senior faculty officer of Health Sciences (Appendix 9). Using a population of 40608 and based on the previous estimated HPV awareness of 22.7% and knowledge of 9.3% (Chikandiwa and Van Wyk, 2013). The sample size was calculated using Epi Info™ (Appendix 10),

the Epi Info utilised the formula:  $n = \frac{Z^2 \times p \times (1-p)}{c^2}$

Z is the value from standard normal distribution corresponding to the desired confidence interval, i.e. (z=1.96 for 95% CI).

P is the expected true proportion between 9.3%-22.7%.

C is the desired confident interval precision at 0.05.

Based on the input for population survey, the sample size was estimated to be 138 participants. To account for non-responses, assuming that there would have been a 10% attrition rate, the extra 13 participants were calculated as follows:

$$\text{attrition rate} = \frac{10}{100} \times 138 = 13.8$$

To get a sample size of 151 participants however, 150 participants were recruited which were deemed minimum for the study. The **Soweto campus** has four faculties i.e. Education (Edu), Economic and Financial Services (EFS), Management and Humanities with an estimated 9734 number of students. **Auckland Park Bunting Road (APB)** campus has three faculties i.e. Management, Art Design and Architecture (ADA), Tourism and Hospitality with an estimated 6665 number students. **Auckland Park Kingsway (APK)** has five faculties i.e. Law, EFS, Science, EBE and Management with an estimated 11219 students. **Doornfontein campus (DFC)** has



four faculties i.e. EBE, Health Sciences (HSC), Science and Management with an estimated 12990 students. Using the above proportions 25 participants from APB campus, 41 participants from APK, 48 participants from DFC and 36 participants from Soweto campus were selected and recruited (Table 1).

## **2.5 Data collection.**

Data was collected over a period of one hundred and twenty days from the month of July to October 2017. The selected students who agreed to participate in the study were given time to read the letter of information which explained the purpose of the study and how confidentiality was going to be maintained. The researcher answered questions to clarify concerns about anonymity and potential gains when required. Participants were requested to sign the consent form and answer the pretested, structured self-administered questionnaire developed from literature (Shaffiee *et al.*, 2013; Waller *et al.*, 2003). Permission was obtained from previous authors to utilise previous questionnaires (Appendix 7). The questionnaire was self-administered, closed-ended and anonymous. It was pretested on 20 students at the Doornfontein campus prior to the conducting of the study to determine efficacy and correct any highlighted issues. After the pre-test, question 2 in section B was modified to ensure that only the participants that indicated they had heard of HPV answered the questions relating to HPV knowledge. The participants that were involved in the pre-test were excluded from the main study. The questionnaire (Appendix 5) allowed for quantitative data collection on socio-demographic characteristics, awareness of HPV, knowledge of HPV, perception of HPV, knowledge of HPV vaccination and what the efficient ways of making people aware of HPV would be.

## **2.6 Statistical Analysis.**

Data obtained from the study was entered on to Excel and imported to the Statistical Package for Social Sciences v23. Chi-square, Cramer's V and Fischer's exact tests were used to describe factors associated with HPV awareness, perception and knowledge. Logistic regression analysis using 95% CI was used to evaluate factors associated with awareness, perception and knowledge of HPV. Descriptive statistics such as frequencies, percentages, means and standard deviation were also used to calculate the data. The results are presented in tables and graphically using clustered bar charts and/ or pie charts. Responses to the questionnaire were used to calculate the knowledge scores.

## **2.7 Ethical considerations.**

Ethical approval (Appendix 8) was obtained from the University of Johannesburg's Faculty Academic Ethics Committee; ethics number (REC-01-43-217). Permission to carry out the study at UJ clinics was obtained from Sr. Geya (Primary Health Care manager) before commencing with the study (Appendix 2). The students who participated in the study were informed that participation in the study was voluntary and that they could choose to withdraw from the study at any time before and during the conduct of the study. Written informed consent was obtained from each participant before administration of the questionnaire. Confidentiality and anonymity were maintained at all times.



## CHAPTER 3

### Results.

#### 3.1 Description of the study participants.

The demographic and behavioural characteristics of the study participants are shown in Table 2. Of the 150 participants, 61 (40.9%) were male and 88 (59.1%) were female with a mean age of 21.44 years ( $\pm 2.3$  SD). Most participants were African (92.7%) with a majority (34.0%) in their second year of undergraduate studies. Half of the participants (50.0%) reported to be residing in university residences. More than eighty percent (84.0%) indicated that they were sexually active and in a relationship. 33.3% of participants indicated they had had two to three sexual partners in the past year, with less than half (41.3%) of participants indicating that they engage in safer sex practices. Of the 150 participants, one (0.6%) and three (1.9%) indicated to having been diagnosed with genital herpes and genital warts respectively.

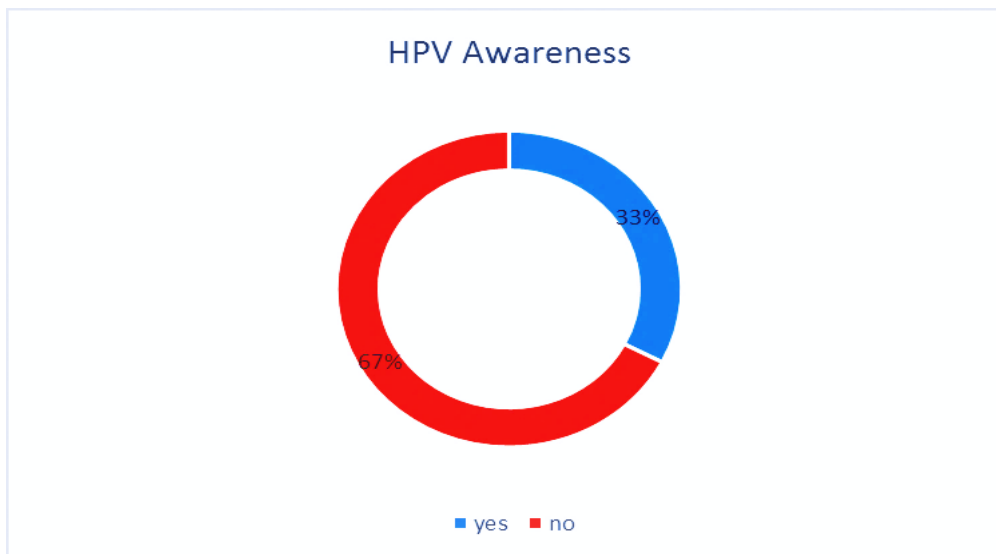


**Table 2: Demographics and behavioural characteristics of participants (n=150).**

<b>Characteristics</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
<b>Age (years)</b>		
18-21	80	53.3%
>21	67	44.6%
<b>Gender</b>		
Male	61	40.94%
Female	88	50.06%
<b>Ethnicity</b>		
African	139	92.7%
coloured	3	2.0%
Asians/Indians	5	3.3%
White	3	2.0%
<b>Year of study</b>		
1 <sup>st</sup> year	41	27.3%
2 <sup>nd</sup> year	51	34.0%
3 <sup>rd</sup> year	22	14.7%
4 <sup>th</sup> year	25	16.7%
Other/honours/masters	11	7.3%
<b>Faculty</b>		
Art, Design and Architecture	7	4.7%
Economic and Financial service	33	22.0%
Education	11	7.3%
Engineering and the Built Environment	34	22.7%
Health Sciences	29	19.3%
Humanities	10	6.7%
Law	4	2.7%
Management	17	11.3%
Science	5	3.3%
<b>Place of Residence</b>		
Commune	19	12.7%
Residence	75	50.0%
Renting a flat/house	28	18.7%
Parents	25	16.7%
other	3	2.0%
<b>Behavioural characteristics</b>		
In a relationship	126	84.0%
Sexually active	126	84.0%
More than one sexual partner in the last year	50	33.3%
<b>#Practice of safe sex</b>		
Never	13	8.7%
Rarely	12	8.0%
Sometimes	23	15.3%
Often	40	26.6%
Always	62	41.3%

# use of condoms, practice of monogamy, and use of non-penetrative methods

### 3.2 Knowledge of HPV infection and the vaccine.

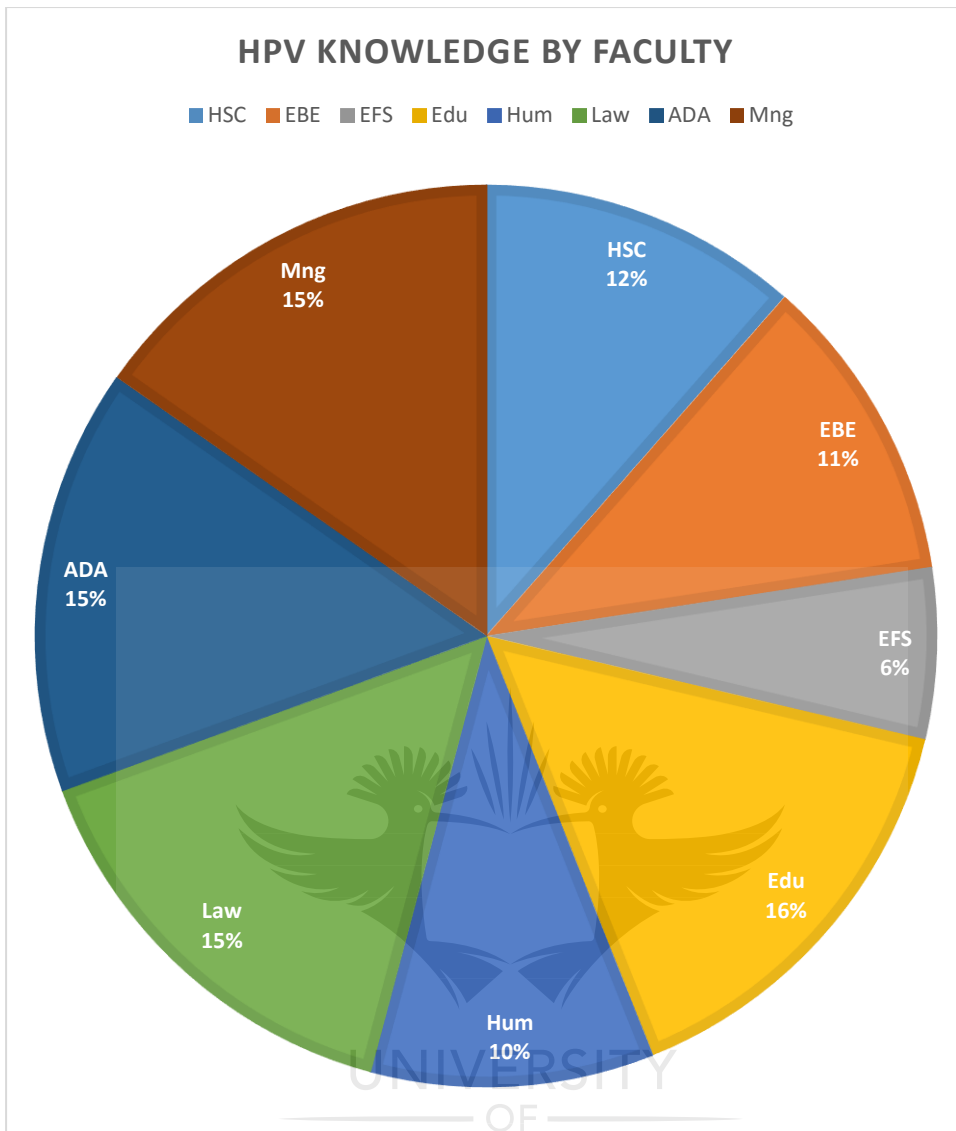


**Figure 4: HPV awareness amongst participants.**

Of the 150 participants, only 49 (32.7%) had heard of HPV (Figure 4) meaning that awareness of HPV was low. Among the 49 participants who had heard of HPV, the knowledge level was inadequate, with (75%) stating condoms protect against HPV and only 32.7% knew that HPV could be passed from parent to child. Most of the participants did not answer questions pertaining to HPV knowledge correctly, with less than seven (14.2%) of the participants who indicated they had heard of HPV being able to answer all seven questions pertaining to HPV correctly. Looking at the whole population (n=150), it can be deduced that awareness and knowledge of HPV was poor, with only thirty-eight (25.3%) and forty-six (30.6%) of participants indicating that HPV is the main cause of cervical cancer and genital warts respectively. In this study school (36.4%) was the main source of information for the participants who had heard of HPV, followed by the media (19.7%), the Internet (15.2%), at the doctor's (i.e. Clinician/Primary Health Provider) (12.1%), while friends and other which encompassed participants hearing of HPV because of work related health training were (12.1%) and (3%) respectively. Even though school was the main source of information, the awareness and knowledge of HPV was poor. Table 3 outlines the questions that were used to test for knowledge of HPV, HPV vaccine awareness and the sources where participants obtained their knowledge of HPV.

**Table 3: Knowledge and awareness of HPV and HPV vaccine.**

Knowledge and awareness	Frequency	Percentage
<b><i>Knowledge items</i></b>		
HPV is the main cause of cervical cancer	38	25.3%
Men carry HPV	45	30.0%
HPV is sexually transmitted	49	32.6%
HPV causes genital warts	46	30.6%
Condoms protect against HPV	36	24.0%
HPV can be transmitted using public bathrooms	18	12.0%
HPV can be passed from parent to child	17	11.3%
<b><i>Awareness of</i></b>		
HPV	49	32.7%
HPV vaccine	28	18.7%
HPV vaccine being available for women in S.A	16	10.7%
<b><i>Source of HPV information</i></b>		
Media (TV, Magazine or Newspaper )	13	19.7%
Friend	8	12.1%
School	24	36.4%
At the Dr's (Clinician/Primary health care provider)	8	12.1%
Internet	10	15.2%
Other ( work health education workshop)	3	4.5%



**Figure 5: HPV knowledge by Faculty n=49.**

Students from all nine faculties participated in the study; Figure 5 highlights the faculty, which obtained better responses compared to other faculties. Participants from the faculty of Education (Edu) had the most correct responses, followed by Law, Art, Design and Architecture (ADA) Management (Mng), Health Sciences (HSC), Engineering and the built Environment (EBE), Humanities (Hum), and Economic and Financial service. None of the Faculty of Science participants had heard of HPV.

**Table 4: Comparison of HPV knowledge score by Faculty.**

Variable	Faculty							
	HSC(n=16)	EBE.(n=11)	EFS(n=5)	Edu(n=3)	Hum(n=3)	Law(n=2)	ADA(n=2)	Mng.(n=7)
<b>HPV is the main cause of cervical cancer</b>	75.0%	72.7%	40.0%	100%	66.7%	100%	100%	100
<b>Men can carry HPV</b>	93.8%	100%	60.0%	100%	100%	50%	100%	100%
<b>HPV is sexually transmitted</b>	100%	100%	100%	100%	100%	100%	100%	100%
<b>HPV causes genital warts</b>	93.8	90.9%	100%	66.7%	100%	100%	100%	100%
<b>Condoms protect against HPV</b>	18.8%	27.3%	40.0%	33.3%	33.3%	0.0%	50.0%	14.3%
<b>HPV can be transmitted using public bathrooms</b>	60.0%	63.6%	80.0%	66.7%	33.3%	100%	100%	42.9%
<b>HPV can be passed on from parent to child</b>	37.5%	18.2%	20.0%	66.7%	66.7%	50.0%	0.0%	28.6%



Table 4 outlines the questions used to test for HPV knowledge and how the different faculties performed for each question. However comparisons to see any statistical significance of knowledge of HPV amongst the faculties was not performed because some faculties (ADA, Law, Hum, Edu) had fewer participants compared to others (HSC, EBE, EFS, Mng) and this could have introduced bias, which could have led to inaccurate interpretation of the results.

The responses given by each gender to ascertain whether there was a knowledge difference between genders are presented in (Table 5).

**Table 5 Gender on the influence of HPV knowledge.**

<b>Question</b>	<b>Male</b>	<b>Female</b>	<b>P-value</b>
HPV is the main cause of cervical cancer	76.9%	77.8%	1.000
Men carry HPV	92.3%	91.7%	1.000
HPV is sexually transmitted	100%	100%	-
HPV causes genital warts	84.6%	97.2%	0.168
Condoms protect against HPV	38.5%	20.0%	0.263
HPV can be transmitted using public bathrooms	50.0%	66.7%	0.325
HPV can be passed on from parent to child	38.5%	30.6%	0.733

The findings suggest that gender did not influence knowledge of HPV, as there was no statistical significance. This was also the case when comparing gender and year of study with knowledge of HPV. Other variables such as year of study, faculty, and number of sexual partners, STI history and place of residence did not show any relationship with HPV knowledge, as results obtained were also not statistically significant.

Table 6 below, depicts predictors/ odds ratios that could have had a bearing on awareness of HPV and the effect each variable had concerning HPV awareness. The odds ratios were tested for participants that were aware of HPV and those that were not aware of HPV, they were tested amongst participants that were 18-21 years of age and those above 21 years, males were compared to females and Black Africans compared to non-Black Africans. The participants in their first years of study were compared to participants in their second year through to fourth year of study. The University residence was compared to other forms of accommodation, the faculty of Health Sciences was compared to other faculties. The participants that had zero sexual partners in the past year were compared to those that had one or more sexual

partners and the participants that indicated that they always practiced safer sex were compared to those that did not always practice safer sex. This verified how each variable had an effect on the participants' awareness of HPV.

The results highlighted that females were three times more likely to be aware of HPV (aORs: 2.92; 95% CI: (1.04-7.84);  $p= 0.033$ ) than males. For ethnicity Whites, Coloureds, Indian or Asian were grouped into one group (non-Black Africans), as their numbers were low and the combined group was compared against Black Africans. The findings indicated that non-Black Africans were eleven times more likely to be aware of HPV than Black Africans (aORs: 11.4; 95% CI: (1.47-87.8);  $p= 0.020$ ).



**Table 6. Predictors of Human papillomavirus Awareness among the university students in Johannesburg, South Africa (n=150).**

Characteristic	HPV awareness				Univariable analysis			Multivariable analysis		
	Yes		No		Unadjusted OR	95% CI	p-value	Adjusted OR	95% CI	p-value
	n	(%)	n	(%)						
<b>Age, yrs.</b>										
18-21	24	<b>48.98</b>	25	<b>51.02</b>	Ref					
>21	56	<b>55.45</b>	45	<b>44.55</b>	1.29	0.65-2.56	0.457	1.1.1	0.41-3.01	0.831
<b>Gender</b>										
Male	13	<b>26.53</b>	36	<b>73.47</b>	Ref					
Female	48	<b>48.00</b>	52	<b>52.00</b>	2.56	1.21-5.39	<b>0.014</b>	2.92	1.09-7.84	<b>0.033</b>
<b>Ethnicity</b>										
Black African	41	<b>83.67</b>	8	<b>16.33</b>	Ref					
Other (non-Black African)	98	<b>97.03</b>	3	<b>2.97</b>	6.37	1.61-25.2	<b>0.008</b>	11.4	1.47-87.8	<b>0.020</b>
<b>Year of study</b>										
1 <sup>st</sup> year	12	<b>24.49</b>	29	<b>28.71</b>	Ref					
2 <sup>nd</sup> year	13	<b>26.53</b>	38	<b>37.62</b>	0.82	0.33-2.08	0.686	0.49	0.16-1.48	0.208
3 <sup>rd</sup> year	10	<b>20.41</b>	12	<b>11.88</b>	2.01	0.69-5.90	0.202	2.08	0.51-8.47	0.306
4 <sup>th</sup> year	11	<b>22.45</b>	14	<b>13.86</b>	1.89	0.67-5.36	0.226	1.56	0.40-6.04	0.519
Other	3	<b>6.12</b>	8	<b>7.92</b>	0.91	0.20-4.01	0.897	0.75	0.10-5.29	0.769
<b>Place of residence</b>										
University residence	23	<b>46.94</b>	52	<b>51.49</b>	Ref					
Staying with parents	11	<b>22.45</b>	14	<b>13.86</b>	1.77	0.70-4.50	0.226	0.87	0.24-3.08	0.826
Renting a flat/house	11	<b>22.45</b>	20	<b>19.80</b>	1.24	0.51-3.01	0.629	1.06	0.36-3.15	0.915
Commune	4	<b>8.16</b>	15	<b>14.85</b>	0.60	0.18-2.01	0.411	0.68	0.16-2.90	0.603
<b>Faculty</b>										
Health and Science	16	<b>32.65</b>	18	<b>17.82</b>	Ref					
Economic and Management	12	<b>24.49</b>	38	<b>37.62</b>	0.36	0.14-0.91	<b>0.030</b>	0.37	0.11-1.17	0.090
Engineering and Architecture	13	<b>26.53</b>	28	<b>27.72</b>	0.52	0.20-1.33	0.176	0.79	0.25-2.46	0.682
Education and Humanities	8	<b>16.33</b>	17	<b>16.83</b>	0.53	0.18-1.55	0.247	0.55	0.15-2.06	0.375
<b>Number of sexual partners</b>										
0	10	<b>20.41</b>	14	<b>13.86</b>	Ref					
1	30	<b>61.22</b>	46	<b>45.54</b>	0.91	0.36-2.32	0.848	1.47	0.36-5.91	0.590
2-3	6	<b>12.24</b>	25	<b>24.75</b>	0.34	0.10-1.12	0.076	0.86	0.15-4.80	0.862

≥4	3	<b>6.12</b>	16	<b>15.84</b>	0.26	0.06-1.14	0.076	0.87	0.13-6.14	0.897
<b>#Safe sex Practices</b>										
Always	24	<b>48.98</b>	38	<b>37.62</b>	Ref					
Often	10	<b>20.41</b>	30	<b>29.70</b>	0.53	0.22-1.27	0.154	0.64	0.20-1.99	0.438
Sometimes	6	<b>12.24</b>	17	<b>16.83</b>	0.56	0.19-1.61	0.283	0.45	0.12-1.70	0.239
Rarely	3	<b>6.12</b>	9	<b>8.91</b>	0.53	0.13-2.15	0.372	0.77	0.15-3.93	0.758
Never	6	<b>12.24</b>	7	<b>6.93</b>	1.36	0.41-4.52	0.619	2.52	0.51-12.5	0.258
<b># Use of condoms, practice of monogamy, and use of non-penetrative methods</b>										



To compare predictors of HPV awareness among the faculties, the faculties were combined to balance the number of participants and minimise bias. The faculties of Management, Economic and Financial Services, became the faculty of Economic and Management Science. The faculty of Engineering and Architecture was a combination of the faculties of Engineering and the Built Environment. The faculty of Art, Design and Architecture, Education and Humanities was a combination of the faculties of Education, Law and Humanities. At univariate analysis, there was a relationship between the faculty of Economic and management, and HPV awareness. Thus, participants from Economic and Management Science faculty had a 64% lesser chance of being aware of HPV as compared to participants from the faculty of Health Sciences (ORs: 0.36; 95% CI: (0.14-0.91),  $p=0.03$ ). However, there was only a trend towards statistical significance after multivariate analysis ( $p=0.09$ ).

After univariable and multivariable analysis, there was no statistical significant association between HPV awareness and other variables such as age, year of study, place of residence, number of sexual partners, and safer sexual practices (Table 6).

### 3.3 Perception about HPV infection and vaccine acceptance.

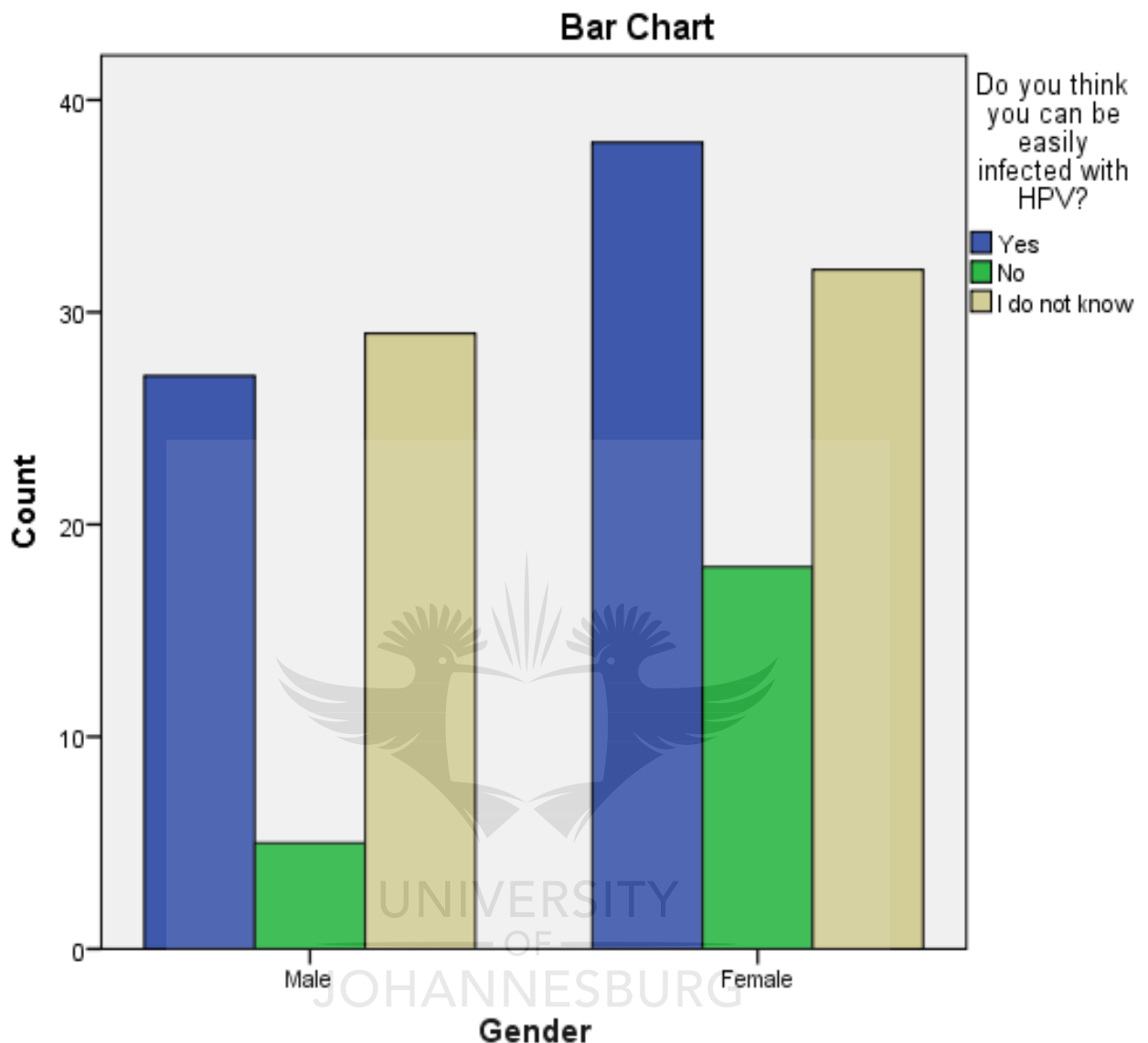
**Table 7: Attitude, Health belief and HPV vaccine uptake.**

Perception of HPV and related disease	frequency	percentage
<b>Health belief question</b>		
Do you think you can easily be infected with HPV	66	44.0%
Do you think HPV infection is a serious disease	111	74.0%
Does the HPV vaccine protect against cervical cancer	50	33.3%
If women have had the HPV vaccine, would they still need a regular pap smear?	70	46.7%
Would you vaccinate against HPV	123	82.0%
Likelihood to recommend vaccine to family and friends	49	32.7%

The perception as a measure of how much a participant felt at risk of acquiring an HPV infection, thus affecting their health belief/health seeking behaviour and attitude were analysed to determine if participants were aware of how easily transmissible HPV is. The perception of HPV was low amongst participants; less than half (44%) of the participants indicated that they could easily be infected with HPV, 15.3% indicated no and 40.7% did not know. By contrast, 74% specified that infection with HPV would be

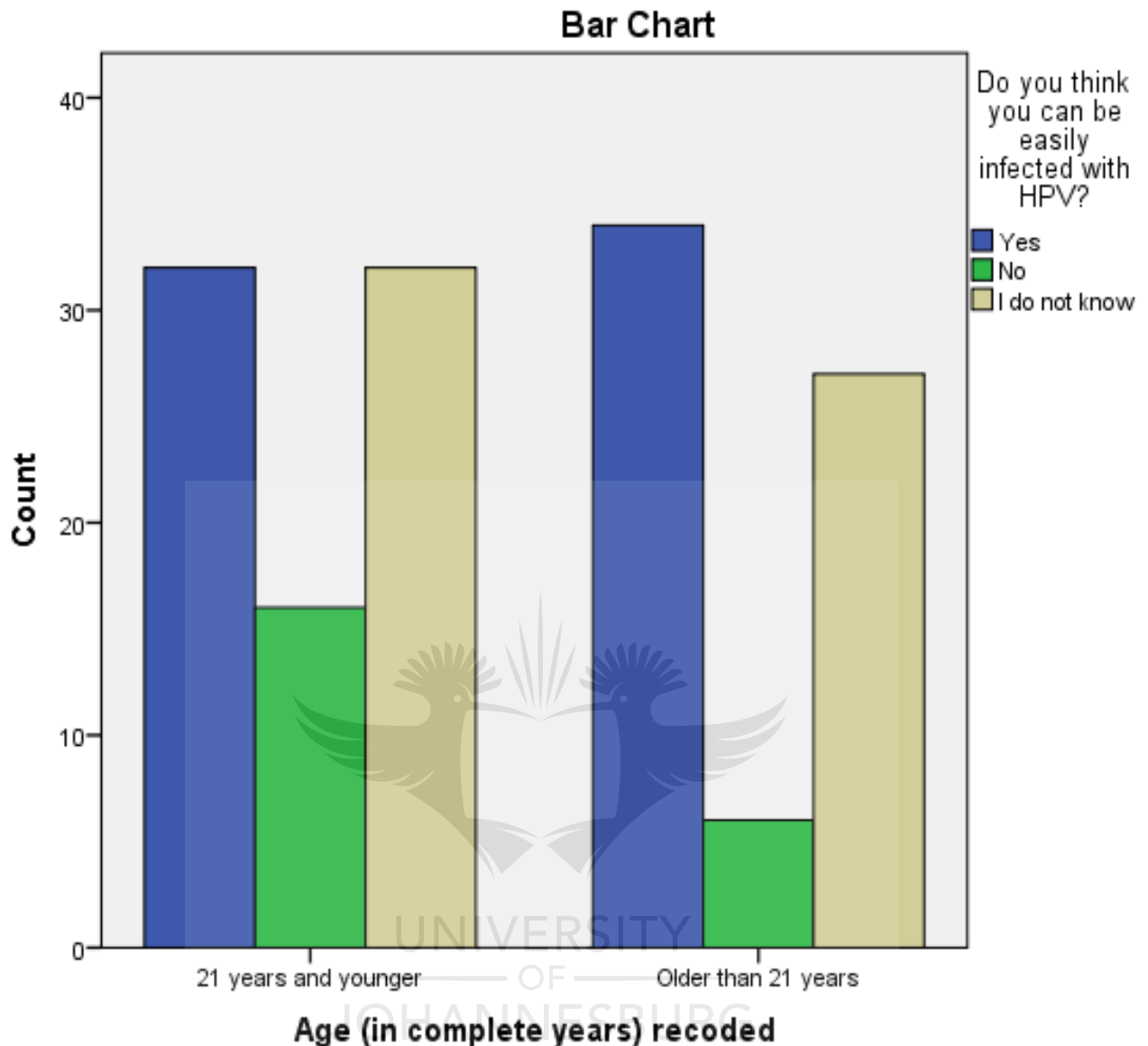
serious, 7.3% indicated no and 18.7% did not know. Almost half (46.7%) of participants knew that a regular Papanicolaou smear (Pap smear) was necessary even after vaccination. Only 33.3% of participants knew that the HPV vaccine protected against cervical cancer with the majority (82.0%) opting to being vaccinated against HPV. Based on the results obtained for HPV knowledge, vaccinating against HPV and the perceived of risk of acquiring an HPV infection, the attitude towards HPV amongst the participants was negative mainly because majority of participants were not aware of HPV.

In order to determine the cause of low perception, gender and age were taken into account to see if these variables played a role on perception of HPV amongst participants. The Pearson Chi-Square test revealed that gender did not influence perception ( $p= 0.099$ ). Results obtained highlighted that 44.3% of male participants and 43.2% of females participants indicated that they felt at risk of HPV infection respectively (Figure 6). Almost half of both male (47.5%) and female (36.4%) participants indicated they did not know their risk of acquiring HPV infection.



**Figure 6: Gender and perception of HPV.**

Age did not show any influence on how participants perceived themselves to be at risk of HPV infection acquisition ( $p= 0.142$ ). Over a third (40%) of participants 21 years and younger indicated that they were at risk of HPV infection, while 50% of participants older than 21 years highlighted that they were at risk. Although results show that participants older than 21 years felt more at risk of HPV infection the results were not statistically significant (Figure 7).



**Figure 7: Age and perception of HPV.**

The above results confirm that awareness and the understanding of HPV was poor amongst participants, which is why they perceived their risk of acquiring HPV was low. Where HPV was viewed as a serious disease, this may have been influenced by participants being aware that HPV infection can result in disease. This appears to be true because majority of participants who indicated that infection with HPV would be serious and were willing to vaccinate against HPV. Overall, the perception and health belief amongst participants was fair and increasing the health belief can benefit greatly from a health education class.



### **3.4 Knowledge of the HPV vaccine.**

The results about the HPV vaccine revealed that only 18.7% of participants knew of the HPV vaccine, 66.0% indicated no and 15.3% did not know. More than two thirds (82.0%) of participants indicated that they would vaccinate against HPV meaning vaccine acceptability was high, however 4.7% indicated no and 13.3% did not know if they would vaccinate. Of the 150 participants, only 33.3% of participants knew that the HPV vaccine protects against cervical cancer, 15.3% indicated no and 51.4% did not know. Less than half (46.7%) of participants knew that if a woman was vaccinated they would still need to have regular Pap smears, 8.0% indicated no and 45.3% did not know.

The results from the HPV vaccine questions highlighted that there was low awareness as well as inadequate knowledge and understanding of the HPV vaccine, with just over half (51.3%) of participants indicating they did not know that the HPV vaccine protects against cervical cancer. The findings also revealed that 22.0% of participants believed that the vaccine could protect against all strains of the virus that cause cervical cancer. This is inaccurate because the vaccines currently available protect against the four common strains of HPV that affect humans. Another concerning finding was that 12.7% of participants indicated that the vaccine protects against all STIs while 42.7% did not know.

To further, establish how knowledgeable participants were regarding the vaccine a score was created to measure how many correct responses each individual participant obtained. The minimum score was zero and the maximum score was five, the questions used for the scoring were D1.3 to D1.7 (Appendix 5, Section D). The average score obtained on the five questions was 1.57 with a standard deviation (SD) of 1.416. This further proves that the knowledge of the HPV vaccine from the study sample (n=150) as a whole was inadequate. Only one (0.066%) participant got all five questions correct, while 49 (32.6%) participants got zero questions correct, 26 (17.3%) participants got one question, 36 (24.0%) participants got two questions, while 19 participants (12.6%) got three and four questions correct respectively (Table 8).

**Table 8: Depicting score on knowledge of the HPV vaccine for questions D1.3 to D1.7.**

<b>Score</b>	<b>Frequency</b>	<b>Percent</b>
0	49	32.6%
1	26	17.3%
2	36	24.0%
3	19	12.6%
4	19	12.6%
5	1	0.066%
<b>Total</b>	<b>150</b>	<b>100.0%</b>

Other findings on vaccine awareness highlighted that 62.7% did not know that there was a vaccine for women and only 10.7% indicated that they knew of the HPV vaccine being available for women in South Africa.

**Table 9: Gender and HPV vaccine knowledge.**

<b>Variable</b>	<b>Male</b>	<b>Female</b>	<b>P-Value</b>	<b>Cramer's V</b>
If women have had the HPV vaccine, would they still need a regular pap smear?	<b>29.5%</b>	<b>58.0%</b>	<b>0.002</b>	<b>0.291</b>
Does the HPV vaccine protect against cervical cancer?	<b>24.6%</b>	<b>38.6%</b>	<b>0.017</b>	<b>0.233</b>
Does the HPV vaccine protect against all strains of the virus that cause cervical cancer?	16.4%	25.0%	0.133	-
Does the HPV vaccine protect against all sexually transmitted infections?	34.4%	51.1%	0.130	-
Is the HPV vaccine currently only available to women in South Africa?	<b>3.3%</b>	<b>15.9%</b>	<b>0.044</b>	<b>0.205</b>

Table 9 looks at vaccine understanding between male and female participants, the questions had three options to choose from (Yes; No; Do not know). Further analysis of results obtained from the questions revealed that gender had an influence on the understanding of certain aspects of the HPV vaccine. Females (58%) showed better understanding of the HPV vaccine than males (29.5%). This could be because of females being exposed to female reproductive health classes at school (i.e. primary or secondary). Although there is statistical significance in the relationship between gender and HPV vaccine knowledge, most participants (66%) indicated that they did not know about the HPV vaccine and its benefits.

The year of study was not linked with a better understanding or knowledge of the HPV vaccine, with P-values greater than 0.05 on all compared variables. This indicated that knowledge levels amongst participants from first year through to fourth year was more or less the same.

**Table 10: Association between number of sexual partners and knowledge of the HPV vaccine.**

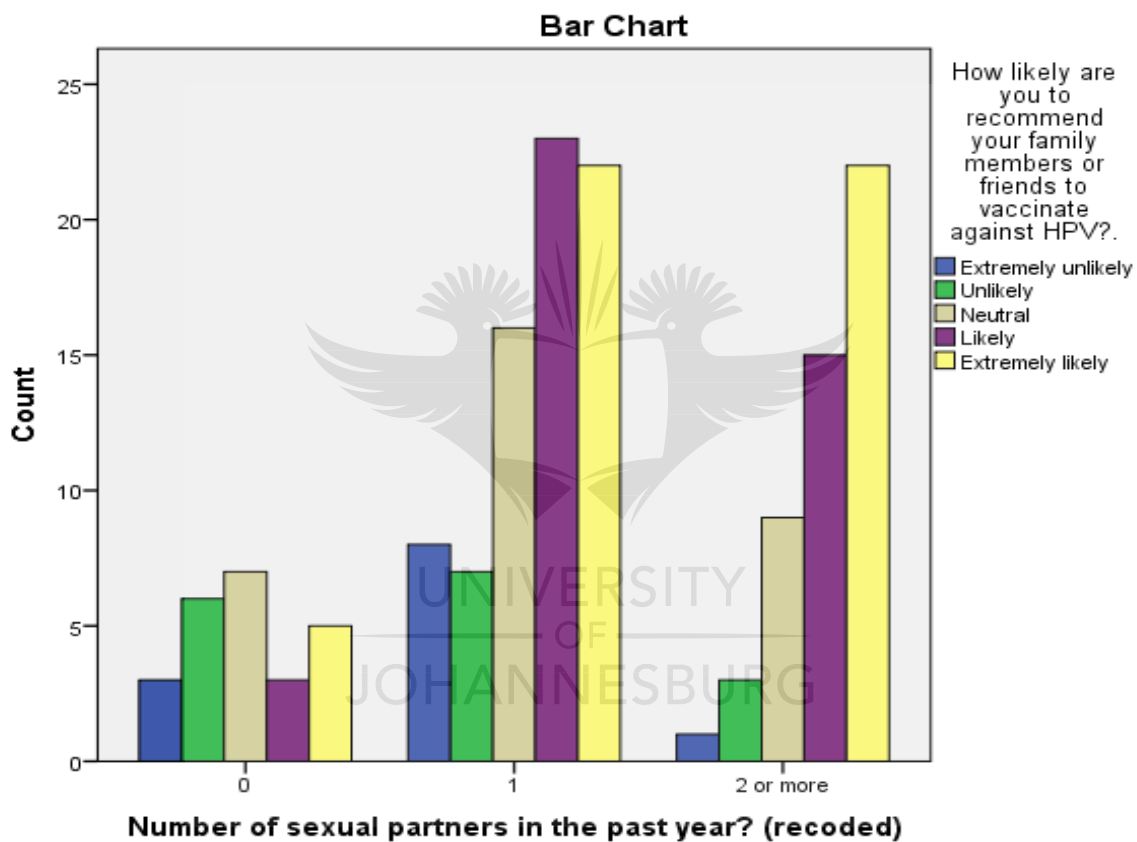
Variable	Number of sexual partners			P-Value
	0	1	≥2	
If women have had the HPV vaccine, would they still need a regular pap smear?	50.0%	52.6%	36.0%	0.130
Does the HPV vaccine protect against cervical cancer?	37.5%	35.5%	28.0%	0.407
Does the HPV vaccine protect against all strains of the virus that cause cervical cancer?	54.2%	17.1%	12.0%	<b>&lt;0.001</b>
Does the HPV vaccine protect against all sexually transmitted infections?	70.8%	47.4%	28.0%	<b>0.014</b>
Is the HPV vaccine currently only available to women in South Africa?	0.0%	15.8%	8.0%	0.094

The number of sexual partners had a statistically significant relationship compared with vaccine knowledge. Participants who had zero or one sexual partner in the past year were more knowledgeable, when compared to participants who had two or more sexual partners in the past year (Table 10). Some comparisons were not statistically significant but the trend observed suggested that having less than two sexual partners in the past year was associated with a better understanding of the HPV vaccine.

### 3.5 Likelihood of recommending the HPV vaccine to family and friends.

The likelihood of participants recommending the HPV vaccine was explored using a Likert score, with participants choosing either being extremely unlikely (1), unlikely (2), neutral (3), likely (4) or extremely likely (5) to recommend the vaccine to family and friends. The study found that 8.0% of participants were extremely unlikely, 10.7% were unlikely, 21.3% were neutral, 27.3% were likely, and 32.7% were extremely likely to recommend the vaccine to family and friends respectively.

The likelihood of participants recommending the vaccine to family and friends was low as the results indicate which could be attributed to the fact that only 18.7% of participants were aware of the HPV vaccine. Poor understanding of the purpose of the vaccine and the benefits of vaccination could have influenced these findings. Contrary to fact that HPV vaccine awareness was poor, participants who had one or two sexual partners in the past year indicated that they would recommend the vaccine to family and friends compared to participants who had zero sexual partners in the past year ( $p= 0.045$ ) (Figure 8).

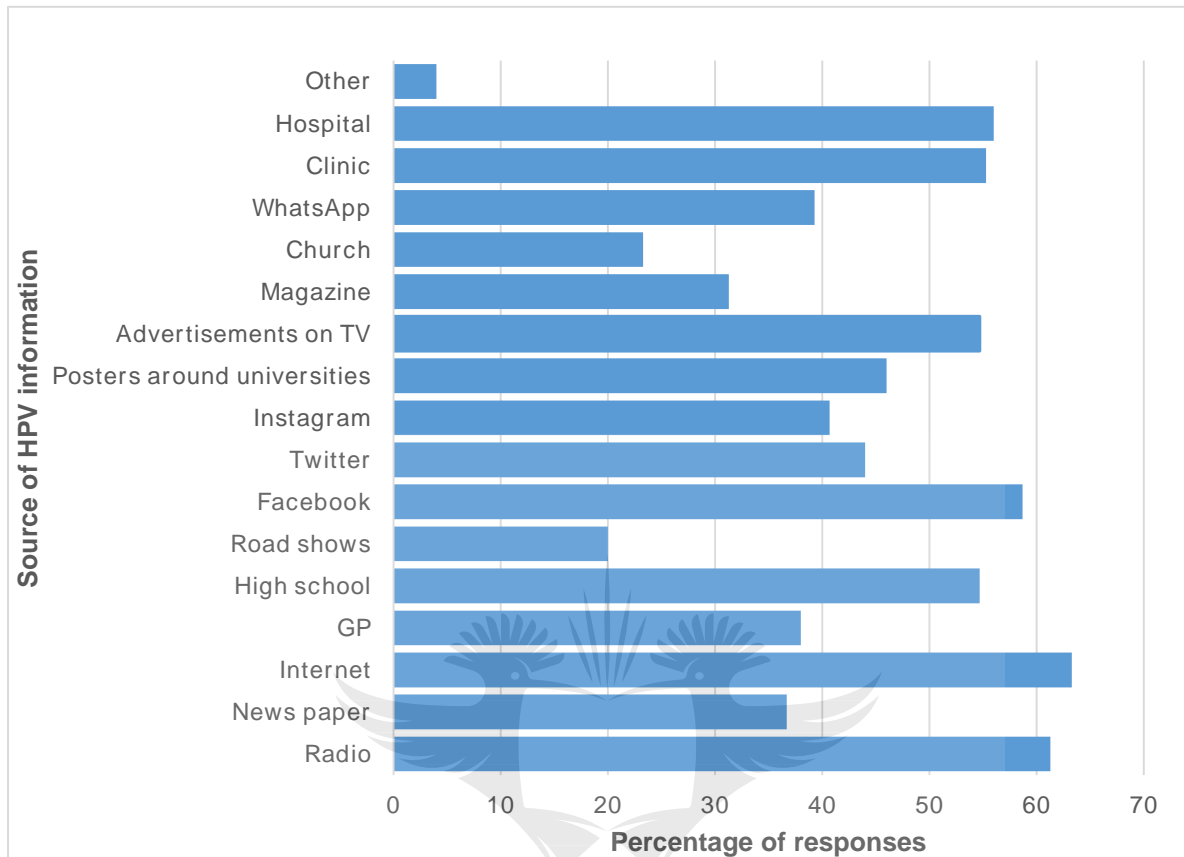


**Figure 8: Number of sexual partners and likelihood to recommend HPV vaccine.**

### 3.6 Platforms to best convey information on HPV.

One of the study objectives was to find a platform that would disseminate information on HPV and allow for enhanced coverage. The Internet 63.3%, Radio 61.3% and Facebook 58.75% were the top three platforms chosen by participants. This was followed by Hospital 56.0%, Clinic 55.3%, Advertisements on TV 54.7%, High school 54.7%, Posters around Universities 46.0%, Twitter 44.0%, Instagram 40.7% and WhatsApp 39.3%, At the doctor's (i.e. Clinician/Primary Health Provider) 38.0%,

Newspaper 36.7%, Magazine 31.3%, Church 23.3%, Road Shows 20.0% and Other 4.0% respectively (Figure 9).



**Figure 9: Best platform to convey information on HPV.**

The results obtained suggest that a less conventional approach is necessary to aid in the dissemination of information, as the target population is technologically inclined (i.e. are using their smart phones and gadgets). This in turn leads to platforms like Facebook, radio and the Internet having the potential to reach a large number of people and can lead to better awareness, understanding and less mistaken beliefs of HPV and the HPV vaccine. The use of standard approaches like the Church, reading a newspaper, magazines and going to road shows, is not favourable as the results show that these are the least preferred platforms for obtaining information.

## CHAPTER 4

### 4.1 Discussion.

This study was undertaken to assess the awareness, knowledge, attitude, towards the Human Papillomavirus and vaccine acceptability among the University of Johannesburg students. It also focused on finding a platform that could be better suited to raising awareness of HPV.

In this study, the results highlighted that 67.3% of participants had never heard of HPV and 32.7% of participants were aware of HPV but had gaps in their knowledge of HPV. However, the researcher explained appendix 6, which elaborated, on HPV and its vaccine to all participants before the questionnaire was answered. It was surprising to find that the faculty of Health Sciences did not perform better on questions pertaining to knowledge of HPV compared to other faculties, as they are more in contact with medical knowledge. The findings of this study which depict low levels of awareness and knowledge (25.3%) of HPV, are similar to results from other studies on similar age groups (Lopez and McMahan 2007, Katz *et al.*, 2011, Chikandiwa and van Wyk, 2013, Kwang *et al.*, 2016). However, when looking at studies that tested Biology and non-Biology students, biology students had better knowledge scores in those studies (Adejuyigbe *et al.*, 2015; Rashid *et al.*, 2016; Yam *et al.*, 2017). Findings in this current study revealed that the faculty of Education had a better knowledge score compared to other faculties including Health Sciences. This is in contrast with the study by Yam *et al.*, (2017), which found that senior medical students had more knowledge of HPV, which was comprehensive and had a positive attitude than non-senior medical and non-medical students did.

This is concerning, particularly for Health Sciences students who are expected to be informative and knowledgeable about different types of diseases and STIs in general. The finding raises questions such as: is the Health Sciences curriculum covering the requirements necessary for students to be knowledgeable health workers in the near future and are Health Sciences students going the extra mile to know more in their field of study? In addition, will not being well informed make the issue of South Africa having limited number of health personnel worse? Senior university students are supposed to be in the advanced years of study and ready to join the work force. This means that they should know and be aware of health related topics because they will

apply the knowledge in their jobs and since this is not the case for a majority of the students, it is very worrying and requires further research to address the situation.

The observed results revealed that only 25.3% of participants knew that HPV is the main cause of cervical cancer, which is similar to the 22.7% result obtained on female tertiary students in the Eastern Cape (Chikandiwa and van Wyk, 2013). Despite commencement of the Nation-wide rollout of free HPV vaccination among South African schoolgirls in 2014, the current study's results showed that the knowledge of HPV has not changed as compared to reports from studies conducted during the pre-vaccine era. Although some participants were aware of HPV, there were significant gaps in their knowledge, which meant that their understanding was poor. The gaps identified included risks and protective factors against HPV; these gaps are why this current study had a low HPV awareness and knowledge score. To deduce why there was poor awareness and gaps in participants' knowledge of HPV, Odds Ratios were tested to identify factors that could have had an impact on awareness of HPV. The results highlighted that gender (i.e. females) and ethnicity (i.e. non-black Africans) were the two independent factors that were associated with HPV awareness with adjusted odds ratios of aORs: 2.92; 95% CI: (1.09-7.84);  $p= 0.033$ ) and (aORs: 11.4; 95% CI: (1.47-87.8);  $p= 0.020$ ) respectively.

This is a cause for concern particularly if being male and being Black African could have a direct influence on HPV awareness. Therefore, attention has to be paid to towns, townships, and villages, to host talks and classes on HPV and/or STIs to help facilitate mass awareness. Males need to be invited to the talks and classes on health education. The talks can be held at school, during or after lectures, at clinics, community halls and village meetings, so that males can be informed about the different health related issues that affect both males and females. Having talks can have a positive outcome by highlighting issues such as risk factors, protective factors, signs and symptoms. These factors can influence how an individual understands health related issues that can affect them and how to look after themselves to lower the chances of acquiring an infection or disease. The findings from this study suggest that educational intervention can be very helpful in improving mass awareness as previous research has pointed out (Shafiee *et al.*, 2013; Kwang *et al.*, 2016; Barnard *et al.*, 2017). Another important too which can be effective is Life skills education, which can help not only in the acquisition of knowledge but also in the development of



relevant skills, which can enable young adults to reduce their risk of STIs (Magnani *et al.*, 2005). This supports the idea of a health education class, as it will avert the issues of poor awareness because of limited exposure to information.

Participants who had heard of HPV identified school as the main source of information, followed by the media, the Internet, Health Practitioners and friends respectively. Similarly, studies conducted among medical students in Nigeria and Hong Kong, found that the school curriculum played a role in HPV awareness and was a good source of information because their findings indicated that most of participants had good comprehensive knowledge of HPV, carcinogenicity of HPV and the outcome of vaccination (Adejuyigbe *et al.*, 2015; Yam *et al.*, 2017). This is a useful finding because it proves that if universities can incorporate health education classes of HPV and STIs in their induction programmes, it will enhance understanding of HPV for all students. Participants in our study obtained their information from school, but unlike the studies in Nigeria and Hong Kong, our findings highlighted poor knowledge scores with significant gaps. This substantiates that low awareness and poor knowledge levels are because of limited access to information and acquisition of information. This lack of knowledge needs a well thought out solution for filling the gaps leading to better knowledge and understanding.

Most participants did not view themselves to be at risk of acquiring an HPV infection. The results of this study were higher than those of Lopez and McMahan, (2007) and most recently Barnard *et al.*, (2017) which showed that only 15.6% of participants felt susceptible to HPV infection and the perceived risk by gender highlighted that 21.9% female and 24.8% male of participants felt susceptible to HPV infection. Chikandiwa and van Wyk (2013) had a similar result (41.0%) for perceived risk of acquiring an HPV infection compared to results from this study (44.0%) which depicts an increase in perceived risk of acquiring an HPV infection. When looking at earlier and recent studies, there is a slight increase in the perceived risk of acquiring an HPV infection, but this is not translating into acceptable sexual behaviour as 20.7% participants in this study reported having two or three sexual partners in the past year and only 41.3% of participants reported that they practice safer sex.



It should be borne in mind that many individuals engage in sexual activities from an early age which in turn increases the likelihood of acquiring an HPV infection (Wang *et al.*, 2011). Low perception can stem from students not being aware of HPV being a virus and that once infected, HPV is not curable and the only way to prevent infection is through vaccination. Therefore, a much-needed drive is necessary to help increase the perception of HPV amongst students. The initiative has to outline that an HPV infection is as serious as testing positive with HIV or the herpes simplex virus and the resulting complications (i.e. urogenital cancers and oropharyngeal cancer) because of the infection can result in serious illness and/or death. This can help overcome barriers like peer pressure that influence risky sexual behaviour and/or decisions while ignoring the risk of STIs (Ngidi *et al.*, 2016). Better understanding could translate into safer behaviour as Kwang *et al.*, (2016) deduced that educational intervention of pre-university students yielded positive results showing improved understanding of HPV, the HPV vaccine and its related diseases, unlike the results they obtained before educational intervention that revealed poor understanding.

Although only 32.7% of participants had heard of HPV, there was high (82.0%) vaccine acceptability, probably due to the information given to the participants before they answered the questionnaire. However, awareness was poor (18.7%), as well as knowledge of the necessity and benefits of vaccination. Most participants obtained an average score of 1.57 on five questions pertaining to HPV vaccine knowledge, where a minimum score was zero and maximum score was five. The results highlighted that males had suboptimal knowledge compared to females, which compares to the findings by Rashid *et al.*, 2016 which highlighted poor HPV vaccine awareness among male participants. Just one third of participants were able to correctly answer questions of the HPV vaccine that included the vaccine being protective against cervical cancer. Similarly Khan *et al.*, (2016) found that 64% of participants in their study rejected the statement of a vaccine being able to prevent cervical cancer. Chikandiwa and Van Wyk (2013) found similar results as less than a third of respondents in their study knew of the HPV vaccine. In contrast (Tripathy *et al.*, 2015) found that 72.1% of participants in a study done with medical students knew of the HPV vaccine. This increased awareness of the vaccine is better compared to this study, and could be influenced by the medical students' curriculum. This further supports and presents an opportunity to explore a health education class at UJ and

universities in general, as it promises to yield positive results. Another interesting finding was that only 32.7% of participants highlighted that they were more likely to recommend the HPV vaccine to family and friends. The possible reasons to explain this are low awareness, a lack of knowledge and a negative attitude towards the vaccine, because the majority of the participants would vaccinate against HPV, but having limited knowledge and awareness could have led them to choose not to recommend the vaccine to family and friends due to having inadequate knowledge of the benefits and importance of vaccination.

In a study conducted in Durban on vaccine uptake, the study found that there was a negative attitude towards vaccination against HPV (Allie and Moodley, 2012) especially from Health Practitioners who believed that the vaccine will unintentionally increase promiscuity. Poor awareness of the HPV vaccine was a contributing factor for the negative attitude towards getting vaccinated. Other factors that contributed to the issue of poor vaccine uptake were cost and the attitude of patients, parents and health workers about the vaccine (Allie and Moodley, 2012; Rositch *et al.*, 2012). A health education class about HPV could benefit students, parents and health practitioners, as it could provide pertinent information that could lead to better understanding of HPV, the HPV vaccine and the benefits of being vaccinated.

Barnard *et al.*, (2017) found that health care provider prompts were helpful with HPV vaccine uptake particularly for males. This finding is useful as males are viewed as vectors of infection (Mupepi *et al.*, 2011). Getting males to vaccinate against HPV can lower cases of infection and cases of cervical cancer or cancers related to HPV, since this study's results highlighted that males had lower awareness and knowledge of the HPV vaccine than females. Females choose to vaccinate more than males do and males would need encouragement if they are to be vaccinated (Barnard *et al.*, 2017). That encouragement can be brought about by providing information and raising awareness of HPV and vaccinating against HPV on platforms that are easily accessible and convenient. This can be achieved by using devices like cellphones and tablets.

The Internet, radio and Facebook were the top three platforms chosen by participants for raising awareness of HPV, which suggests that a less conventional approach is necessary to help raise awareness because of poor information accessibility. A cell

phone is a handy device and is able to access all three platforms without affecting convenience, unlike going to a roadshow, which means getting out of one's comfort zone, and this might not be favourable. Pamphlets or leaflets that are left on reception counters at clinics and hospitals might not be achieving the desired results of providing mass awareness because people have to go to hospitals or clinics to get them, which is also not convenient. The advantages of using the three chosen platforms for health promotion are SNS like Facebook already have an established user base and the target audience is already present and interacting with their SNS (Gold *et al.*, 2011). Zhang *et al.*, (2015) found there was a favourable attitude among 71% female participants concerning chatting about the HPV vaccine on Facebook. In the study participants suggested that a personalised message together with a link from a credible source about the HPV vaccine would have a greater chance of being noticed and read (Zhang *et al.*, 2015).

This is also supported by Gold *et al.*, (2011), who also found that majority (68%) of health promotion activities used Facebook and 30% of activities targeted young people. These findings as well as results from this study indicates that there is a possibility of Facebook contributing to the awareness of HPV, as it was chosen as one of the best platforms to help improve HPV awareness. The Internet and radio as sources of HPV information can possibly increase coverage of awareness. Young adults are always browsing the internet for entertainment or research purposes and they spend a lot of time on their phones, which means that if they receive information on HPV from their university or local health department it will lead to better awareness. Radio can spread information to the masses at large especially those who are illiterate as it is a basic source of entertainment and users often listen to a favourite radio station. Radio stations have news segments and they conduct interviews, which can both be utilised as platforms to educate the masses. Especially in rural areas where information can be scarce, radio can enhance the awareness of HPV as people usually listen to radio in their home language or preferred language and this can lead to better awareness and understanding of HPV.

Non-narrative and first person narrative messages that are text based should be used to spread information on Facebook, the Internet. These message modalities were found to enhance the perceived risk of HPV acquisition, because of a greater

identification and a showing of strong emotions by the participants (i.e. college students) in the study (Nan *et al.*, 2017).



## CHAPTER 5

### 5.1 CONCLUSION AND RECOMMENDATIONS.

In conclusion, HPV awareness was poor amongst university students. This suggests that there is not much exposure to information and this limited access and/or exposure to information about HPV is leading to misconceptions and misapprehension for those who have an idea of what HPV is, while those that had not heard of HPV could remain unaware of this common STI and its vaccine. Continued efforts are needed to raise awareness about HPV and its vaccine, and this information can be provided through educational programmes on the Internet, Facebook and radio. Health workers should be involved in the spread of information at schools, universities and the country in general.

The understanding of the HPV vaccine was poor because of a lack of information on HPV and its vaccine, which is the main issue that requires addressing to increase awareness. This can allow for higher vaccine uptake as research suggests that poor understanding of the vaccine can lead to negative attitudes and low vaccination rates (Allie and Moodley, 2012). Limited access to information about HPV and the HPV vaccine increases the chances of HPV acquisition as a result of ignorance of how easily transmissible HPV is, and of which serotypes of HPV infection can lead to development of anogenital cancer, oropharyngeal cancer and cervical cancer. This can be alleviated by educating the masses about HPV. Mass awareness can aid in lowering the country's health cost budget in the treatment of cancers which can be preventable.

Students' perception of HPV was poor, as most students did not see themselves as being at risk of being infected with the virus, even though safer sex practices do not guarantee hundred percent protection and not having signs and symptoms does not mean that there is no infection. Inadequate knowledge of HPV is a contributor of this. The majority of students were not aware that a routine Pap smear is important even after vaccination and they did not know that the HPV vaccine protects against cervical cancer. There is a need to educate all students at UJ. Social networking sites should be employed to reach out to students as research is indicating that SNS like Facebook are platforms students prefer using to discuss issues pertaining to their health (Zhang *et al.*, 2015).

After careful analysis of the study results, it is recommended that the University of Johannesburg should have a health education class for all students especially in the first year. The educational intervention should be for both males and females, as it will benefit both sexes. It will help for more informed decision-making about sexual partners, a heightened awareness of HPV, the HPV vaccine and STIs in general. There should be posters around campus and residences to promote HPV awareness.

There should be a nationwide HPV campaign at Universities and the country, aimed especially at adolescents and young adults to educate them on HPV, the HPV vaccine and its benefits. This can be done via the Internet, radio and Facebook, as this study found that these could be good platforms for spreading information on HPV.

The necessity of having a Pap smear annually will have to be emphasised so that students can know that “yes” to be vaccinated allows for protection against cervical cancer and HPV infection; however, the HPV vaccine does not protect against all strains of HPV that cause cervical cancer, anogenital cancers and oropharyngeal cancer. Safer sex practices can help lower the chance of HPV infection but it should be emphasised that condoms do not give hundred percent protection, which is why it is important to vaccinate.

Future research should assess the feasibility of using the Internet, radio and SNS as platforms for raising awareness of HPV especially in a South African and African context where inequality can be a factor that determines access to services like the internet.

## **5.2 Study limitations.**

Our sampling method could have led to participants who were more interested in the topic being more willing to be a part of the study and this could have introduced bias; however since awareness of HPV was low this should not have been the case.

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## APPENDICES.

### Appendix (1)

Are you between the ages of 18-40 years? Have you heard of the *Human Papillomavirus*?



<http://www.pkids.org/HPV/ads.html>

---

Whether you have heard of it or think you know about it come, be a part of change and answer a friendly questionnaire to help raise *awareness!!*

---

<http://www.upmcmhealthmatters.com/hpv-not-just-a-womans-risk/>



**Location:** University of Johannesburg primary health clinics/ campus library

**Date and time:** 31 Jul 2017 – 18 Sep 2017 between 10 am – 5 pm

Participation in this study is voluntary and you are free to refuse to participate in the study at any time without prejudice. For more information on the study please contact I. T. Ncube on 0745896907 or by email [itaincube2@gmail.com](mailto:itaincube2@gmail.com) permission from the Human Research Ethic Committee to perform this study has been requested/granted.

Appendix (2)

187 Albertina Sisulu rd

Purchase place

Doornfontein

2094

02/05/17

To Sr. Geya

The University of Johannesburg primary health clinic

Auckland park campus

Johannesburg

2094

**Letter requesting permission to conduct a study.**

I Itai Tendai Ncube am a student at the University of Johannesburg. I would like to conduct a study at your clinics on students visiting the clinic and those from the university from all campuses. 100-150 participants will form the study population. The title of my study is the Assessment of Awareness, Knowledge, Attitude towards the Human Papillomavirus Infection and Vaccine Acceptability among University of Johannesburg Students. I would like to use the primary health clinics because my target population is comprised of young adults, who use the facility for various reasons and it is easily accessible. I would like to use a room or space you have at the clinics to conduct the study. The aim of the study is to assess perception, knowledge and risk factors associated with the human papillomavirus. The study will involve answering a questionnaire on the Human Papillomavirus, which will take up to 15 minutes to complete. The responses obtained will be used to assess the participant's perception, knowledge and risk factors on the Human Papillomavirus. The study will therefor help raise awareness of the Human Papillomavirus and its effects. The names and identification numbers of participants will not be required as everything is done confidentially, each participant will be allocated a number that will aid in identifying their responses. The selected participants will be required to read a letter of information and sign a consent form. They will also be notified that they can also withdraw from the study at any time if they feel uncomfortable to partake in the study. Your understanding and approval for the conduction of the study will be highly appreciated.

Regards

I.T. Ncube.

Student number: 216089741



1. LETTER OF INTRODUCTION AND INFORMED CONSENT
2. FOR PARTICIPATION IN ACADEMIC RESEARCH

**Title of the Research Study:** Assessment of Awareness, Knowledge, Attitude towards the Human Papillomavirus Infection and Vaccine Acceptability among University of Johannesburg Students.

**Principal Investigator/s/researcher:** Itai Tendai Ncube

**Contact details:** cell 074 589 6907 and email: [itaincube2@gmail.com](mailto:itaincube2@gmail.com)

3. You are cordially invited to participate in an academic research study on the perception, knowledge and risk factors associated with the Human Papillomavirus (HPV) among young adults. Each participant must receive, read, understand and sign this document **before** the start of the study.
4. **Purpose of the study:** The purpose of the study is to evaluate the perception, knowledge and risk factors associated with the Human Papillomavirus among young adults. The results of the study may be published in an academic journal. You will be provided with a summary of our findings on request. No participants' names will be used during the course of the study and in the final publication.
5. **Duration of the study:** The study will be conducted over a period of a month and a half and its projected date of completion is 18<sup>th</sup> of Sep 2017. The questionnaire will take between 10-15 minutes to answer.
6. **Research procedures:** The study will make use of a questionnaire to obtain data on HPV from you the participant, the questionnaire will be answered in a designated room, in private with only one participant allowed per turn. Participants will be randomly selected (just like flipping a coin).
7. **What is expected of you:** is to answer the questionnaire to the best of your abilities, please bear in mind that **some of the questions are sensitive** and your cooperation will be highly appreciated.
8. **Your rights:** Your participation in this study is very important. You may, however, choose not to participate and you may also stop participating at any time without stating any reasons and without any negative consequences. You, as a participant, may contact the researcher at any time in order to clarify any issues pertaining to this research.
9. **Confidentiality:** All the data will be handled by the researcher and supervisor. Participants' names and or identity numbers will not be needed for the study. Each participant will be allocated a number soon after reading and signing the consent form. The data collected from the study will be destroyed two years after the study has been completed.
10. **Remuneration:** none
11. **Costs of the Study:** participants will not pay for the study.
12. **Research-related Injury:** none.

**Written Informed Consent**

**Statement of Agreement to Participate in the Research Study:**

(I,.....subject's full name....., ID number....., have read this document in its entirety and understand its contents. Where I have had any questions or queries, these have been explained to me by .....to my satisfaction. Furthermore, I fully understand that I may withdraw from this study at any stage without any adverse consequences and my future health care will not be compromised. I, therefore, voluntarily agree to participate in this study.

Subject's name (print) .....

Subject's signature: ..... Date: .....

Researcher's name (print) .....

Researcher's signature: ..... Date: .....

Witness name (print) ..... Witness signature:  
..... Date: .....





## Appendix 5

Dear sir/madam

I Itai Ncube is undertaking a research project on the perception and knowledge of the human papillomavirus (HPV) among students at the University of Johannesburg. For the achievement of my research goals, I kindly request that you complete the following short questionnaire regarding awareness, knowledge, perception, risk factors, HPV promotion and vaccine recommendation. It should take no longer than 10 min of your time. Please note **some of the questions are sensitive** and your cooperation will be highly appreciated.

**Please do not enter your name or contact details on the questionnaire. It remains anonymous.**

Should you have any queries or comments please feel free to contact my supervisor Ms Ingrid Van der Westhuyzen on 011 559 6263 or email on [ingridv@uj.ac.za](mailto:ingridv@uj.ac.za) or the chair of the University of Johannesburg's Ethics committee, DR. C. Stein on [cstein@uj.ac.za](mailto:cstein@uj.ac.za)

Sincerely

I.T. Ncube



Please answer the following questions by crossing (X) in the relevant block or writing down your answer in the space provided.

### **Section A – Background & risk information**

This section of the questionnaire refers to biographical information. **Some of the questions are sensitive**, but the information that will be obtained from those questions will help me meet my objectives. Rest assured your responses will remain anonymous. Your co-operation is appreciated.

#### 1. Gender

Male	1	
Female	2	

#### 2. Age (in complete years)

--	--

#### 3. Ethnicity

African	1	
White	2	
Coloured	3	
Indian or Asian	4	

#### 4. Academic year of study?

1 <sup>st</sup> year	1	
2 <sup>nd</sup> year	2	
3 <sup>rd</sup> year	3	
4 <sup>th</sup> year	4	
Other	5	

#### 5. Where are you residing?

Commune	1	
Residence	2	
Renting a flat/house	3	
Parents	4	
Other specify	5	

#### 6. Which Faculty are you from?

Art, Design and Architecture	1	
Economic and Financial Sciences	2	
Education	3	
Engineering and the Built Environment	4	
Health Sciences	5	
Humanities	6	
Law	7	
Management	8	
Science	9	

7. Number of sexual partners in the past year?

0	1	
1	2	
2-3	3	
4 or more	4	

8. How often do you practice safe sex e.g. use of condoms, practice of monogamy and use of non-penetrative methods?

Never	1	
Rarely	2	
Sometimes	3	
Often	4	
always	5	

9. Have you ever suspected that you have a sexually transmitted infection due to lesions on your genitals?

Yes	1	
No	2	

10. Which of the following sexually transmitted infections, have you ever been diagnosed with by a medical professional? (Mark all applicable)

None	1	
Genital herpes	2	
Genital warts	3	
Syphilis	4	
Gonorrhoea	5	
Chlamydia	6	
Other (specify)	7	
Don't want to answer	8	
Don't know	9	

**Section B – HPV knowledge**

1. Have you ever heard of the Human papillomavirus (HPV)?

Yes		1.
No		2.

2. If you answered **Yes** to the above question, how did you hear about the Human papillomavirus (HPV)? (Mark all applicable) **Please proceed to Section C if your answer was No to question 1**

Media (TV, Magazine or Newspaper)		1.
Friend		2.
School		3.
At the Doctor's		4.
Internet		5.
Other (specify):		6.
I do not know what it is		7.

3. The following statements can either be True or False questions. Please mark your preferred answer with an (X).

	True (1)	False (2)
HPV is the main cause of cervical cancer		
Men can carry HPV		
HPV is sexually transmitted		
HPV causes genital warts		
Condoms protect against HPV		
HPV can be transmitted using public bathrooms		
HPV can be passed on from parent to child		

**Section C- Perception on HPV**

1. Do you think you can be easily infected with HPV?

Yes		1.
No		2.
Don't know		3.

2. Do you think HPV infection is a serious disease?

Yes		1.
No		2.
Don't know		3.

**Section D – HPV and vaccination**

1. The following Questions are Yes or No questions please mark with an (X) your preferred answer(s).

	Yes (1)	No (2)	I do not know (3)
Do you know about the HPV vaccine?			
Would you vaccinate against HPV?			
If women have had the HPV vaccine, would they still need a regular pap smear?			
Does the HPV vaccine protect against cervical cancer?			
Does the HPV vaccine protect against all strains of the virus that cause cervical cancer?			
Does the HPV vaccine protect against all sexually transmitted infections?			
Is the HPV vaccine currently only available to women in South Africa?			

2. How likely are you to recommend your family members or friends to vaccinate against HPV?

Extremely unlikely	1	
Unlikely	2	
Neutral	3	
Likely	4	
Extremely likely	5	

3. Which of the following will be the best way of making people aware of HPV? (Mark all applicable)

Radio		1.
News paper		2.
Internet		3.
At the Doctor's		4.
High school		5.
Road shows		6.
Facebook		7.
Twitter		8.
Instagram		9.
Posters around universities		10.
Advertisements on TV		11.
Magazine		12.
Church		13.
WhatsApp		14.
Clinic		15.
Hospital		16.
Other (specify)		17.

**Thank you for your co-operation**

## STATISTICS on CERVICAL CANCER and HPV INFECTION

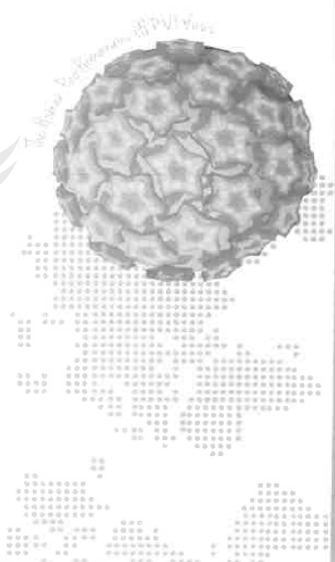
- The incidence of cervical cancer in **South Africa** is reported to be between **22,8 and 27 per 100 000 women**, as compared to the **global average of 15,8**
- In **2008** there were **5 743 NEW CASES** reported with **3 027 associated deaths** in South Africa
- **99%** of cervical cancers are caused by **Human Papillomavirus (HPV)**
- Approximately **7 in 10 people** will have HPV at some point in their lives
- Of the more than **100 strains** of HPV, **two strains of HPV (HPV-16 and HPV-18)** are found to cause at least **70% of all cervical cancer cases**
- **HPV-16 and HPV-18** strains are vaccine-preventable

## Human Papillomavirus (HPV)

- Is a very **common** infectious agent
- Has **no visible symptoms**
- Is responsible for **most cases** of cervical cancer
- Is transmitted during sexual activity

## Cervical Cancer

- In **South Africa** cervical cancer is the **second most common cancer** among women
- Is a cancer that affects the lower part of the womb (**cervix**)
- **Only affects women** if not detected at an early stage is **difficult to treat and often results in death**



## HPV Vaccine

- **Prevents cervical cancer**
- Is **most effective** if given at a young age (9 years and older)
- Is **safe** and **effective**
- Has been used in **many countries**
- Requires **2 doses** (6 months apart)
- Is **recommended** by the **World Health Organisation** for girls before they are exposed to HPV
- Introduction presents an opportunity for **South Africa** to make **long term health benefits**

## HPV Vaccine CANNOT

- **Treat or cure cervical cancer**
- **Prevent or treat human immunodeficiency (HIV) infection**
- **Prevent or end pregnancy** – HPV vaccine is **NOT** a method of family planning
- Affect a girl's **ability** to have **children** in the **future**

## Appendix 7

### Itai Ncube

---

**From:** Tai Ncube <itaincube2@gmail.com>  
**Sent:** Friday, 02 February 2018 06:05  
**To:** Itai Ncube  
**Subject:** Fwd: RE: My masters project  
**Attachments:** SS Questionnaire\_1a 13\_02\_02.doc; SS Questionnaire\_1b 13\_02\_02.doc; SS Questionnaire\_1c 13\_02\_02.doc; Supplementary material for Knowledge Measure Validation.pdf; Validation of a measure of knowledge about human papillomavirus (HPV) using item.pdf

----- Forwarded message -----

**From:** "Waller, Jo" <j.waller@ucl.ac.uk>  
**Date:** Feb 16, 2016 11:32  
**Subject:** RE: My masters project  
**To:** "Tai Ncube" <itaincube2@gmail.com>  
**Cc:**

Dear Tai

I'm attaching the 3 questionnaires we used in that study (at 3 time-points). Please feel free to use anything that's helpful, obviously acknowledging our paper in any publications arising from the work. I'm also attaching the paper we published more recently on a validated measure of HPV knowledge, which would be a better one to use for knowledge.

Best wishes

Jo

~~~~~

Dr Jo Waller

Cancer Research UK Career Development Fellow in Behavioural Science

Principal Research Associate

CR-UK Health Behaviour Research Centre

Department of Epidemiology and Public Health

UCL, 1-19 Torrington Place

LONDON WC1E 6BT

## Appendix 7

### Itai Ncube

---

**From:** Tai Ncube <itaincube2@gmail.com>  
**Sent:** Friday, 02 February 2018 09:14  
**To:** Itai Ncube  
**Subject:** Fwd: RE: Questionnaire  
**Attachments:** questionnaire HPV.doc

----- Forwarded message -----

From: "Dr Mohamad Nasir Shafiee" <[nasirshafiee@hotmail.com](mailto:nasirshafiee@hotmail.com)>  
Date: Mar 3, 2016 04:57  
Subject: RE: Questionnaire  
To: "Tai Ncube" <[itaincube2@gmail.com](mailto:itaincube2@gmail.com)>  
Cc:

Hi,

Herewith I attached

Please cite our paper in your study

Thanks

MNS

---

Date: Sat, 27 Feb 2016 04:40:54 +0200  
Subject: Questionnaire  
From: [itaincube2@gmail.com](mailto:itaincube2@gmail.com)  
To: [nasirshafiee@hotmail.com](mailto:nasirshafiee@hotmail.com)

Good day Sir

My name is Tai Ncube and I'm a masters student at the university of Johannesburg and I am going to be doing a study of the perception, knowledge and risk factors associated with the HPV among young adults so for that I would like to adapt some questions in the study you did on perception, knowledge and attitude towards the human papillomavirus infection and Vaccination for cervical cancer prevention among university students.

Regards Tai



## Appendix 7

### Itai Ncube

---

**From:** Tai Ncube <itaincube2@gmail.com>  
**Sent:** Thursday, 01 February 2018 19:48  
**To:** Itai Ncube  
**Subject:** Fwd: Re: Permission to reproduce figures

----- Forwarded message -----

From: "Laia Bruni" <lbruni@iconcologia.net>  
Date: Oct 10, 2017 18:30  
Subject: Re: Permission to reproduce figures  
To: "Tai Ncube" <itaincube2@gmail.com>, <hpvcentre@iconcologia.net>  
Cc: "Van Der Westhuyzen, Ingrid" <ingridv@uj.ac.za>

Dear Tai

Yes, of course, permission granted. Please feel free to use all the materials posted on the website. We only ask to be properly cited.

Best regards

Laia

Laia Bruni, MD, MPH, PhD

Unit of Infections and Cancer- Information and Interventions (UNIC-I&I) | Cancer Epidemiology Research Program | Catalan Institute of Oncology (ICO), IDIBELL | Avda. Gran Via 199-203 | 08908 Hospitalet de Llobregat (Barcelona, Spain) | Tel. +34 93 2607812; Fax: +34 93 2607787

E-mail: [lbruni@iconcologia.net](mailto:lbruni@iconcologia.net); [bruni.laia@gmail.com](mailto:bruni.laia@gmail.com)

ICO/IARC Information Centre on HPV and Cancer: [www.hpvcentre.net](http://www.hpvcentre.net)

El dv., 6 d'oct. 2017 a les 18:32, Tai Ncube (<[itaincube2@gmail.com](mailto:itaincube2@gmail.com)>) va escriure:

Dear Secretariat,

Hope I find you well. My name is Itai Ncube I am a student at the University of Johannesburg student number 216089741. I am doing second year of my masters, and my research paper is on HPV. I would like to get permission to use figure 10, 16 and 17 in the human Papillomavirus and related diseases report for my literature review. Your favorable response will be highly appreciated.

Regards

Tai

OF  
JOHANNESBURG

Appendix 8



**FACULTY OF HEALTH SCIENCES**

**RESEARCH ETHICS COMMITTEE**

NHREC Registration no: REC-241112-035

REC-01-43- 2017

2 June 2017

TO WHOM IT MAY CONCERN:

STUDENT: NCUBE, I  
STUDENT NUMBER: 216089741

TITLE OF RESEARCH PROJECT: Assessment of the Perception, Knowledge and Risk Factors Associated with Awareness of the Human Papillomavirus Among Young Adults

DEPARTMENT OR PROGRAMME: BIOMEDICAL TECHNOLOGY

SUPERVISOR: Mrs I van der Westhuyzen  
CO-SUPERVISOR:

The Faculty Academic Ethics Committee has scrutinised your research proposal and confirm that it complies with the approved ethical standards of the Faculty of Health Sciences; University of Johannesburg.

The REC would like to extend their best wishes to you with your postgraduate studies.

Yours sincerely,

Dr C Stein

Chair : Faculty of Health Sciences REC

Tel: 011 559 6564

Email: [estein@uj.ac.za](mailto:estein@uj.ac.za)

## Appendix 9

### APPENDIX 9

**Itai Ncube**

---

**From:** Tai Ncube <itaincube2@gmail.com>  
**Sent:** Tuesday, 28 August 2018 20:29  
**To:** Itai Ncube  
**Subject:** Fwd: Number of enrolled students  
**Attachments:** image001.png

----- Forwarded message -----

**From:** Pieterse, Raihaanah <rpieterse@uj.ac.za>  
**Date:** Mon, 07 Aug 2017, 14:57  
**Subject:** RE: Number of enrolled students  
**To:** Tai Ncube <itaincube2@gmail.com>

Good day

This is what I have.

|      |               | Headcount<br>Total |
|------|---------------|--------------------|
| EDU  | Actual<br>(A) | 3896               |
| FADA | Actual<br>(A) | 1363               |
| FEBE | Actual<br>(A) | 9309               |
| FEFS | Actual<br>(A) | 10737              |
| HSC  | Actual<br>(A) | 3963               |
| HUM  | Actual<br>(A) | 6126               |
| LAW  | Actual<br>(A) | 1655               |
| MAN  | Actual<br>(A) | 8954               |
| SCI  | Actual<br>(A) | 4268               |



# Appendix 10

**APPENDIX 10**

Population survey or descriptive study  
For simple random sampling, leave design effect and clusters equal to 1.

Population size:


Expected frequency:

Acceptable Margin of Error:

Design effect:

Clusters:

| Confidence Level | Cluster Size | Total Sample |
|------------------|--------------|--------------|
| 80%              | 59           | 59           |
| 90%              | 97           | 97           |
| 95%              | 138          | 138          |
| 97%              | 169          | 169          |
| 99%              | 237          | 237          |
| 99.97%           | 386          | 386          |
| 99.99%           | 538          | 538          |



UNIVERSITY OF JOHANNESBURG