

KNOWLEDGE ABOUT HUMAN PAPILLOMAVIRUS, HUMAN PAPILLOMAVIRUS VACCINE AND CERVICAL CANCER AMONG FEMALE STUDENTS AT THE UNIVERSITY OF WITWATERSRAND AND THEIR SEXUAL PRACTICES

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Medicine in the branch of Obstetrics and Gynaecology.

Johannesburg, September 2012

DECLARATION

I, Evelyn Khozga Kalua, declare that this research report is my own work. It is being submitted for the degree of Master of Medicine in the branch of Obstetrics and Gynaecology in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree at this or any other University.

.....

..... day of 2012

DEDICATION

In loving memory of my parents

Soka and Florence Kalua

ABSTRACT

Introduction: Cervical cancer is one of the few preventable cancers. Health education messages about the cancer and its prevention should form part of the prevention strategies. Assessing knowledge about various aspects of the cancer has an important role in determining knowledge gaps that exist and therefore helps in designing health education messages about the cancer.

Sexual behaviour has been shown to play a major role in determining risk of contracting Human papillomavirus (HPV) and of developing cervical cancer.

This study was designed to assess knowledge of HPV, HPV vaccine, cervical cancer and its correlates, and to assess sexual practices among female students at the University of Witwatersrand.

Methods: This was a descriptive cross-sectional study. Data was collected using a self-administered questionnaire that was administered in female residences and analysed using the STATA 10 statistical package.

Results: A total of 860 questionnaires were distributed in 4 female residences. Amongst these, 190 questionnaires were completed. Awareness of cervical cancer was high (95%) but knowledge of its risk factors and preventive measures was low. Only 43% and 27% of the respondents had knowledge about HPV and HPV vaccine respectively. Although only 47% of the respondents were sexually active, sexual behaviour that would put these women at risk for contracting HPV infection and cervical cancer namely, high numbers of sexual partners, early age of coitarche and inconsistent condom use were present among those that were sexually active.

Conclusion: Risk factors for cervical cancer and gaps in knowledge about cervical cancer, HPV and HPV vaccine exist among this population and there is need for further health education.

ACKNOWLEDGEMENTS

Many thanks to

1. My supervisor Dr William Edridge for his guidance in the planning and implementation of this study and for organising funding to carry out the project.
2. Management of the University of the Witwatersrand for allowing me to carry out the study among their students.
3. The subjects who willingly participated in the study.

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1. INTRODUCTION

1.1. BACKGROUND

Cervical cancer is a major health problem in developing countries. The prevention of this cancer is currently dependent on the use of cervical cytology as a means to recognise premalignant change (1). Human Papillomavirus (HPV) has been identified as central to premalignant change and cancer development (2) and the HPV vaccine is a possible prevention strategy(3). Assessment of knowledge about HPV, HPV vaccines and cervical cancer amongst South African women is therefore important for possible cervical cancer prevention.

The relationship between sexual behaviour, HPV infection and risk of developing cervical cancer has been well documented (4). Assessing sexual behaviour amongst South African women would not only allow that risk factors for cervical cancer be identified amongst these women, but also the implementation of strategies to minimise, or hopefully eliminate these risk factors.

According to the World Health Organisation (WHO), cancer of the cervix is the leading cause of gynaecological related deaths worldwide. It is the commonest cancer among women in developing countries, and the second commonest cancer worldwide in women. Women in developing countries account for about 85% of both annual cases of cervical cancer (estimated at 493,000) and annual deaths from cervical cancer (estimated at 273,500). According to a 2002 WHO report, the crude incidence rate of cancer of the cervix in South Africa is 30.2/100,000 women per year (5).

HPV is the commonest sexually transmitted disease. Approximately 75-80% of sexually active women will be infected with HPV at some point in their lifetime (6). There are over 100 known serotypes of this virus and about 40 of these are thought to infect the genital tract (7). It is

known that infection of the genital tract with HPV leads to a range of states from asymptomatic carriage of the virus, genital warts, cervical dysplasia to cervical carcinoma (7). Epidemiological studies suggest that at least 15 of the HPV genital tract serotypes, called high risk types, are significantly associated with progression to invasive carcinoma of the cervix (8). Persistent HPV infection is implicated in 99.7% of all cervical cancers (2). The low risk serotypes are associated with development of genital warts and low grade squamous intra-epithelial lesions (LGSIL) of the cervix. The commonest of these high risk serotypes are HPV 16 and 18 while 6 and 11 are the commonest of the low risk serotypes (8).

Highest rates of HPV infection are said to be found in the 18-28 year age group, most likely because sexual debut often occurs in mid to late teens and HPV exposure usually occurs at this time. These infections invariably are transient (6).

Invasive cancer of the cervix is one of the few preventable cancers. These preventive strategies include primary and secondary. Primary preventative measures include issues of lifestyle modification to eliminate risk factors for cervical cancer such as commencing sexual activity at an early age, promiscuity (4) and smoking (9). Primary prevention can also be achieved by the use of Human Papillomavirus (HPV) vaccines (3). Currently there are 2 vaccines available, a quadrivalent vaccine against HPV 6, 11, 16 and 18, Gardasil, and Cervarix, which is a bivalent vaccine against HPV 16 and 18. The Centre for Disease Control and Prevention (CDC) Advisory Committee on Immunisation Practices (ACIP) recommended routine HPV vaccination for 11-12 year olds and for girls as young as 9 years old. The Committee also recommended the vaccination of 13-26 year old females who have not been previously vaccinated or have not completed the full vaccination series (10). In South Africa, the vaccines have been registered for use amongst girls aged 10 years and above (11).

Circumcision of males has been shown to reduce the risk of both genital HPV infection and cervical cancer in their female partners (12). This is because circumcised men are three times less likely to harbour HPV in their penis than uncircumcised men (12). Male circumcision therefore is also a primary preventative strategy for cervical cancer.

The mainstay of secondary prevention of cervical cancer in developing countries is the use of cervical cytology which is able to detect premalignant conditions of the cervix years before they become malignant (1). Cervical cytology has a very high specificity (98-99%) but its sensitivity is low (50-75%) (1). Secondary preventive measures also include visual inspection of the cervix after acetic acid application (VIA) (1, 13), visual inspection of the cervix after Lugol's iodine application (VILI) (13), and HPV typing (1). VIA has been shown to have a sensitivity of 55% in detecting high grade precancerous lesions while the sensitivity of VILI is said to be about 87% (13). The use of HPV typing for cervical cancer screening is still surrounded by many controversies. As a screening test to detect high grade squamous intraepithelial lesions (HGSIL), HPV typing has been shown to have comparable sensitivities to cytological screening. The major gain of HPV typing is seen in its very high negative predictive value (>97%) when it is used to triage patients with minor abnormalities on cytology. Given the fact that HPV is such a common sexually transmitted disease and persistent infection with this virus has serious consequences, prevention of the infection would aid in bringing down the mortality and morbidity that results from cervical cancer. Even though the low risk serotypes are responsible for 90% of genital warts (which are benign), presence of these lesions brings about psychological and physical distress to the women and is an economic burden to the health system as these women will have to be treated and followed up until the lesions are cleared.

The Health Belief Model (HBM) postulates that a person's willingness to engage in a health-seeking behaviour is influenced by perceived benefits, barriers, susceptibility, and seriousness

of the disease (14). Therefore a woman will only take a decision to modify her lifestyle, be vaccinated against HPV or to participate in screening services for cervical cancer if she has the right information pertaining to the disease.

The HPV vaccine is available in the private sector in South Africa but not in state hospitals due to its high cost. There is no legislation for HPV vaccination in South Africa, and at present, its use remains voluntary. Therefore, it is important that the general population and especially those who are eligible for the vaccine be aware and understand the link between HPV and cervical cancer so that an informed decision can be made as to whether or not to vaccinate against this virus.

1.2. LITERATURE REVIEW

1.2.1. Knowledge about HPV, HPV vaccine and cervical cancer

Most studies have shown that knowledge about HPV and cervical cancer among populations is low and inaccurate, though the range may be great. According to a systematic review of 39 studies between 1992 and 2006 on HPV knowledge, knowledge about HPV varied from 13%-93% (15).

1.2.1.1. Knowledge about HPV, HPV vaccine and cervical cancer among adult populations in developed countries

In the United States, cross-sectional data from 3,026 women aged 18-75 years responding to the 2005 Health Information National Trends Survey was analysed. Forty percent of the women in the study had heard about HPV. Less than half knew it caused cervical cancer. Knowledge that HPV was sexually transmitted and that it caused an abnormal pap

smear was 64% and 79% respectively. Factors associated with having heard of HPV included younger age, being non-Hispanic, being white, having higher education, exposure to multiple health information, and having tested positive for HPV(16).

In a more recent American study (2009) in which knowledge about HPV and HPV vaccine was assessed in 4 different states among 202 adults in the general population, the majority (93%) had heard of HPV and 84% knew it caused cervical cancer. Eighty-seven percent had heard of HPV vaccine but only 18% knew the vaccine was used to protect against cervical cancer. Interestingly in this study, although awareness of HPV vaccine was high among the population, the benefit of the vaccine was not clear to them. Levels of knowledge about HPV and HPV vaccine were found to be different in the different ethnic groups, with whites being more knowledgeable than blacks (17).

In 2007, a survey to assess public knowledge and attitudes towards HPV vaccination was performed in Birmingham in the United Kingdom in which 420 participants aged 16-54 years were recruited. Very low knowledge scores were found. Out of 6 HPV related questions that were asked, 81% of participants did not get any of the answers correct and only 5.9% got 4 or more answers correct. Significant differences in knowledge were identified between ethnic groups(whites being more knowledgeable than blacks), social class(only 1% of the manual workers were knowledgeable) and increasing age, with older people being more knowledgeable than younger ones(18).

1.2.1.2. Knowledge among South African Women

In a 2009 South African study, in Cape Town, 100 women attending an anti-retroviral clinic were randomly selected and interviewed about their knowledge of cervical cancer and Pap smears. Seventy-eight percent of them had never heard about cervical cancer, 59%

reported having had a pap smear and about 40% did not know what the pap smear was used for (19).

Another South African study based in the Western Cape between 2007 and 2008 looked at challenges towards HPV vaccination and vaccine uptake. Fifty in-depth interviews were conducted with health care providers, policy makers and community members (43 women aged 21-57 years). Findings indicated that women's knowledge and understanding of cervical cancer, the relationship between HPV and cervical cancer and purpose of cervical cytology tests was low. Even health care providers had varying levels of knowledge about current cervical cancer screening policies and the relationship between HPV and cervical cancer (20).

In 2010, attitudes, knowledge and beliefs about HPV and cervical cancer among 86 females aged 18-44 years attending an ante-natal clinic in Johannesburg, South Africa were examined. Sixty-one percent of the participants had heard of cervical cancer, and only 29% had heard of HPV; of those who had heard of HPV, 79% were aware it was sexually transmitted, 33% were aware there was no cure, 67% knew it was a risk for cervical cancer and 75% knew condom use offered protection from HPV (21).

1.2.1.3. Knowledge among students in the developed countries

A study was performed in the United States in 2008 among 1282 students in a large public university to assess knowledge of HPV and cervical cancer. Ninety-two percent of the participants had heard of HPV but they were not aware of modes of transmission, ways of prevention, commonality of the HPV infection and its role in cervical cancer. Twenty-two percent of the participants had heard about the HPV vaccine. Eighty-five percent understood the risk factors for cervical cancer. However, some risk factors such as smoking and poor nutrition were underestimated. In this study, the source of information about HPV was television (TV) commercials (66%), friends (38%), high school or college class (37%), and the

internet (32%). The majority however preferred to get this type of information from a physician (22).

In a study performed in Italy in 2008 among 1348 women aged 14-24 years, 29% reported having heard that HPV is one of the commonest infections of the genital tract and three-quarters of them identified that the infection is primarily transmitted sexually; half reported having heard of cervical cancer. Sixty percent were aware a cervical cytology was used to detect pre-cancerous changes in the cervix, 42% knew the HPV vaccine was a preventive measure for cervical cancer and 34% were aware condom use could prevent HPV infection and cervical cancer. Those who were more likely to have heard about HPV and HPV vaccine were older women, also those who had one parent in the health profession and those who had a friend or family member diagnosed with cervical cancer (23).

In Portugal, a study was performed to assess knowledge of HPV and cervical cancer among 1706 university students in 2010. This study showed that 55% had heard of HPV and 88% knew it was a risk factor for cervical cancer. Eighty-nine percent were willing to be vaccinated but only 13% stated prevention of cervical cancer as the reason for vaccination. Statistical differences in knowledge about cervical cancer were found between male and female

($p < 0.001$) and between Health science and non-Health Science students, ($p < 0.001$). There were no differences in the level of knowledge between those who were sexually active and those who were not (24).

1.2.1.4. Knowledge among students in the developing world including South Africa

There are a number of studies that have assessed knowledge about HPV and cervical cancer among university students in the developing world.

In 2009, a study to assess knowledge and health beliefs of cervical cancer screening was performed in Ghana among 140 college students whose ages ranged between 20-35 years. Eight percent were aware of the link between HPV infection and cervical cancer and 1% was aware smoking was a risk factor for cervical cancer. Sixty-four percent were aware cervical cytology was used to detect pre-cancerous changes in the cervix and 78% thought these changes could easily be cured (25).

A Nigerian study that assessed awareness of cervical cancer and HPV vaccine and its acceptance among university students found that 35% of the students knew of HPV, 53% had heard of cervical cancer and 74% were willing to accept the HPV vaccine. Age, medical education, HPV knowledge and awareness of cervical cancer were significant predictors of readiness to accept the HPV vaccine (26).

In a study at the University of the Transkei in the Eastern Cape in 1998 to assess cervical cancer awareness and risk factors among female university students, it was shown that 74% of the 260 participants in the study had heard of cervical cancer and 68% were able to identify HPV as a risk factor for cervical cancer. In this group knowledge of multiple sexual partners and early age of sexual debut as risk factors for cervical cancer was 57% and 34% respectively. Twenty-nine were aware cervical cancer was a preventable disease (27).

Another study to assess cervical cancer awareness among female university students in South Africa at Mangosuthu University of Technology in Kwazulu Natal (2009) showed that less than half (42%) had heard of cervical cancer. Forty percent thought cervical cancer was a preventable disease, 42% had heard of a cervical cytology and 38% were aware it was used to prevent cervical cancer. Knowledge of risk factors for cervical cancer was low: 29% identified early age of sexual debut, 31% multiple partners, 18% smoking and 48% HPV infection as risk factors for cervical cancer. It was found that 40% of the students were sexually active and

among them 28% reported having 2 or more sexual partners (28). There were no questions relating to knowledge of the HPV vaccines.

1.2.2. Risk factors for cervical cancer

Factors that increase the risk of cancer of the cervix among HPV DNA positive women include the use of oral contraceptives (for 5 or more years), high parity (5 or more children), and previous exposure to sexually transmitted diseases such as Chlamydia trachomatis and Herpes Simplex Virus type 2 and infection with HIV(6). Smoking has been identified as a risk factor for developing cervical cancer. In a longitudinal study of 1485 women aged 15-19 years in the UK in 2009 to assess smoking as a risk factor for cervical intra-epithelial neoplasia, it was shown that current smoking intensity was associated with an increased incidence of high grade cervical intra-epithelial lesions (CIN) after controlling for cervical HPV status. Women who were positive for HPV infection and smoked 10 or more cigarettes per day were twice as likely as non-smokers to develop high grade CIN (9).

1.2.3. Sexual behaviour, cervical cancer and HPV

Sexual behaviour has been shown to be one of the factors that modify the risk of HPV infection and cervical cancer, particularly age at first sexual intercourse (AFSI) and number of sexual partners.

In a 2006 study in the Western Cape in South Africa, information on age of sexual debut and number of lifetime partners was collected from 524 incident cervical cancer patients and 1541 hospital controls. It was shown that women whose AFSI was <16 years had a relative risk (RR) of developing cervical cancer of 1.6 (95% CI 1.2-2.2) compared to those whose AFSI was 16 years or more. Women who had 4 or more sexual partners had a RR of 1.7 (95% CI 1.2-2.2) of developing cervical cancer compared to those who had <4 sexual partners.

Early sexual debut in this group was associated with lower education, higher number of sexual partners and alcohol use. Having a greater number of sexual partners was associated with younger age of sexual debut, being black, being single, higher education level and alcohol use (4).

In a study among 333 women aged between 22-53 years who were diagnosed with squamous cell carcinoma of the cervix between 1986 and 2004 in the Seattle-Puget South region in the United States, results showed that AFSI influenced the age at which cervical cancer was diagnosed. The mean age of diagnosis with squamous cell cervical carcinoma was 3.1 years younger for women with AFSI < 15 years and 2.6 years younger for those with AFSI between 15 and 18 years when compared with those with AFSI of 19 years or more (29).

In the Netherlands a study was performed in 2007 to assess sexual behaviour and HPV prevalence among 2065 women aged 18-29 years, and factors associated with HPV prevalence were increasing age, current smoking, number of partners in the past 6 months and years of being sexually active with total number of partners being the most powerful predictor of HPV prevalence (30).

Consistent use of the condom by male partners of newly sexually active women has been shown to reduce the risk of cervical and genital HPV infection (31). A longitudinal study among 82 female students at University of Washington was conducted between 2000 and 2005 to evaluate whether use of condoms by their male partners reduced the risk of male to female transmission of HPV. Results showed that consistent condom use by the male partner reduced the risk of HPV infection and risk of developing cervical intra-epithelial lesions in the female. Incidence of HPV infection was 37.8 /100 patient years at risk among women whose partners used the condom all the time compared to 89.3 /100 patient years among those whose partners used it less than 5% of the time. Among those whose partners used the condom all the time, no

cervical intra-epithelial lesions were detected in 32 patient year at risk while 14 incident lesions were detected among 97 patient years at risk among those whose partners did not use the condom consistently (31).

1.2.4. Sexual behaviour among adolescents in South Africa

A nationally representative survey was carried out among 6217 women aged 15-24 years in all the nine provinces in South Africa in 2007 using the 2001 national census as a sampling frame. Sixty-seven percent reported being sexually active, 52% were on some form of contraception and of these, 26% were using the condom, 66% were using hormonal contraception and 7% were on dual methods (barrier and hormonal). In this sample, those women who were students or employed were more likely to use contraception than those who were unemployed (32).

In the 1998 study mentioned previously among university students in the Eastern Cape, 87% of them reported being sexually active and mean age of coitarche was 17 years. Fifty-five percent were on some form of contraception and of those, 9% used the condom, 50% used the Nuristerate injection and 32 % were taking the contraceptive pill. It was shown that major risk factors for cervical cancer present among these students included initiation of coitus before the age of 18 (53%), multiple partners (73%), male partners with other partners (38%), previous history of sexually transmitted illnesses (42%) and vulval warts (4.7%) (27).

1.3. RATIONALE FOR THE STUDY

In order to design health education messages about HPV, HPV vaccine and cervical cancer, it is crucial to determine the level of knowledge in the society and what gaps exist. Few studies in South Africa have assessed knowledge about HPV and cervical cancer and these studies were mostly in the general adult populations, although two studies have assessed knowledge amongst university students. The two studies that were performed among university students, include one in The Eastern Cape, at the University of Transkei in 1998 (27) and the other at Kwazulu–Natal in 2009 (28). There has been no such study in the Gauteng province. In addition, the mentioned studies focussed mostly only on knowledge of cervical cancer and HPV and not on the HPV vaccine.

The intention of this study, therefore, was to assess knowledge of HPV, HPV vaccine and cervical cancer among female students at The University of Witwatersrand and the correlates of this knowledge. The other objective was to determine the sexual behaviour and practices that might put them at risk of developing cervical cancer later in life.

This particular cohort was chosen because they were easy to access and also because they fall in an age group eligible for the HPV vaccine, a group where the risk of acquiring HPV infection is high and where multiple risk factors for persistent HPV infection and hence cervical cancer exist.

2. METHODS

2.1. Study setting

The study was conducted at The University of the Witwatersrand which is a multiracial, English medium university which has 5 faculties (Commerce, Humanities, Health Sciences, Science and Engineering). It is situated in Parktown in Johannesburg, South Africa.

2.2. Study population

This group consisted of female undergraduate students in 4 of the 5 female residences. Mixed residences were not included, since there was no clear indication where female and male students resided in mixed residences and the study was confined to female students only. There were no exclusion criteria. Students of all age groups, race, year of study, and programme enrolled were included.

2.3. Sample size

The researcher chose a convenient sample size of 200. Sample size calculation was not performed since no specific comparison was considered to be required to achieve significance.

2.4. Study design

This was a cross sectional descriptive study.

2.5. Data collection

Data collection was performed between the 24th September and the 31st October 2010. Data was collected using a self-administered anonymous questionnaire in the English language (see Appendix A).

Pilot testing of the questionnaire was performed using a sample of 15 female students. Responders were asked if there were difficulties with questions within the questionnaire or

with interpretation. None were identified. These piloted questionnaires were not included for analysis.

Questionnaires for the study were distributed in 4 female residences at the University of Witwatersrand by the researcher.

The questionnaires were distributed by sliding them under the doors of the rooms. Students were asked to place their filled in questionnaires in a sealed box that was placed in the reception area of every residence within a week of receipt. The boxes were designed to be deep with a slit just enough for submission to prevent interference. The completed questionnaires were then collected by the researcher from the box a week after they were distributed. The boxes remained in the reception area for another week before the researcher went to collect them.

According to Ms Nicky Lowe, the Residence Development Manager at the University of Witwatersrand, students in these residence are mixed in terms of year of study, the programme in which they are enrolled, and race.

2.5.1 The questionnaire

Development of the questionnaire was guided by literature review and the study objectives.

The principles of questionnaire development were adapted from previous authors (33-35), namely that the questions should be clear and understandable to the recipients, unambiguous and ethical, and that the questionnaire should be piloted to assess any ambiguity not originally recognised.

Questions on knowledge about HPV and HPV vaccine were adapted from an American study which assessed knowledge of HPV and HPV vaccine in the general population (17).

The questionnaire had a series of questions divided into 5 sections: (1)Socio-demographic information; (2)Sexual activity; (3)Knowledge of HPV; (4)Knowledge of HPV vaccine; (5)Knowledge of cervical cancer.

Socio-demographic characteristics that were asked included age, year of study and programme of study, where the student accessed medical care, the profession of the bread winner in their family. Students were also asked whether they smoked.

Sexual behaviour questions included whether the student was sexually active, age of sexual debut, number of sexual partners, whether those who were sexually active used contraception and which type of contraception they were using.

Five specific questions were asked relating to HPV and three relating to the HPV vaccine. In the questions, participants were asked to choose the correct answer among the options that were given, or state lack of knowledge.

Knowledge of cervical cancer was assessed by asking about knowledge of risk factors and preventive measures including cervical cytology. Cervical cytology was referred to in the questionnaire as 'pap smear'. Out of 4 options, students were asked to circle which they thought were risk factors for cervical cancer. There was a similar question on preventive measures for cervical cancer.

2.6. Data analysis

Categorical variables were coded to facilitate data entry entered on a spread sheet. Analysis was performed using STATA 10 statistical package. Continuous variables were summarised using means and standard deviation for normally distributed data. Comparison of variables was performed using Pearson's chi-square test. The Fisher's exact test was used if observations within cells were less than 5. A p value <0.05 was considered significant.

2.7. Limitations

As information pertaining to sexual behaviour is very sensitive, participants might not have given honest answers to questions that were asked. We attempted to minimise this by making the questionnaires anonymous and assuring the participants of maintaining confidentiality. The other limitation was the possibility of the participants looking up the answers in books or on the internet, therefore not giving a true picture of what their knowledge was.

Information from these students cannot be generalised to the population at large because university students fall in a group of women more likely to know more about HPV and its role in cervical cancer than the general population. More studies will have to be performed focussing on the general population.

2.8. Funding

This research was funded by a Baragwanath Hospital research fund registered with the Wits Health Consortium, 'Ukuhlola'.

2.9. Ethics and protocol review

Permission to conduct the study was obtained from the Human Research Ethics Committee (medical), Ethics Clearance Certificate number M10654 (Appendix B), and from the University's administration. The protocol was also reviewed by the Assessors Committee in the Department of Obstetrics and Gynaecology.

2.10. Consent

The questionnaires had an information sheet on the front page explaining what the study was about. It was agreed that by returning the questionnaire, the student had given consent to take part in the study (Information sheet included in Appendix C).

3. RESULTS

3.1. Questionnaire completion

Out of 860 questionnaires that were distributed, 192 students completed and returned the questionnaires. This gives a response rate of 22%. Two of the questionnaires were discarded because less than 50% of the questions were answered. Therefore 190 questionnaires were analysed.

3.2. Demographics of the respondents

The mean age of the respondents was 20.3 years (standard deviation 1.7). Distribution of the respondents' ages is shown in Table 1.

Table 1: Age distribution of the respondents

Age(years)	n(190)	%(100)
17-20	111	58
20-24	76	40
≥25	3	2

Majority of the participants were black, n=158 (83%) and the remaining were Indian, n=19(10%), white, n=6 (3%) and of mixed race, n=7 (4%) (Figure1).

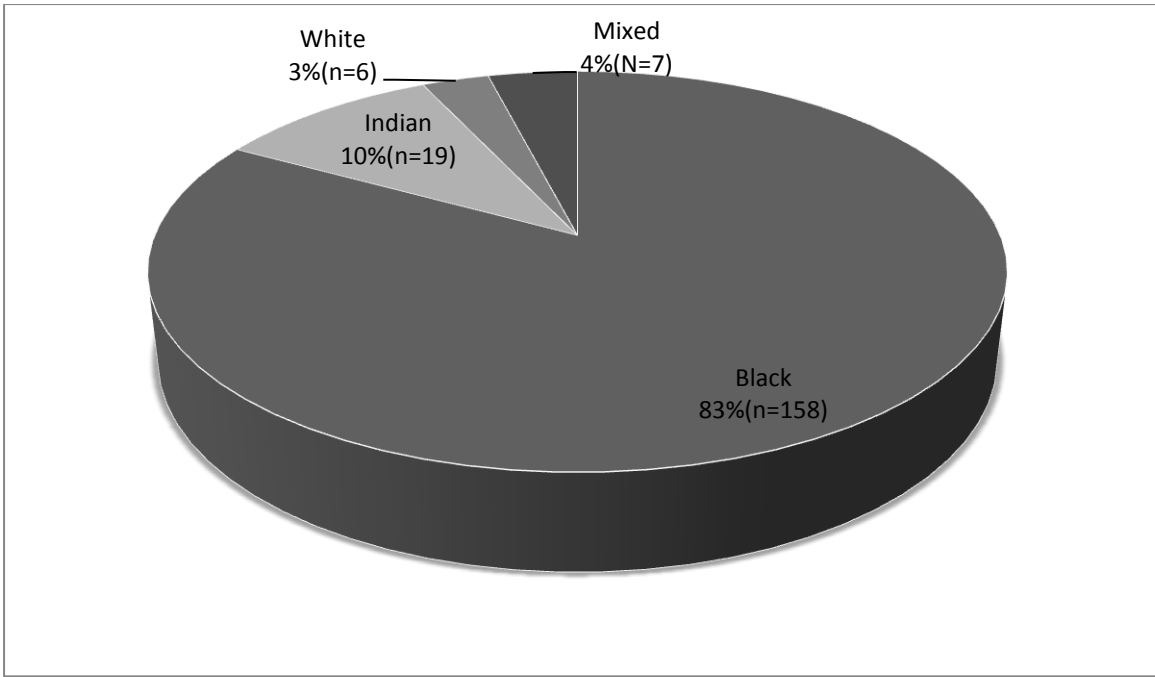


Figure 1: Distribution by race

Most of the respondents were enrolled in Faculties of Commerce (n=60, 32%), and Science including Engineering (n=48, 25%) while the rest were studying Humanities (n=43, 23%), Medicine (n=25, 13%), and other Health Science programmes (Physiotherapy, Pharmacy, Occupational Therapy) (n=14, 7%) (Table 2).

Table 2: Distribution of programme enrolled

Programme	n(190)	%(100)
Commerce	60	32
Science(Non medical)	48	25
Humanities	43	23
Medicine	25	13
Other Health Sciences	14	7

The majority of the respondents were either in their 2nd (n=60, 32%), or 3rd year (n=54, 13%) of study with a minority in 4th year to 6th year (Table 3).

Table 3: Distribution by year of study

Year of study	n(190)	%(100)
1st year	47	25
2 nd year	60	32
3 rd year	54	28
4 th year	24	12
5 th year	3	2
6 th year	2	1

More than half (n=107, 56%), of the respondents accessed their medical care from private hospitals(Figure2).

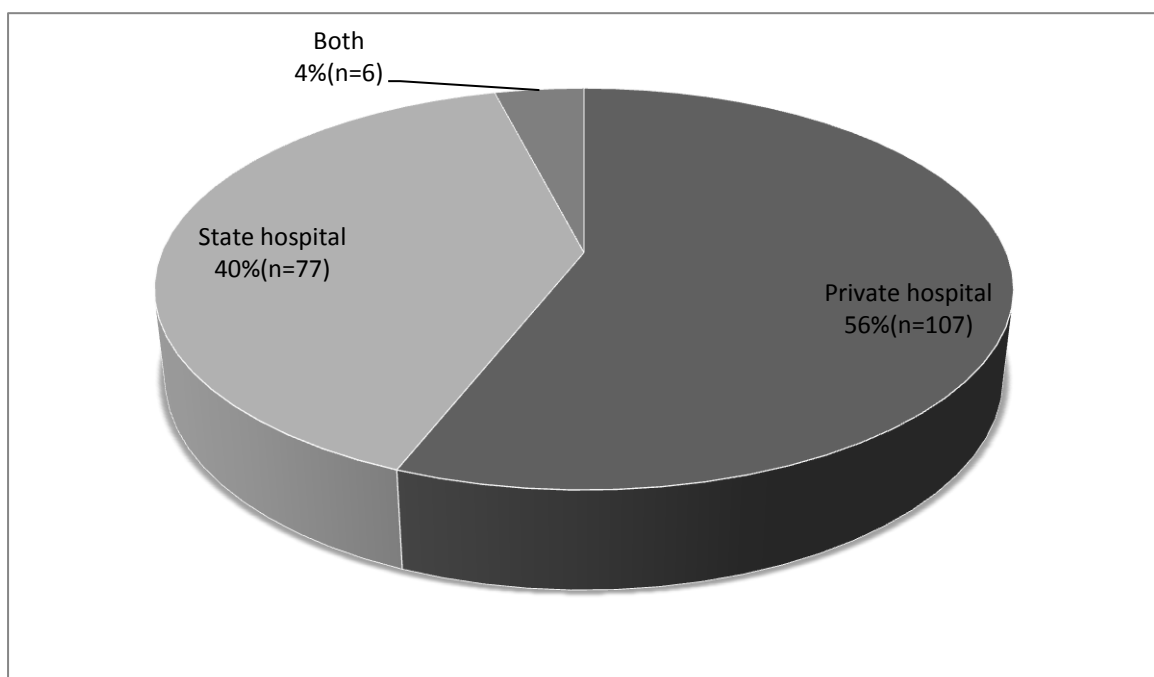


Figure 2: Access to medical care

Seventy-five percent (n=143) of the respondents came from families which were classified as being of high socio-economic status i.e bread winner in upper management, mid-management positions or professionals. Twenty-five percent (n=47) were from families of low socio-economic status (i.e small business owner, manual worker, unemployed (Table 4).

Table 4: Distribution by socio-economic status

	n(190)	%(100)
High socio-economic status	143	75
Low socio-economic status	47	25

Fifteen (8%) of the participants smoked while 175 (92%) did not (Figure 3).

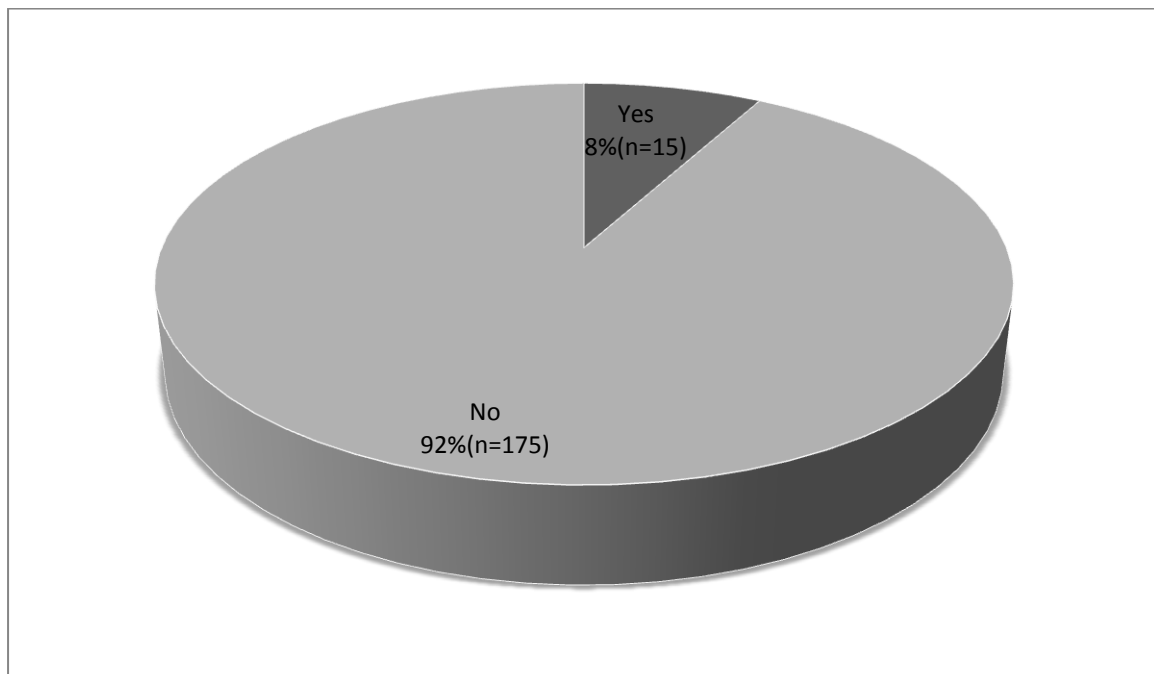


Figure 3: Smoking status

3.3. Sexual practices among the study population

Eighty-nine (47%) of the respondents were sexually active (Figure 4).

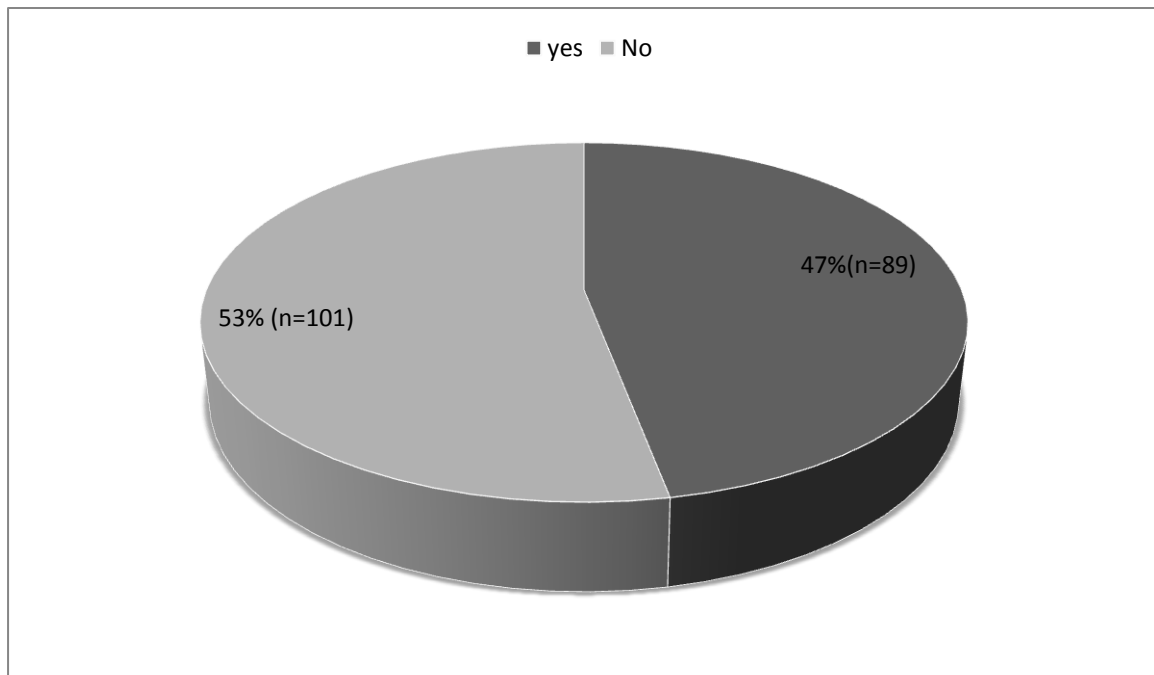


Figure 4: Proportion sexually active

Mean age of coitarche was 18 years (standard deviation 1.6). Age at coitarche was 16 years or less in 14% of the respondents (Table 5).

Table 5: Distribution of age at coitarche

Age at coitarche	n(89)	%
13 -16 years	13	14
17-20 years	67	76
>20 years	9	10

The mean number of sexual partners was 3 (range 0-27). Twenty-one percent of the group had had more than 5 sexual partners (Figure 5).

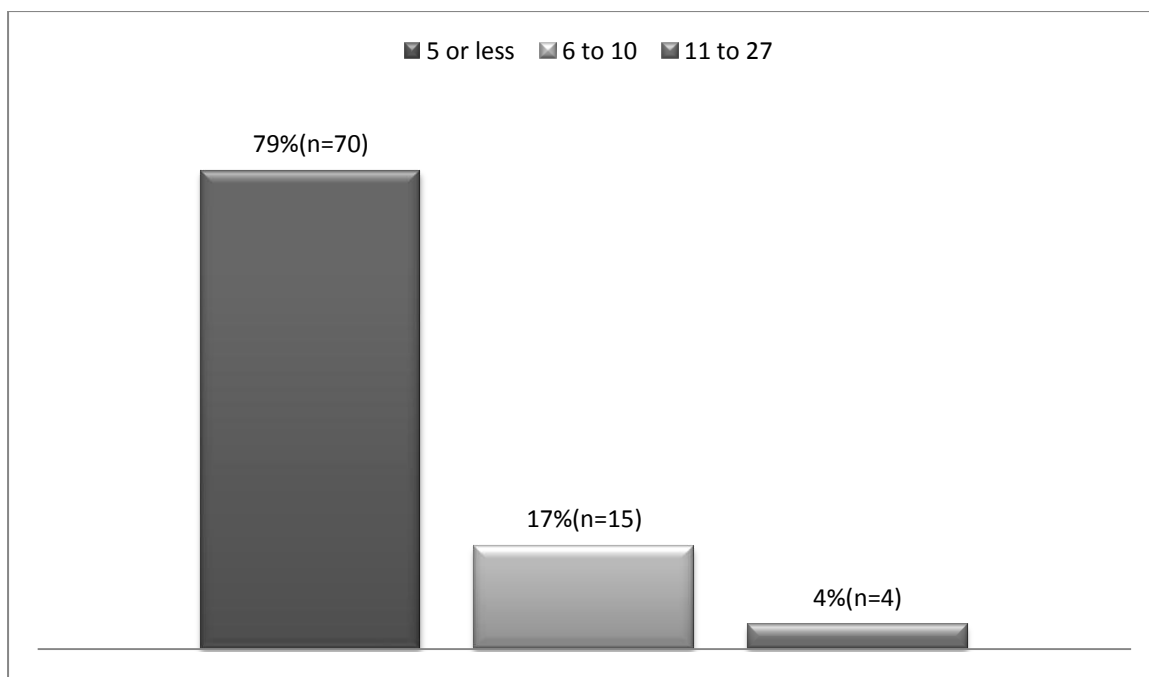


Figure 5: Distribution of number of sexual partners

3.3.1 Contraception use among the respondents

Of those who were sexually active, 75 (83%) were on some form of contraception. Sixty (80%) used the condom only for contraception, 2(3%) used the injection only, while 13 (17%) used another form of contraception in addition to the condom [pill(n=9), injection(n=2) or loop (n=2)].

Of the condom users, 37 (62%) reported to use it every time they had sexual intercourse, 16(27%) most of the time while 7 (11%) used it sometimes.

3.3.2. Sexual behaviour and smoking

There were a number of relationships which were noted between sexual behaviour and smoking.

Smokers were more likely to be sexually active than non-smokers (p=0.04). Eighty seven percent of all the smokers (n=13) were sexually active vs 43% of all the non smokers (n=76) (Table 6).

Table 6: Relationship between being sexually active and smoking

Sexually active	Smoking status		P value
	Yes	No	
	n=15 (100%)	n=175 (100%)	0.04
Yes	13 (87)	76 (43)	
No	2 (13)	99 (57)	

There was a significant association between the age of coitarche and smoking ($p=0.03$). Smokers had sexual debut at a relatively younger age than non-smokers. Out of all smokers who were sexually active, 12 (92%) had sexual debut at the age of 18 years or less while for sexually active non-smokers, 46 (61%) had their sexual debut at the age of 18 years or less (Table 7).

Table 7: Relationship between age at coitarche and smoking

Age at coitarche	Smoking status		P value
	Yes	No	
	n=13(100)	n=76(100)	0.03
< 18 years	12(92)	46(61)	
\geq 18 years	1(8)	30(39)	

A significant association was seen between smoking and number of sexual partners ($p=0.04$).Smokers were more likely than non-smokers to have had more than 5 sexual partners (32%, of smokers vs 20% of non-smokers). (Table 8).

Table 8: Relationship between Smoking and Number of sexual partners

No of partners	Smoking status		P value
	Yes	No	
	n=13(100%)	n=76(100%)	0.04
≤ 5	9(68)	61(80)	
>5	4(32)	15(20)	

3.4. Knowledge about cervical cancer

Of all the respondents in the study, 180 (95%) had heard of cervical cancer (Figure 6).

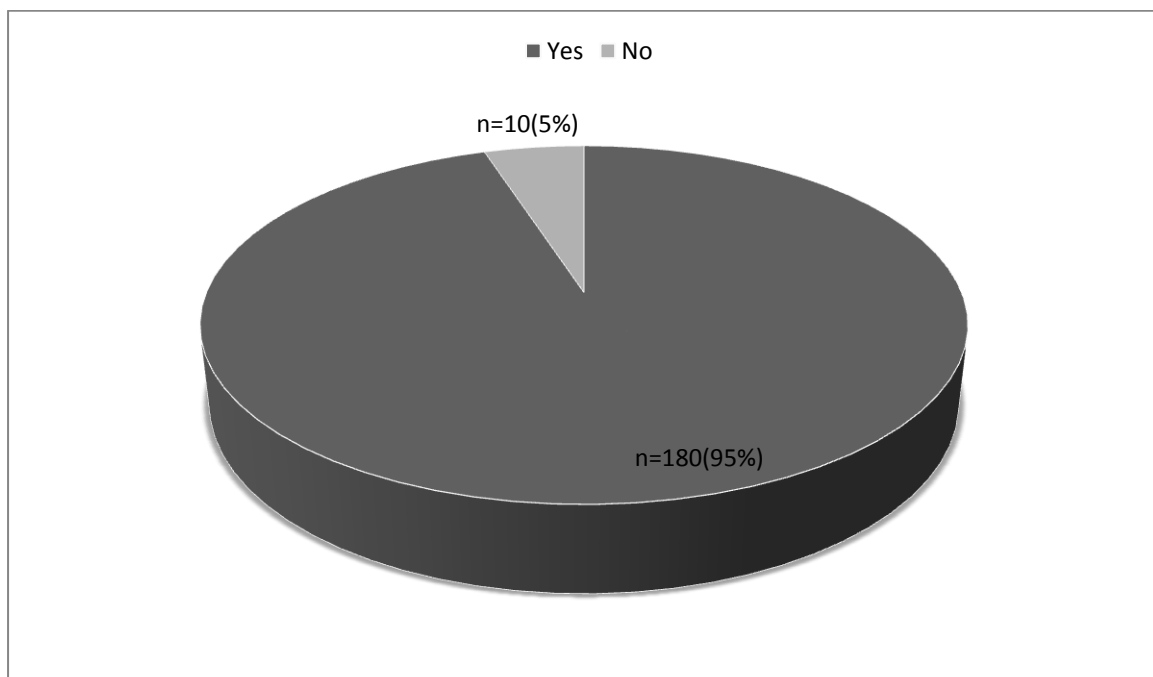


Figure 6: Proportion of those who had heard about cervical cancer

There was a trend for students from families of high socio-economic status as assessed by the profession of the breadwinner in the family to have heard about cervical cancer when compared to those from families of low socio-economic status although this difference did not

reach statistical significance, $p=0.07$. Another trend was seen in medical and other health science students where these students more likely to have heard of cervical cancer than the rest of the students, $p=0.06$.

3.4.1. Source of information about cervical cancer

The majority of the respondents ($n=108$, 60%) had heard of cervical cancer from the media (magazine, television, radio, newspaper and the internet), 28 (16%) obtained the information from medical or nursing staff. The others obtained their information from a lecture or class ($n=70$, 39%) or from a friend, parent or family member ($n=44$, 24%) (Table 9).

There were overlaps in the source of information in that most of the respondents had more than one source of information.

Table 9: Source of information about cervical cancer

	n	%
Family, friend or parent	44	24
Lecture / Class	70	39
Medical or Nursing staff	28	16
Media(TV, Radio, Newspaper, Internet)	108	60

3.4.2. Knowledge of risk factors for cervical cancer and its correlates

Two of the 180 respondents who had heard of cervical cancer did not respond to the question on risk factors. Analysis is performed in 178 respondents. One hundred and three respondents (58%) identified early age of sexual debut as a risk factor for cervical cancer and 36 (20%) identified smoking as a risk factor for cervical cancer. Forty-eight (27%) did not know what the risk factors were (Figure 7). Most of the respondents identified more than one risk factor, hence the overlap.

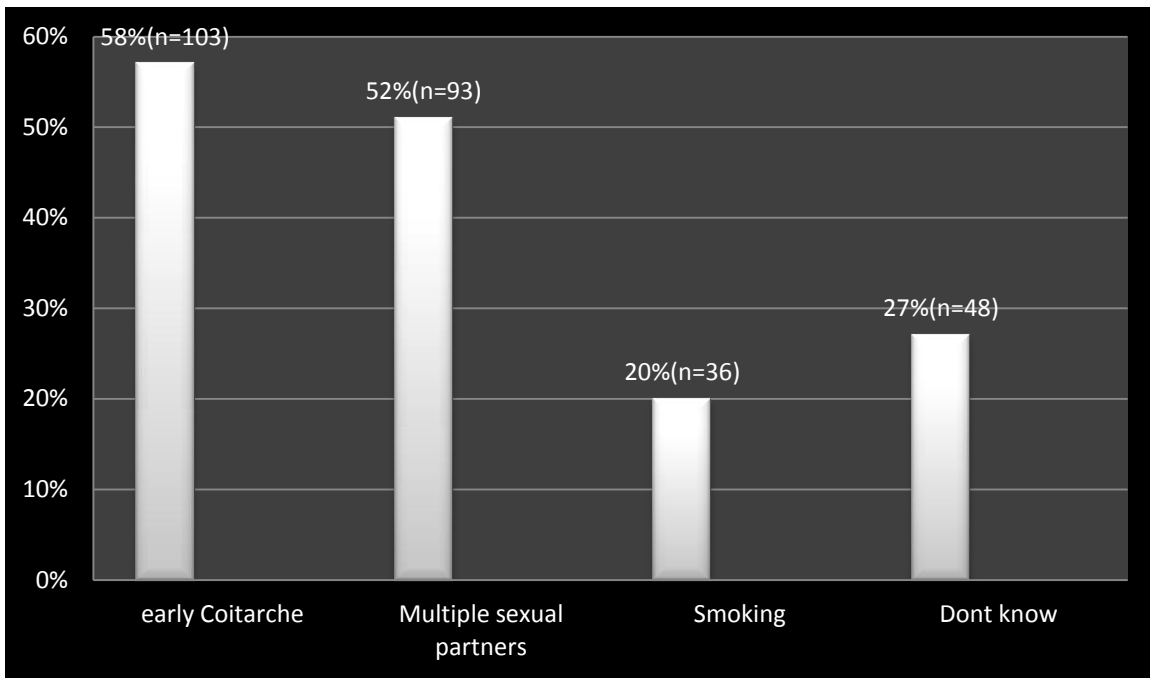


Figure 7: Risk factors identified

Out of 4 options that the respondents were asked to indicate which ones they thought were risk factors for cervical cancer (3 of which were correct), 23 (13%) were able to identify all the three risk factors while 50 (28%) did not know what the risk factors were (Figure 8).

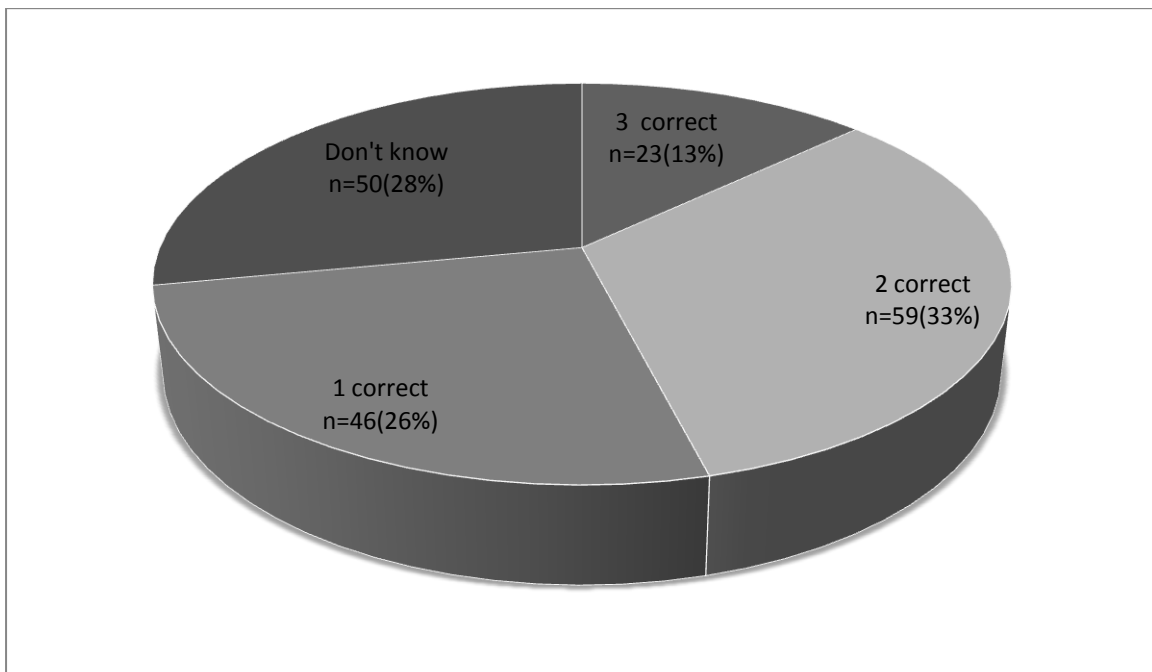


Figure 8: Number of correct risk factors identified

There was a significant association between knowledge about risk factors for cervical cancer and the different programmes enrolled ($p=0.02$). Highest levels of knowledge were found among students studying medicine and those in health science programmes while students studying humanities had the lowest levels of knowledge (Table 10).

Table 10: Comparison of knowledge of risk factors and programme enrolled

Programme	Number of correct risk factors identified				P value
	≥ 2	1	Don't know	Total(178)	
	n(%)	n(%)	n(%)	n	0.02
Humanities	16(41)	10(26)	13(33)	39	
Medicine	18(72)	3(12)	4(16)	25	
Other Health Sciences	10(72)	2(14)	2(14)	14	
Science	29(63)	4(9)	13(28)	46	
Commerce	35(65)	1(2)	18(33)	54	

Significant differences in the knowledge of risk factors were also noted in the ethnic groups ($p=0.02$). Non-black students were more likely to be aware of the risk factors than black students. Fifty three percent ($n=16$) of non-black vs 43% ($n=66$) of blacks were aware of at least 2 risk factors for cervical cancer. (Table 11).

Table 11: Comparison of knowledge of risk factors and ethnic group

Ethnic group	Number of correct risk factors identified				P value
	≥ 2	1	Don't know	Total(178)	
	n(%)	n(%)	n(%)	n(%)	0.02
Black	66(43)	38(26)	44(30)	148(100)	
Non-black	16(53)	8(27)	6(20)	30(100)	

Smokers were less knowledgeable about the risk factors than non-smokers. Twenty-one percent of smokers vs 48% of non-smokers were aware of at least 2 risk factors for cervical cancer, $p=0.04$ (Table 12).

Table 12: Comparison of knowledge of risk factors and smoking

Smoker	Number of correct risk factors identified				P value
	≥ 2	1	Don't know	Total	
	n(%)	n(%)	n(%)	n=178(%)	0.04
Yes	2(21)	8(57)	3(22)	14(100)	
No	79(48)	28(23)	47(29)	164(100)	

There was no association between knowledge of risk factors and frequency of condom use ($p=0.1$) or number of sexual partners ($p= 0.5$).

3.4.3. Knowledge of preventive measures and its correlates

Out of all who had heard of cervical cancer, 88 (49%) thought it was a preventable disease. The majority of them identified the cervical cytology and delaying age of sexual debut as preventive measures for cervical cancer ($n=59$, 67% and $n=54$, 61% respectively) while 23 (26%) thought not smoking would prevent cervical cancer. Again, there was overlap in that most of the respondents identified more than one preventive measure (Figure 9).

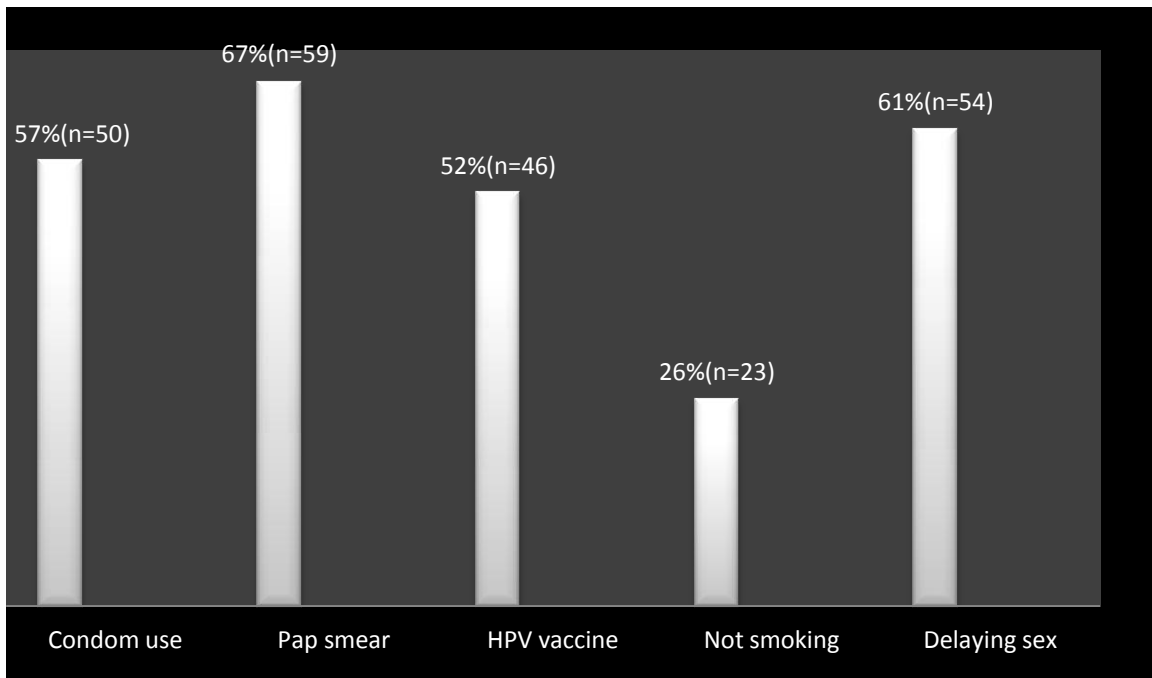


Figure 9: Preventive measures for cervical cancer identified

Out of the seven options (5 of which were correct), that respondents were asked to indicate which ones they thought were the preventive measures for cervical cancer, 17% identified all the five preventive measures. Overall 42 (47%) of those who thought cervical cancer was preventable identified at least 3 out the 5 preventive measures. (See table 13).

Table 13: Distribution of number of correct answers for preventive measures

No. of correct answers	n=88	%(100)
Five	15	17
Four	10	11
Three	17	19
Two	27	31
One	19	22

There was a significant association between knowledge of preventive measures and the programme the student was enrolled in ($p=0.01$). Medical students and those students in other health science programmes were more likely to have identified at least three out of the five preventive measures than students in other programmes (72% and 70% of medical and health science students respectively vs 29%, 39% and 45% of arts, science and commerce students respectively) (Table 14).

Table 14: Comparison of knowledge of preventive measures and programme enrolled

Programme	Number of correct answers			Total	P Value
	≥ 3	2	1		
	n (%)	n(%)	n(%)	n=88(100%)	0.01
Humanities	8(29)	6(28)	9(43)	21	
Medicine	13(72)	3(16)	3(16)	19	
Other Health Sciences	7(70)	3(30)	0	10	
Science	7(39)	8(44)	3(17)	18	
Commerce	9(45)	7(35)	4(20)	20	

There was no association between knowledge of preventive measures and number of partners ($p=0.2$) and smoking status of the student ($p =0.2$)

3.4.4. Knowledge about cervical cytology

Of those who had heard of cervical cancer, 146 (81%) had heard about cervical cytology. Eighty-eight (60%) were aware that its use was to screen for cervical cancer, 31 (21%) gave a wrong answer (to clean the womb, to check for sexually transmitted infections, to check for any gynaecological cancer and to check the vagina), and the remainder, 27(19%) did not know what cervical cytology was used for.

Thirty four (18%) of the respondents had had a cervical cytology test performed.

3.5. Knowledge about HPV

Eighty one (43%) of the respondents had heard about HPV (Figure 10).

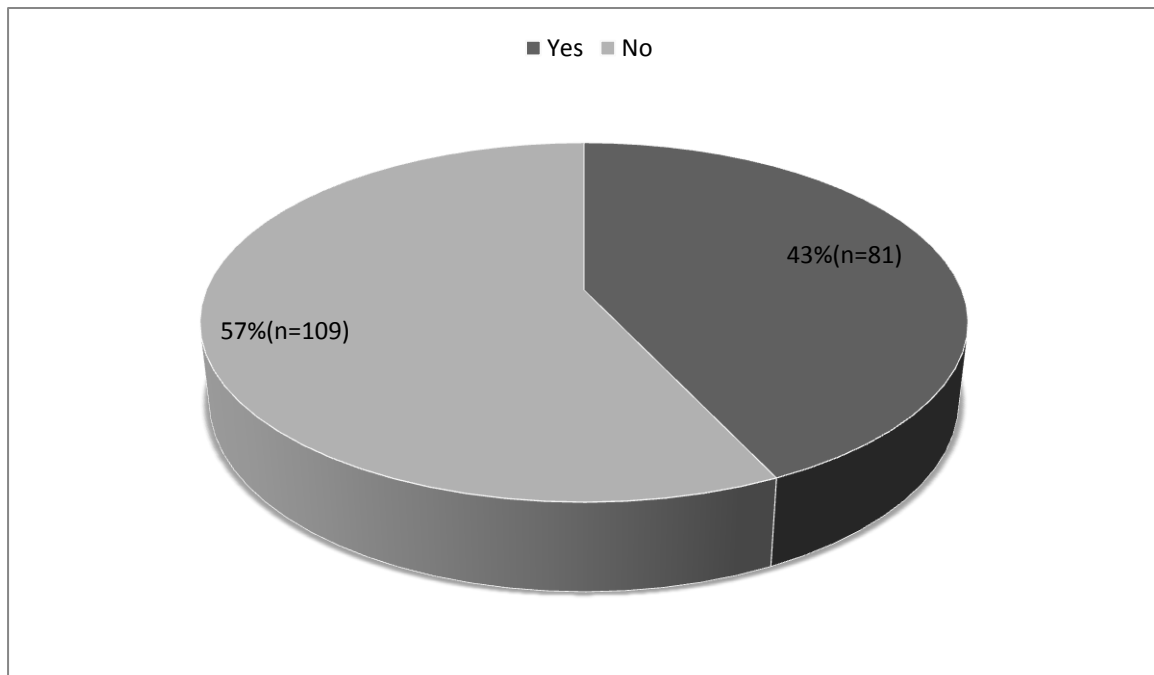


Figure 10: Proportion of respondents who had heard of HPV

Out of those who had heard of HPV, 50 (62%) were aware HPV could cause genital warts, 68 (84%) were aware it could cause cervical cancer, 46 (57%) were aware HPV was common in women in their 20s, 48 (59%) were aware HPV is usually asymptomatic, 51 (63%) were aware both men and women could get HPV, and 62 (76%) were aware it was sexually transmitted (Table 15). There was no significant association between knowledge of how HPV is transmitted and frequency of condom use ($p=0.8$).

Table 15: Distribution of answers to specific questions on HPV

	Yes	No	Don't know
	n(%)	n(%)	n(%)
HPV can cause genital warts	50(62)	3(3)	28(35)
HPV can cause cancer	68(84)	3(3)	11(13)
HPV is common in women in their 20s	46(57)	4(4)	31(39)
HPV is usually asymptomatic	48(59)	7(9)	26(32)
	Women only	Both men & women	Don't know
Who can get HPV	22(27%)	51(63%)	8(10%)
	Sexually	Don't know	Wrong answer
HPV transmission	62(76%)	11(14%)	8(10%)

3.5.1. Source of information about HPV

Of those who had heard of HPV, 46 (57%) had heard about it from a class or lecture, 33 (41%) from the media (magazine, television, newspaper or internet). Nine-teen (23%) had heard about it from a parent, family member or friend while 13 (16%) obtained the information from medical staff. The majority had more than one source of information.

3.5.2. Correlates of knowledge about HPV

Sexually active students were more likely to have heard about HPV than those that were not sexually active (50%, n=45, sexually active vs 35%, n=36) not sexually active (p=0.03) (Table 16).

Table 16: Comparison of having heard about HPV and sexual activity

Sexually active	Heard about HPV			P value
	Yes	No	Total	
	n(%)	n(%)	n(%)	0.03
Yes	45(50)	44(50)	89(100)	
No	36(35)	65(65)	101(100)	

Those who accessed medical aid from private hospitals were more likely to have heard of HPV than those who accessed it from state hospitals or both private and state hospitals (52% in private vs 30% in state hospitals vs 33% in both, $p=0.01$) (Table 17).

Table 17: Comparison of having heard about HPV and where medical aid accessed

Medical care	Heard about HPV		Total(190)	P value
	Yes	No		
	n(%)	n(%)	n(100%)	0.01
Private	56(52)	51(48)	107	
State	23(30)	54(70)	77	
Both	2(33)	4(67)	6	

Students from high socio-economic status backgrounds were more likely to have heard of HPV than those from low socio-economic families (47% from high vs 30% from low socio-economic status families had heard of HPV, $p < 0.01$) (Table 18).

Table 18: Comparison of having heard about HPV and socio-economic status

Bread winner	Heard about HPV		Total(190)	P value
	Yes	No		
	n(%)	n(%)	n(100%)	< 0.01
High socioeconomic status	67(47)	76(53)	143	
Low socioeconomic status	14(30)	33(70)	47	

Medical students and students in other health science programmes were more likely to have heard about HPV than students in the other programmes (92% and 86% in medicine and health sciences respectively, vs 42%, 28%, and 23% in humanities, commerce and science respectively) $p < 0.01$ (Table 19).

Table 19: Comparison of having heard about HPV and programme enrolled

Programme	Heard about HPV		Total	P value
	Yes	No		
	n(%)	n(%)	n=190(100%)	
Humanities	18(42)	25(23)	43	<0.01
Medicine	23(92)	2(8)	25	
Other Health Sciences	12(86)	2(15)	14	
Science	11(23)	37(77)	48	
Commerce	17(28)	43(72)	60	

There was no significant difference between having heard about HPV and frequency of condom use, $p = 0.7$.

Out of 5 specific questions about HPV that were asked, 57 (70%) of the respondents were correct in at least three questions. Medical and other health science students were more likely

to get at least 3 questions right than students from other programmes (87% and 92% in medicine and health sciences respectively vs 61%, 50 % and 59% in arts, science and commerce respectively), $p=0.04$ (Table 20).

Table 20: Comparison of number of correct answers and programme enrolled

Programme	Number of correct answers out of 5		Total (n=81)	P value
	≥ 3	<3		
	n(%)	n(%)		0.04
Humanities	11(61)	7(29)	18	
Medicine	20(87)	3(13)	23	
Health Science	11(92)	1(8)	12	
Science	5(50)	5(50)	10	
Commerce	10(59)	7(41)	17	

There was no association between knowledge of how HPV is transmitted and frequency of condom use ($p=0.8$).

Knowledge of HPV as a possible cause of cancer was highest among medical students (100%) and students in other health science programmes other than medicine or nursing (92%). This knowledge was lowest among those studying Commerce (65%), $p=0.008$ (Table 21).

Table 21: Comparison between programme enrolled and knowledge of HPV as a cause of cervical cancer

Programme	HPV can cause cancer			Total	P value
	Yes	No	Don't know		
	n(%)	n(%)	n(%)	n(%)	0.008
Humanities	15(83)	0	3(17)	18(100)	
Medicine	23(100)	0	0	23(100)	
Other Health sciences	11(92)	1(8)	0	12(100)	
Science	8(73)	0	3(27)	11(100)	
Commerce	11(65)	1(6)	5(29)	17(100)	

Knowledge of HPV as a possible cause of genital warts was highest among medical students (87%) and in students in other health science programmes (83%) and lowest among science students (27%) ($p=0.001$) (Table 22).

Table 22: Comparison between programme enrolled and knowledge of HPV as a cause of genital warts

Programme	HPV can cause genital warts			Total(n=81)	P value
	Yes	No	Don't know		
	n(%)	n(%)	n(%)	n(100%)	0.001
Humanities	8(44)	2(11)	8(44)	18	
Medicine	20(87)	0	3(13)	23	
Health	10(83)	1(8)	1(8)	12	
Science					
Science	3(27)	0	8(73)	11	
Commerce	9(53)	0	8(47)	17	

There was no association between students in the different programmes and their knowledge of how HPV is transmitted ($p=0.6$), of who could get HPV ($p=0.1$) and of the fact that HPV could be asymptomatic ($p=0.6$).

Forty-two (52%) of the respondents who had heard about HPV reported not being worried of getting HPV infection, 24(30%) were a little worried and 15 (18%) were very worried. The degree of worry about the infection was not significantly related to whether they were sexually active or not ($p=0.1$), the number of sexual partners they had had ($p=0.2$) or how frequently they used condoms ($p=0.2$).

3.6. Knowledge about HPV vaccine

Out of all the respondents, 51 (27%) had heard about the HPV vaccine (Figure11).

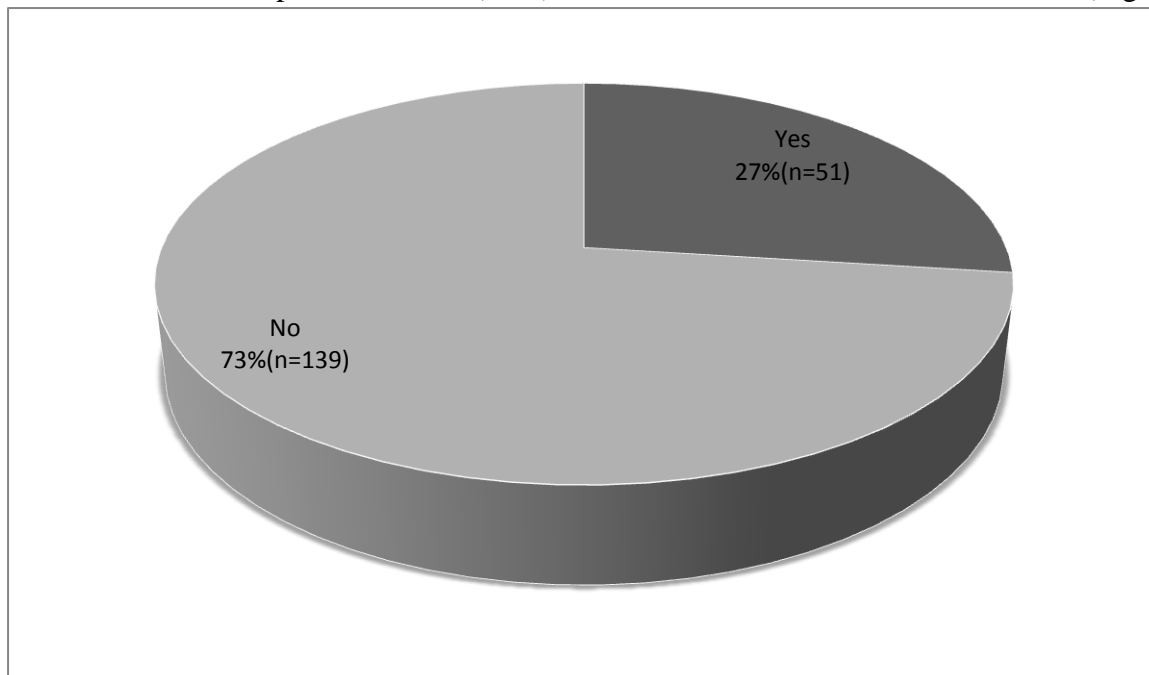


Figure 11: Proportion heard about HPV vaccine.

Of those who had heard of the vaccine, 31 (61%) were aware that the recommended age group was 9-26 years, 34(67%) were aware it was only females who are eligible to get the vaccine, and 33(65%) were aware that the currently available vaccines protect against genital warts and cervical cancer (Table 23).

Table 23: Distribution of answers to specific questions on HPV vaccine

Recommended age group	9-26 yrs	27-40 yrs	41-50 yrs	Don't know
	31(61%)	12(23%)	0	8(16%)
Who is eligible	Males	Females	Both	Don't know
	0	34(67%)	14(27%)	3(6%)
Protective against cancer and warts	True	False	Don't know	
	33(65%)	6(12%)	12(23%)	

3.6.1. Correlates of knowledge about HPV vaccine

Black students were less likely to have heard of HPV vaccine than the non-black students (24% vs 41%), $p=0.04$ (Table 24).

Table 24: Comparison of having heard about HPV vaccine and ethnic group

Ethnic group	Heard of HPV vaccine			P value
	Yes n(%)	No n(%)	Total n(%)	
Black	38(24)	120(76)	158(100)	0.04
Non-black	13(41)	19(59)	32(100)	

Sexually active students were more likely to have heard about the vaccine than those who were not sexually active (35% vs 20%), $p = 0.017$ (Table 25).

Table 25: Comparison of sexually active with having heard of HPV vaccine

Sexually active	Heard about HPV vaccine		Total(n=190)	P value
	Yes n(%)	No n(%)		
Yes	31(35)	58(65)	89(100)	0.01
No	20(20)	81(80)	101(100)	

There was a significant association between the programme in which the students were enrolled and awareness of the HPV vaccine. Students studying medicine or other health science programmes were more likely to have heard about the HPV vaccine (68% and 64% respectively) than the rest of the group, $p < 0.01$ (Table26).

Table 26: Comparison of programme enrolled with having heard about HPV vaccine

Programme	Heard about HPV vaccine		Total(n=190)	P value
	Yes	No		
	n(%)	n(%)	n	<0.01
Humanities	14(33)	29(67)	43	
Medicine	17(68)	8(32)	25	
Health Sciences	9(64)	5(36)	14	
Science	5(10)	43(90)	48	
Commerce	6(10)	54(90)	60	

No significant differences were however noted in knowledge of specific aspects of the HPV vaccine among students in the various programmes.

4. DISCUSSION

Unfortunately, only 22% of the questionnaires distributed were completed and returned. The results might have been different if all the students had completed the questionnaire or had been interviewed. This low return rate might have created bias in our findings. From the outset of the study, however, it was anticipated that there would be a substantial 'non return' of the questionnaires and hence the aim of questionnaires to be analysed being set at 200 as stated previously in the Methodology. Other similar studies have however shown higher return rates. The study among university students in Kwazulu-Natal had a return rate of 97% (28) while the study in the Eastern Cape had a return rate of 74% (27). This may reflect different methods of distribution and collection.

In our study, awareness about cervical cancer was found to be very high (95%). This is higher than the rates reported in most studies in and outside South Africa among the general population as well as amongst adolescents (28, 21, 24, 26). In South Africa, 22% of women interviewed in an ART clinic in Cape Town (19) and 61% of women attending an ante-natal clinic in a Johannesburg township (21) had heard of cervical cancer. Only 53% of students in a study conducted in a Nigerian university had heard of cervical cancer (26) and less than half (42.9%) of the students Mangosuthu University of Technology in KZN had heard of cervical cancer (28). In the University of Transkei in the Eastern Cape, 74% of the students had heard of cervical cancer (27). Lower levels of education in the studies performed among adult women in South Africa might explain their lower levels of awareness. Just over one third (36%) of the women in the Johannesburg ante-natal study had received tertiary education (21). It has been shown that higher level of education is associated with better knowledge about HPV and cervical cancer (16).

In our study, over a third of the students (39%) had heard about cervical cancer in a class or lecture. The KZN study was conducted in a university of technology which does not offer any health science programmes and this might explain their lower levels of awareness. The study in the Eastern Cape included medical students which may be why their level of awareness was relatively high.

Another possibility is that levels of awareness about cervical cancer differ between the provinces reflecting how much health education is being given in the various provinces in South Africa.

In our study, more than half (60%) of those who had heard of cervical cancer obtained the information through the media or internet and only 16% had heard about it from health professionals. The KZN study showed comparable findings where only 19% of the students reported having obtained the information from a health professional and in the Eastern Cape study, only 7% obtained the information from a clinic. However the KZN study showed a much lower proportion (19%) of students who had obtained the information from the media (28). Our study has shown the role that the media may have in educating women about health issues. Therefore, use of the media to disseminate health messages should be encouraged.

Health professionals also have a role to play in educating women about cervical cancer. Our study however showed that a very small proportion of the respondents had obtained information about cervical cancer from a health professional. Health professionals may have to make greater efforts to educate their patients about cervical cancer regardless of age. The screening policy for cervical cancer in South Africa is to perform cervical cytology from the age of 30 years. The majority of the study populations in our study, the KZN, and Eastern Cape studies were less than 30 years old. It is possible that women who are younger than the recommended age group for cervical cancer screening are not usually

educated about the cancer by health professionals. However, it is important to remember that most of the lifestyle modifications that could prevent cervical cancer should start well before screening for cervical cancer starts and therefore it is important to educate young women about such lifestyle issues. In addition, one study among adolescents in the US showed that adolescents prefer to get information on sexual health from a health professional and not the media (22).

In our study, just over half of those who had heard of cervical cancer were able to identify early coitarche (58%) and multiple partners (52%) as risk factors for cervical cancer. Only 20% knew smoking was a risk factor for cervical cancer. The level of awareness of these risk factors followed the same trend in the studies performed among university students in Eastern Cape and Kwazulu Natal. In the Eastern Cape, 34% of the respondents identified early age of sexual debut and 57% multiple partners as risk factors (27). In KZN 28% and 31% identified early sexual debut and multiple partners respectively as risk factors for cervical cancer and 18% identified smoking as a risk factor (28). The trend is similar in developed countries. One study in the US showed that adolescents underestimated smoking and poor nutrition as risk factors for cervical cancer (22). In our study, knowledge of risk factors for cervical cancer, particularly smoking was poor and this knowledge was particularly low among smokers. There is therefore a need to emphasise the role of smoking as a risk factor for the development of cervical cancer.

There was no association between knowledge of risk factors and number of sexual partners in our study. This suggests that knowledge of risk factors did not actually result in behaviour change.

Among those who had heard of cervical cancer, only 49% thought it was a preventable disease. Knowledge that cervical cancer is a preventable disease among KZN students was comparable to our findings (41%) (28), but was lower in the study in Eastern Cape (29%) (27), and in the

study performed in Johannesburg (21) among 18-44 year old women (39%). In our study, just over half of the 88 students who thought cervical cancer was a preventable disease thought condom use and HPV vaccine could prevent cervical cancer (56%, 52% respectively). The low level of knowledge of cervical cancer as a preventable disease is worrying. Women are less likely to use screening facilities, HPV vaccine or modify their lifestyles if they don't fully understand what the benefits of doing this are. Therefore, in our health education messages, it is important to emphasise the fact that cervical cancer is a preventable disease.

Even though a high proportion of the students (82%) had heard of cervical cytology, there were many misunderstandings about its use. Sixty percent knew it was used to screen for cervical cancer and the remaining 40% either gave a wrong answer or did not know what cervical cytology was used for. However, the proportion of cervical cytology awareness in our study was much higher than the KZN study which showed that only 42% of the students had heard of pap smear and only 38% of them knew the use of it (28). There is need to give women the right information on the use of cervical cytology in order to increase uptake of this screening method.

Less than half (43%) of the respondents in our study had heard of HPV. Most studies have also shown low levels of HPV awareness (15, 21, 24, 25, 26). In our study, sexually active students were more likely to have heard about HPV than those who were not sexually active. The findings in a Portuguese study were different where the level of awareness about HPV was not different between the two groups (24). It is a concern that those who are not sexually active are less aware of HPV. This is the group we should be focussing on in educating about HPV so that precautions can be taken to prevent the infection when they become sexually active.

As in other studies (24, 26), our study also showed that health science students were more aware of HPV and cervical cancer than those in other fields. There is need to propagate

information on HPV to students in other programmes where sexual health is not part of their curricula using other forms of materials such as pamphlets. It may also be true that health science students are more naturally aware of health information than non health science students.

It was shown in our study that students accessing medical care from private hospitals were more likely to have heard about HPV and HPV vaccine than those in state hospitals. Because of its high cost, the HPV vaccine is available only in private hospitals in South Africa. This might explain why students in private hospital were more likely to have been exposed to some information about HPV and the vaccine. However social surroundings, exemplified by access to private health care, could also play a role in knowledge about HPV in this group of women.

Eighty four percent of the 81 students who had heard of HPV knew HPV was a possible cause of cervical cancer. In the study among ante-natal clinic attendees in Johannesburg, 67% of those who had heard of HPV were aware of the link between HPV and cervical cancer (21). Among Ghanaian university students, only 8% knew of this link (25), 48% knew about the link among university students in KZN (28) and 68% among students in Eastern Cape(27). The higher level of awareness of this link in our study than in other studies among university students can be explained by the fact that the topics on HPV and cervical cancer are part of the curricula among medicine and health science programmes and the other universities do not have health sciences faculties, though, as emphasized, health science students may have greater general health awareness as much as benefiting from formal health education.

It is important for women to know about the link between HPV and cervical cancer. This would motivate them to practise preventive measures e.g condom use and the HPV vaccine.

In our study, only 27% of the respondents had heard of the HPV vaccine. This is comparable to a study in the United States in 2008 among university students in which awareness about the

vaccine was 22% (22). Again, in our study, sexually active students were more likely to have heard about the vaccine than those who were not sexually active. This is a concern because to achieve maximum benefit of the vaccine, it should be given to girls before they contract HPV i.e before they become sexually active. It would be a good thing for those who are not sexually active to be made aware of the vaccine and its benefits so that decisions to vaccinate can be made before they become active.

Just below half (47%) of the students in our study were sexually active. This rate is comparable to the KZN study that showed just over half (51%) of the students were sexually active (28). These proportions are however much lower than those that have been reported in other studies. In the study among students in the University of Transkei in Eastern Cape in 1998, 87% of students were said to be sexually active (27). In another study among a representative sample of 15-24 year olds from all the nine provinces in South Africa in 2007, 68% of the respondents reported being sexually active (29). It has been shown among South African youth that delayed sexual debut was associated with higher education attainment (32). This might explain why university students were less likely to be sexually active than youth in the general population. It is also possible that we are seeing a downward trend in sexual activity among the youth where young women are deciding to delay sex. This could be in response to the message of abstinence as a way of preventing HIV infection. The other explanation might be that the students were not entirely honest in disclosing their sexual activity owing to the sensitive nature of the subject.

In our study, condom use among those that were sexually active was high - 97% of those who were on some form of contraception (83%) used the condom either alone or with another form of contraception. This is higher than what was shown among KZN where condom usage was 81% (28). It is also much higher than what was reported in the 2007 survey of a national representative sample of South African 15-24 year old adolescents which showed that only

33% used the condom. In that study, it was shown that 67% were on hormonal contraceptives only (32). The study in the Eastern Cape University in 1998 also showed a very high rate of hormonal contraceptive usage (89%) with condom usage of only 10% (27). Our study showed very little hormonal contraceptive use (3%). This suggests a possible shift among the South African youth to use condoms for contraception rather than hormonal contraceptives, though other explanations, for example regional differences and differences of study groups, are possible. If there were an increase in condom use, this might be explained by health education messages that advocate for condom use as a way of preventing HIV. Use of condoms should be encouraged, not only as a preventive measure for HIV but also for HPV and subsequently cervical cancer.

In our study, over half (62%) of the respondents whose partners used the condom reported using it every time they had sexual intercourse. This is comparable to the KZN study that showed that 63% reported using the condom all the time (28). Although this proportion is high, it would be better if all those using condoms used them all the time in order to achieve maximum benefit. Using it sometimes unsurprisingly offers less protection against HPV than using it all the time (31).

Mean age at coitarche in our study was 18 years. This is comparable to other South African studies (4, 27, 28). Fourteen percent of the respondents in our study had their coitarche at the age of 16 years or less and the youngest age of sexual debut was 13 years. Therefore, if we are to legislate HPV vaccination in South Africa, these ages will have to be borne in mind. Young girl will definitely have to be vaccinated at least before they reach the age of 13 years. There is need for more studies on a larger scale to determine the age at which an average South African girl initiates sexual activity. Those students whose sexual debut was at the age of 16 years or less are particularly at high risk of developing cervical cancer later in life (4) and would therefore benefit the most from this vaccine.

Twenty one percent of the study population reported having more than 5 sexual partners in their life time. This again increases their risk for developing cervical cancer (4). It is particularly worrying that smokers reported earlier ages of sexual debut and a higher number of sexual partners than non-smokers and were less knowledgeable about risk factors for cervical cancer. All these facts put them at a particularly high risk for cervical cancer. Young women who smoke should therefore be a subgroup which should receive special attention as far as health education messages about cervical cancer are concerned.

5. CONCLUSION

Our study showed that knowledge of risk factors and preventive measures for cervical cancer was poor even though awareness of the cancer was high. Less than half of the subjects knew that cervical cancer was a preventable disease and there were many misconceptions about the use of the cervical cytology. There is therefore a need to concentrate on educating women on the preventable nature of the disease.

Knowledge of HPV was low in this study population. This shows that even though these women were aware of cervical cancer, its link to HPV was not known to them. Sexual health messages have focused on preventing HIV while ignoring other sexually transmitted infections such as HPV. Health education messages about HPV can be incorporated in HIV messages since both infections are sexually transmitted and therefore have similar preventive measures. Knowing that using a condom for example, will protect against HPV, HIV and cervical cancer will perhaps motivate women to use it consistently.

Even though the participants in our study were in an age group eligible for HPV vaccine and majority obtained their medical care in private hospitals where the HPV vaccine is currently available, very few of them knew about the vaccine. This means that even those women that

have access to the vaccine don't actually know about it. Educating young women about the vaccine might help improve the vaccine uptake.

Just over half of the students in this study were not sexually active. This is possibly a reflection of the positive impact of the abstinence message as a preventive strategy for HIV. However, this study showed that among those who were sexually active, there is still a group that has remained resistant to health messages on HIV and risky sexual behaviour such as inconsistent condom use and multiple sexual partners still exist even among educated women. This puts these women at risk of HIV and HPV infection as well as cervical cancer. There is therefore a need to continue giving health messages in the hope of further modifying these practices.

APPENDIX A : QUESTIONNAIRE

The following questionnaire is voluntary and *entirely confidential*. Note that your name *does not appear* on the form. Also note that your room number *does not appear* on the form. You may leave out any questions. This questionnaire is from the Dept of Obstetrics and Gynaecology at Wits. It is to help us to find out about what people know, and what their actual experience is. We actually do not know. Please fill out the form if you can. Please place the completed form in the big box by the door to the Res. The forms are hard to steal. Even if someone did.....they would have *no idea* whose forms they were. Thank you for helping. Please contact Dr Edridge(082-331-3656), or Dr Kalua(082-218-4738), if you would like to. Your enquiry will be *completely confidential, and can be anonymous*. **Please place the filled in Questionnaire in the box within a week of receipt.**

Study number

QUESTIONNAIRE

A) SOCIO- DEMOGRAPHIC CHARACTERISTICS

1) Age

2) Program enrolled

3) Year of study

4) Sex (please circle) Male Female

5) Ethnicity (please circle) Black White Indian Other

6) Where do you access medical care ? (please circle)

Public Sector

Private hospital

7) What is the profession of the bread winner(s) in your family? (please circle)

a) Upper management / Big business owner

b) Mid- Management/ Clerk / Junior public servant / Professional

d) Small business owner

e) Manual worker/tradesperson

e) Other.....

8) Do you smoke? (please circle) Yes / No

B) SEXUAL HISTORY.

9) Have you ever had sex? (please circle) Yes / No

10) If yes, how old were you when you first had sex?..... years. If not, leave blank

11) How many sexual partners have you had?

12) Are you on any contraception? (please circle) Yes / No

13) If yes, which one? (please circle – you may circle more than one, or none)

- a) Condom
- b) The injection
- c) The pill
- d) The loop (IUCD)

14) If your answer in Quest 13 is Condom, how often do you use it? (please circle)

- a) All the time
- b) Most of the time
- c) Sometimes

C) KNOWLEDGE ABOUT HUMAN PAPILLOMA VIRUS (HPV)

15) Have you ever heard of the Human papilloma virus (HPV) ? (please circle) Yes / No

(If your answer is Yes proceed. If No, please go to section D)

16) Who/What was the source of the information regarding HPV? (please circle, circle more than one if you wish)

- a) Parent
- b) Classmate/Friend
- c) Family member
- d) Medical or Nursing staff

e) Lecture/Class

f) Other (please circle) (a) Magazine (b)TV (c)Radio (d)Newspaper

17) How is HPV transmitted?
.....

18) HPV can cause Cervical Cancer (please circle) True False Don't know

19) HPV can cause genital warts (please circle) True False Don't know

20) Who can become infected with HPV? (please circle)

a) Men only

b) Women only

c) Both Men and Women

d) Don't know

21) HPV is common in women in their 20s (please circle)

True False Don't know

22) Most people with genital HPV do not have symptoms of the infection (please circle)

True False Don't know

23) How worried are you of getting HPV? (please circle)

a) Not worried

b) A little worried

c) Very worried

D)KNOWLEDGE ABOUT HUMAN PAPILLOMA VIRUS (HPV) VACCINE

24) Have you ever heard about the HPV Vaccine?.....(please circle) Yes / No

(If your answer is Yes, proceed . If No, please go to Section E)

25) For which age group(s) is it recommended? (please circle)

c) Multiple sexual partners

d) Smoking

e) Don't know

31) Have you ever heard of a Pap smear (please circle) Yes / No

32) If Yes, what is its use? If No please leave blank and pass to Quest 34

.....
.....

33) Have you ever had a Pap smear (please circle) Yes / No

34) Is cancer of the cervix preventable? (please circle) Yes / No / Don't know

35) If Yes, which of the following are preventive measures for this type of cancer?
(please circle, more than one if you like). If No do not answer

a) Using Condoms

b) Good hygiene

c) Pap smear

d) Human papilloma virus (HPV) Vaccine

e) Not smoking

f) Exercise

g) Delaying age of first sexual contact

APPENDIX B: ETHICS CLEARANCE

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Dr Evelyn Kalua

CLEARANCE CERTIFICATE

M10654

PROJECT

A Study to Assess Knowledge of Human Papilloma Virus (HPV), HPV Vaccine, Cancer of the Cervix, and Recent and Current Sexual Practice amongst Students at University of the Witwatersrand

INVESTIGATORS

Dr Evelyn Kalua.

DEPARTMENT

Department of Medicine

DATE CONSIDERED

25/06/2010

DECISION OF THE COMMITTEE*


Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE

29/07/2010

CHAIRPERSON.....


(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Dr W Ederidge

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**
PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

APPENDIX C: INFORMATION SHEET

INFORMATION SHEET

Hello, my name is Evelyn Kalua. I am a doctor in the Obstetrics and Gynaecology Department of Chris Hani Baragwanath Hospital. We are conducting a research to assess how much students know about the Human Papillomavirus (HPV), the Human Papillomavirus vaccine and cervical cancer. We are finding this out by asking students to fill in a questionnaire. This questionnaire has been approved by The Wits Human Research Ethics Committee (Medical) and is being distributed to all students in the residential halls at Wits. Questions relating to socio-demographic characteristics, sexual history, and questions to assess how much you know about HPV, HPV vaccine and cervical cancer will be asked. This information will help us determine how much the youth know about these issues and help us in designing education programmes regarding these topics. This research is entirely voluntary. In other words, a person who does not want to be involved does not have to complete the questionnaire. If a person does agree to take part in the study but finds certain questions that they do not wish to answer, they do not have to answer those questions, and a person may withdraw from the study if at any time they wish to. Anyone who takes part will not gain from taking part, nor will they be paid for taking part.

All answers given, if a person takes part, will be entirely confidential i.e. nobody else will be allowed to see them. The answer sheets will not have any name on them and it will not be possible to identify an individual from their answers in any way. By returning the questionnaire, it is accepted that consent to participate in the study has been given.

A box will be placed at the reception area in your residential hall. After completing the questionnaire, please place it in the box. Your answers will not be at all traceable to yourself.

Please do not hesitate to contact us on the following numbers after completion of the questionnaire if you have anxieties or uncertainties: 0822184738 (Dr Kalua) or 0823313656 (Dr Edridge). Your enquiries can be completely anonymous.

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