



The Open Public Health Journal

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RESEARCH ARTICLE

The Knowledge of Female Students Regarding the Human Papilloma Virus and Vaccines at a Selected University in South Africa

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Abstract:

Background:

The Human Papillomavirus (HPV) is one of the viruses that causes high mortality rates worldwide, and if not detected and treated early, it may lead to fatal complications such as cervical cancer and breast cancer.

Purpose:

The aim of this study was to determine the knowledge of female students regarding the Human Papillomavirus (HPV) and its vaccines at a selected University in the Limpopo Province, South Africa.

Methods:

A quantitative approach was adopted in this cross-sectional descriptive study. The target population was all female students residing in the university residences on campus, and a sample size of 310 students was determined. A systematic sampling technique was used to select the rooms of students, and a self-administered questionnaire was used to collect data. Data collected was analysed using SPSS version 26, and results were presented in the form of frequency and percentages.

Results:

Out of the 310 respondents, 56.8% had never heard about the HPV, while 43.2% had heard about the HPV and its vaccines. The majority (82.9%) of the respondents were uncertain about the two HPV vaccines available in South Africa, while only 1.9% of the respondents knew that anal cancer is one of the health problems related to HPV. The results of the study further showed that 56.8% of the respondents did not know whether the HPV vaccines prevented cervical cancer or not, while only 6.1% disagreed that the HPV vaccines prevented cervical cancer.

Conclusion:

The study concludes that the female students at the selected university had insufficient knowledge regarding HPV and its vaccines. Since cervical cancer is one of the major causes of death in low and middle-income countries, knowledge regarding HPV and its vaccines is crucial, especially among the young generation, in order to promote the effective prevention of cervical cancer. Community and university radios should have programs about health promotion issues informing the communities about HPV and its vaccines.

Keywords: Cervical cancer, Human papillomavirus, Human papillomavirus vaccines, Female Students, Population, Health promotion.

Article History

Received: November 25, 2020

Revised: February 16, 2021

Accepted: March 8, 2021

1. INTRODUCTION

The Human Papillomavirus (HPV) is a sexually transmitted virus that spreads through genital contact [1]. There are two types of HPV vaccines, namely, Gardasil and Cervarix, which are given to young girls to protect them from dangerous HPV types that can progress into cancer [2].

The findings of a study that was conducted on female nursing students in Switzerland revealed that the majority of students at non-health-related schools did not know about HPV and its vaccines [3]. However, a study conducted in Nigeria revealed that the majority of students knew about HPV and its vaccines, as well as the related infections, but they only heard about it from school [4].

A study conducted at the University of the Free State in South Africa revealed that the majority (76%) of first-year students had knowledge about cervical cancer, while a few

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students (34%) knew that cervical cancer is caused by a virus, but did not know which one. In the same study, a few students (29%) knew that HPV caused cervical cancer and that there are vaccines that protect one from the virus. 71% of students were not aware of the virus that caused cervical cancer and vaccines available to fight against the virus. Findings in the same study further revealed that less than half of the students (43%) knew that the vaccine was provided by the government in South Africa at no cost [5].

The HPV burden is expected to increase more due to the prevalence of HPV risk factors. In 2012 there were 6.7 million cases of cervical cancer caused by HPV worldwide, with 3.5 million deaths among females. The HPV cases are expected to escalate to 9.9 million with 5.5 million deaths annually by 2030 because of the development of the population [6].

There are efforts made by the selected university management, through programs such as first thing first, HIV and AIDS, ZAZI, SHE conquers, cervical cancer, condom and pregnancy week campaigns. All these programs were provided by the university to the students. Despite that, however, students still engaged in excessive alcohol intake during campus parties, which led them to practice unprotected sexual intercourse, resulting in Sexually Transmitted Infections (STIs) and unplanned pregnancies. Therefore, the aim of this study was to determine the knowledge of female students regarding the HPV and its vaccines at a selected university in the Limpopo Province of South Africa

2. MATERIALS AND METHODS

2.1. Study Design

The study used a quantitative, cross-sectional descriptive design to determine the knowledge of female university students regarding the Human Papillomavirus (HPV) and its vaccines in the Limpopo Province of South Africa [7].

2.2. Study Setting

This study was conducted at a rural-based university located in the Limpopo Province of South Africa. Limpopo is one of the nine provinces of South Africa, and it is comprised of only two universities. The selected university is situated in the Northern part of the province in one of the districts which shares land port borders with Zimbabwe and Botswana. The university had a population of approximately 16,117 students in 2019. The institution has eight schools, and female students are accommodated at six residences on campus. The university has one campus clinic that renders primary health care services, and it uses the regional hospital as their referral hospital, which is about 8km from the university.

2.3. Study Population

The study population comprised of all female students residing in the university campus residences, registered for the academic year 2019. At the time, the population of female students residing in campus residences, from which the sample was drawn, was 987.

2.4. Sampling and Sampling Procedure

The Slovin's formula [$n=N / \{1+Ne^2\}$] was used to calculate the sampling size for the study, where n denotes the sample size and N denotes the population size with $e = 0.05$ as the margin of error [7]. The sampling size of 310 was calculated based on the population of 987 female students who were residing on campus in 2019, with 10% added to cover for non-responses. Systematic sampling was used to select rooms in residences from which female students were selected. To determine the sampling interval, the following formula was used: K (sampling interval) = size of the population divided by the sample size, which is represented as N/n [7]. The interval of this study was calculated as $987/310 = 3$. Therefore the interval was 3. The researcher focused only on the females residing inside the campus and went door to door to collect data. Since respondents were residing in their single residence rooms, they were selected using their rooms at an equal interval of every 3rd room. The first room was selected randomly, and after that, every 3rd room was selected. However, in cases where the room was locked with no response, the researcher went to the next room and thereafter visited every 3rd room until the proportional sampling size was reached in each residence.

2.5. Data Collection Instrument

Data was collected from the respondents using a self-administered questionnaire which was constructed guided by the objectives of the study and using literature from previous related studies. It was comprised of close-ended questions and was written in English, the medium of instruction at that particular tertiary institution in South Africa. It was comprised of three sections: Section A (5 questions), consisting of demographic data of the respondents, Section B (5 questions), relating to the sexual history of the respondents, and Section C (15 questions), relating to the respondents' knowledge regarding HPV and its vaccines. This made up a total of 25 questions, which took about five minutes for the respondents to complete.

2.6. Validity and Reliability

To ensure the quality of the results, the questionnaire was presented on 10% (31) of the sample size among female university students who were residing in off-campus residences because they had similar characteristics to the study population. A pre-test was done to find out any possible errors in the instrument, such as unclear instructions, inadequate time limits, as well as the ambiguity of items [7]. However, the findings of the pre-test were not included in the study; instead, they were used to restructure some questions and to determine the time limit of the data collection instrument. To ensure face and content validity, the questionnaire was checked by the supervisors, one of whom was an expert in oncology. The questionnaire was also scrutinized by a reproductive health specialist for validity. Comments from these experts were used to modify and restructure the questionnaire. A test re-test was done to check the stability of the instrument; the same questionnaire was given to the same respondents on two occasions, with 5 days apart, to check if the responses given

were the same on both occasions. Cronbach’s Alpha reliability coefficient was 0.839, indicating consistency in the responses.

2.7. Data Collection Procedure

After obtaining ethical clearance from the ethics research committee, written permission was also obtained from the university student affairs management, and female students were visited in their residences (door-to-door visits) for data collection. An information letter was given and explained to the respondents. Those who were willing to participate were asked to sign an informed consent form indicating that they agreed to participate in the study. The questionnaires were given to the respondents by the researcher in each residence, in their rooms. The respondents were provided with a pen and time to read and complete the questionnaires in their privacy. Each respondent had to put the questionnaire inside a sealed envelope provided in order to maintain privacy, and completed questionnaires were collected on the same day. The researcher was a female master’s student, and the respondents’ responses were not affected in any way.

2.8. Data Analysis

Data were entered into a computer using Microsoft Excel and exported to SPSS Version 26 for analysis. Data were further checked and cleaned to minimize entry errors and

missing or wrong values. Descriptive statistics such as frequencies and percentages were used to analyze data.

3. RESULTS

The data were collected from 310 respondents.

3.1. Demographic Characteristics of Respondents

As shown in Table 1, the majority, *i.e.*, 272 (87.7%), of the respondents, were between the ages of 18 and 26 years, 93 (30.0%) were from the school of management sciences, while 18 (5.8%) were from the school of agriculture.

Table 1 shows that out of 310 respondents, 120 (38.7%) were dating, while 15 (4.8%) were married, 67 (21.6%) were in their first year of study, 104 (33.5%) were in their third year of study, while 50 (16.1%) were in their fourth year of study, or at the honours level. The demographic characteristics of the respondents are presented in Table 1.

3.2. Sexual history of the Respondents

As shown in Table 2, the majority, *i.e.*, 130 (41.9%) of the respondents, had sexual intercourse once a month, while 12 (3.9%) said they had sexual intercourse every day. The results also show that 121 (39%) of the respondents had had one sexual partner in the last 3 years, while 50 (16.1%) had had three or more sexual partners in the last 3 years.

Table 1. Demographic characteristics of the respondents (N=310).

-	Frequency	Percentage (%)
Gender		
Female	310	100
-	-	-
Age		
18-26 years	272	87.7
27-30 years	19	6.1
30years and above	19	6.1
Schools of the respondents		
Management	93	30.0
Education	35	11.3
Human and social sciences	30	9.7
Mathematics and natural sciences	24	7.7
Law	60	19.4
Agriculture	18	5.8
Health sciences	30	9.7
Environmental sciences	20	6.4
Level of study		
1 st year	67	21.6
2 nd year	89	28.7
3 rd year	104	33.5
4 th year/honours	50	16.1
Marital status		
Single	167	53.9
Dating	120	38.7
Cohabiting	8	2.6
Married	15	4.8

The results, as shown in Table 2, further indicate that 147 (47.4%) of the respondents use a condom as a contraceptive method, while 8 (2.6%) of the respondents use an Intrauterine Contraceptive Device (IUCD) or a loop as a contraceptive method. The results again indicate that 117 (37.7%) of the respondents always use a condom during sexual intercourse, whereas 105 (33.9%) of the respondents occasionally use condoms. The results in Table 2 further show that only 42 (13.5%) have been diagnosed with sexually transmitted infections (STIs). Table 3 indicates the sexual history of the respondents.

3.3. Knowledge Regarding the Human Papilloma Virus

Table 3 shows the knowledge of the respondents regarding HPV, and 176 (56.8%) respondents indicated that they had never heard about the HPV, while only 30 (9.7%) had heard

about the HPV from healthcare workers. The study found that 166 (53.5%) of the respondents did not know any health problem related to the HPV, while only 6 (1.9%) knew that anal cancer is a health problem related to the HPV.

Table 3 shows that 206 (66.5%) respondents did not know the medium through which the HPV is transmitted, while only 2 (6%) indicated that the HPV could be transmitted through coughing. Out of 310 respondents, 188 (60.6%) indicated that they did not know about the prevention of HPV, while only 11 (3.5%) indicated that HPV vaccines, antibiotics, and the use of condoms during sexual intercourse could all prevent HPV infections. About 136 (43.9%) indicated that females are the ones most affected by the HPV, while only 3 (1.0%) indicated that the HPV could affect. Table 3 indicates the knowledge of the respondents regarding HPV.

Table 2. Sexual history of the respondents (N=310).

-	Frequency	%
Number of times they have engaged in sexual intercourse	-	-
Everyday	12	3.9
Once a week	45	14.5
Twice a week	54	17.4
Once a month	130	41.9
Never	69	22.3
Number of sexual partners	-	-
One	121	39.0
Two	84	27.1
Three and more	50	16.1
None	55	17.7
Contraceptive methods used by respondents	-	-
Condom	147	47.4
Contraceptive Pill	30	9.7
Contraceptive Injection	26	8.4
IUCD or Loop	8	2.6
None	99	31.9
Consistency of using a condom	-	-
Always	117	37.7
Occasionally	108	34.8
Never	85	27.4
Respondents diagnosed with STIs	-	-
Yes	42	13.5
No	268	86.5

Table 3. Knowledge regarding human papillomavirus (n=310).

Information About HPV	Frequency	Percentages (%)
Ever heard	134	43.2
Never heard	176	56.8
Source of information about HPV	-	-
School	48	15.5
Media	56	18
Healthcare workers	30	9.7
Never heard	176	56.8
Health problems related to HPV	-	-
Cervical cancer	94	30.3
Anal cancer	6	1.9

(Table 3) contd.....

Information About HPV	Frequency	Percentages (%)
Genital warts	20	6.5
Do not know	166	53.5
All of the above	24	7.7
Medium at which HPV is transmitted	-	-
Cough	2	0.6
Genital skin to skin	60	19.4
Contact with body fluid	26	8.4
Don't know	206	66.5
All of the above	16	5.1
Prevention of HPV	-	-
HPV vaccines	65	21.0
Antibiotics	19	6.1
Using a condom	27	8.7
Do not know	188	60.6
All of the above	11	3.5
Gender mostly affected by HPV	-	-
Male	136	43.9
Female	3	1.0
Do not know	117	37.7
Both	54	17.4

Table 4. Knowledge regarding HPV vaccines (N=310).

Knowledge Regarding HPV Vaccines	Agree	%	Uncertain	%	Disagree	%
Two human papillomavirus vaccines are available in South Africa	43	13.9	257	82.9	10	3.2
Human papillomavirus vaccines are available to girls at the primary level	52	16.8	202	65.2	56	18.1
Human papillomavirus vaccines are given to girls before they are sexually active	161	51.9	130	41.9	19	6.1
Human papillomavirus vaccines are given to girls at the age of 9-13 years in SA	58	18.7	214	69.0	38	12.3
Human papillomavirus vaccines prevent cervical cancer	115	37.1	176	56.8	19	6.1
Human papillomavirus vaccines prevent the HPV and STIs	87	28.1	187	60.3	36	11.6
Human papillomavirus vaccines are not effective on HPV infected person	42	13.5	212	68.4	56	18.1
Human papillomavirus vaccines should be given at 6 months interval	61	19.7	222	71.6	27	8.7
Knowledge regarding the HPV vaccines that are available in SA	58	18.7	233	75.2	19	6.1

3.4. Knowledge Regarding the Human Papillomavirus Vaccines

Table 4 indicates the knowledge of respondents regarding the HPV vaccines. The study revealed that the majority, 257 (82.9%) of the respondents, were uncertain about the types of vaccines available in South Africa (SA), while only 10 (3.2%) disagreed that vaccines are available in SA to prevent HPV infection. Furthermore, 202 (65.2%) respondents were uncertain about the HPV vaccines that are available to girls at the primary level, and 52 (16.8%) agreed that the HPV vaccines are available to girls at the primary level. Table 4 also shows that 161 (51.9%) of the respondents agreed that the HPV vaccines are given to girls before they are sexually active, while only 19 (6.1%) disagreed. About 187 (60.3%) students were uncertain whether the HPV vaccines prevented cervical cancer and sexually transmitted diseases (STIs) while 87 (28.1%) agreed that the HPV vaccines prevented HPV and STIs. Table 4 indicates the knowledge of the respondents regarding HPV vaccines.

4. DISCUSSION

According to the results of this study, trends have been indicated regarding the knowledge of respondents when it comes to HPV and its vaccines. Lack of knowledge regarding HPV and its vaccines can have a negative impact on the health of the population, such as taking preventative measures against HPV. The purpose of this study was to assess the knowledge of female students regarding HPV and its vaccines. The results showed that the majority of the respondents were not at all or less knowledgeable about HPV and its vaccines.

The majority, *i.e.* , 272 (87.7%) of respondents, were between the age of 18-26 years; 173 (64%) from that age group reported that they were aware about HPV and its vaccines, and this might be because most of the respondents between the ages of 18-26 years have received the HPV vaccines at the age of 9-13 years at their primary school level. Similarly, a study conducted in New York revealed that few (6.1%) respondents from the age of 27 and above were not knowledgeable about HPV and its vaccines, and the reason might be that the HPV vaccines were introduced after they had passed their primary

school level [8].

Similarly, a study that was conducted among students in Southwest Nigeria revealed that students between the ages of 17 to 20 years were more knowledgeable about the HPV and its vaccines that are given to young girls before they become sexually active and that if the HPV is not treated early, it may lead to cancer [9]. The reason might be that some students between the ages of 17 and 20 years received the vaccine at the primary school level.

The results of this study are also supported by the study that was conducted in Duhok, Iraq, which reported the difference in knowledge between the respondents whose ages ranged between 18-26 years and 27 years and above [10]. Furthermore, according to a study that was conducted in Nigerian tertiary health institutions, 10.3% of the respondents from the age of 27 years and above did not understand HPV and its vaccines because, by the time the HPV vaccines were introduced, they were already older than 13 years, and their school curriculum did not include health-related problems like HPV [4]. The results of this study further revealed that schools of the respondents influenced the knowledge of students regarding the HPV and its vaccines. In the schools that did not focus on human health, such as school of agriculture, law, and environmental studies, the majority of their respondents, *i.e.*, 13 (72%) from the school of agriculture, never heard about HPV, and only 5 (28%) knew about HPV.

The study further reveals that female university students engage in risky sexual behaviour, which may put them at risk of contracting HPV. The results show that 16.1% had had three or more sexual partners, 27.4% did not use condoms, while 33.9% occasionally used condoms during sexual intercourse. According to the Health Belief Model, perceived severity is the belief that encourages one to take preventative measures against certain diseases when they realise the physical and social consequences of the disease [14]. In this study, female university students engaged in risky sexual behaviour because they were likely unaware of HPV and its complications. Contrarily, a study conducted in Saudi Arabia revealed that the use of alcohol and drugs may cause students to be involved in unprotected sex and change from one sexual partner to another within a short period [11]. Similarly, a study conducted in Italy revealed that some students engaged in risky sexual behaviour due to peer pressure and financial constraints [12].

The results of this study revealed that 56.8% of the respondents had never heard about the HPV either from school, media, or health care workers, which meant that they did not know about HPV and its prevention. This study further revealed that 53.5% of the respondents did not know the health problems related to the HPV, which might result in ignorance of any symptoms related to the HPV and expose them to the risk of HPV infections. Similarly, a study conducted among students at Bushehr University of Medical Sciences in Iran revealed that 56.4% of the students had poor knowledge regarding the HPV, its mode of transmission, complications, and preventive strategies. The same study reports a significant relationship between faculty and knowledge of the students regarding HPV [14]. Another study conducted among students in South Carolina revealed that few students knew about the

risk factors associated with HPV and its preventive measures [15]. The same study further revealed that nursing students lack knowledge about the HPV and its vaccines; it could be because they are taught about health-related issues in detail only towards the final year of their studies [15].

The study further assessed the knowledge of university students regarding HPV vaccines, and the results reveal that the majority (82.9%) of the respondents were uncertain about the HPV vaccines that are available in South Africa. The lack of knowledge of university students regarding the availability of the HPV vaccines is a concern because, at the tertiary level, they should be able to advocate for the prevention of cervical cancer. Therefore, if tertiary students do not understand the benefits of HPV vaccines, they may also not be able to influence the community; as a result, young children might not be vaccinated against HPV [5]. In other countries, such as Saudi Arabia, HPV is stigmatized, and women are not allowed to talk about reproductive health issues because it is regarded as a taboo [11]. Therefore, women end up not knowing about the HPV and its vaccines.

According to the Health Belief Model, perceived susceptibility entails the person's belief about the chances of being affected by a disease, and therefore the person's belief towards a disease influences a decision to take a preventative measure [13]. The Health Belief Model indicated that participants who are knowledgeable about the HPV are more likely to be aware of health problems related to the HPV and the belief that the use of a condom and HPV vaccines can prevent them from being infected by diseases caused by the HPV. Furthermore, respondents who were not knowledgeable about the HPV did not understand the need for being vaccinated against it, and they also did not believe that the HPV vaccines can protect them against contracting the HPV.

5. LIMITATION OF THE STUDY

The study was conducted in one university and did not include males, although HPV can affect both males and females. Ideally, studies about HPV should be conducted in more than one university with a larger sample. However, the findings of this study provided crucial information on the knowledge of university students regarding HPV and its vaccines.

CONCLUSION

Knowledge regarding the HPV and its vaccines at the selected university is insufficient, as revealed by the results of the study. It is recommended that the institutions of Higher Education and Training should revise their curricula and include health-related modules in all schools. Community and university radios should have steady programs designed specifically to broadcast about health promotion issues to help inform the communities regarding HPV and its vaccines, assisting in the prevention of cervical cancer.

AUTHORS' CONTRIBUTIONS

MPM, a Master of Public Health (MPH) student, contributed to the conceptualisation, design, data collection, and analysis. NSM and DUR are the supervisors and have contributed by guiding the MPH student in the

conceptualisation and preparation of the manuscript. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The ethical approval to conduct the study was granted by the University of Venda Research Ethics Committee, South Africa (Project no: SHS/19/PH/18/0710). Further permission to conduct the study was granted by the University Director of Student Affairs.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT OF PUBLICATION

All the participants were given an information letter explaining the purpose and the nature of the study, assurance of anonymity, confidentiality, voluntary participation, and the right to withdraw from the study at any time with no consequences.

STANDARDS FOR REPORTING

STROBE guidelines and methodology were followed.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of the article is available from corresponding author [N.S.M] upon reasonable request.

FUNDING

This research project was funded by National Research Foundation (NRF) Masters Scholarship, IMGR (UID 118698). The funder did not participate in the conceptualisation, draft, and approval of the manuscript.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest, financial or otherwise.

ACKNOWLEDGEMENTS

We would like to thank all the students at the selected university who participated in the study.

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