



PREVALENCE AND FACTORS ASSOCIATED WITH HPV AMONG FEMALE SEX WORKERS IN KAYONZA DISTRICT, RWANDA

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Abstract

Background:

Human Papillomavirus (HPV) among female sex workers (FSWs) caused a number of issues that are related to their health problems and even death.

Objective:

To estimate the prevalence and factors associated with HPV among FSWs in Kayonza district, Rwanda.

Methods: A cross-sectional study was conducted amongst 379 FSWs selected using simple random sampling. Structured questionnaire was used. Descriptive statistics including percentages and frequencies were computed. Chi-square by use of were applied to determine the factors associated to HPV among the female sex workers. Multivariate analysis using was applied to determine the strength and direction of association.

Results: The highest percentage (34.1%) was of respondents aged between 40 and 44 years, about half (51.9%) attained primary education; most (64.3%) were single. The prevalence of the HPV was 34.1%. After running multiple logistic regression the following factors were independently associated with HPV: FSWs who never attended school [AOR = 2.84; 95%CI = 1.74-4.62; p <0.001], HIV infection [AOR = 2.35; 95%CI = 1.40-3.94; p =0.003], smoking [AOR = 3.27; 95%CI = 1.95-5.49; p <0.001], taking shower daily [AOR = 0.45; 95%CI = 0.27-0.73; p =0.001] and lack of using condom [AOR = 2.74; 95%CI = 1.14-6.59; p =0.024].

Conclusion: Targeted health education about HPV risk factors, integrated cervical cancer screening programmes in ongoing HIV/AIDS care services, provision of condoms and provision of HPV to this high-risk group of female sex workers should be implemented.

Keywords: Associated factors, Female sex workers, Human Papillomavirus, Prevalence

Introduction

The early screening of HPV helps the timely detection, prevention and its cure at low risk and low cost to earlier precursor lesions within asymptomatic women to avail early diagnosis, follow – ups and treatment. The third commonest cancer among women is HPV in the worldwide, where WHO (2018) recorded new cases of 569,847 people, and related deaths of 311,365 people. The adenocarcinoma is the second after the majority cases of squamous cell carcinoma (Hu, *et al.*, 2018). Others studies stated HPV as the fourth commonest cancer among females in the worldwide, and second most known among the females of 15 to 44 years old in the whole globe (Bruni, *et al.*, 2014). Despite, the practicability and feasibility of screening the HPV using VIA even in rural areas of Rwanda, the HPV persists being the public health burden in Rwanda. The recent study conducted by Partners in Health (PIH) revealed that the summative results of 34.0% on HPV prevalence among FSWs compare to that of nationwide which is at 35.1% (PIH, 2021).

In Rwanda, Makuza, *et al.*, (2015) identified risk factors associated to HPV such as getting into sexual activity while teen, family history of HPV, having different sexual partners, smoking tobacco, using oral contraceptive pill in 5 years, immune depression due to malnutrition, more than 3 children of high parity and systemic diseases. In less developed countries, there is almost no existence of cytology based screening services or deoxyribonucleic acid typing of HPV since they are far beyond the health service capabilities of these countries, that is why the high rate of HPV is associated to poor countries due to lack of appropriate screening methods. However, to identify the pre-cancerous lesions in the clinic rather than in laboratory the Lugol's iodine (VILI) or commonly known VIA was used (Mabeya, *et al.*, 2012).

The government of Rwanda has continued to put effort in preventable and curable diseases like HPV especially among the groups of people who are more hit like female sex workers (WHO, 2012; NIRS, 2015 and PIH, 2021). However, there still a number of public health burden, issues of knowledge gap due to almost non-existence or few studies that have focused on prevalence and factors associated to HPV concentrating on the factors like socio-demographic and economic factors, lifestyle factors and biological factors associated to HPV. Thus, it is in this regard this issue has to be addressed by putting a lot attention and emphasis on assessing the prevalence and factors associated to HPV among female sex workers in Kayonza District of Rwanda.

Methods and Materials

Research Design

This was a cross-sectional quantitative approach in order to examine the prevalence and factors associated to HPV among female sex workers in Kayonza District. The quantitative method was selected to achieve the objectives as it is used to assess the outcome variable and the associated factors at one point in time.

Sample size and sampling

The target population of the study were female sex workers (FSW's) and the study was targeting a total of 677 female sex workers in Kayonza District, Rwanda. To calculate the sample for this study the researcher used the formula of Cochran (1977) as per the following

$$n = \frac{Z^2 pq}{d^2}$$
$$n = \frac{(1.96)^2 (0.34 \times 0.66)}{(0.05)^2}$$
$$n = 345$$

Where:

- The n was the sample size
- The Z is 1.96 deviating from 95% CI
- The p is 0.34 as the likelihood of reoccurring as per the former report of PIH, 2021. This was estimated from the recently conducted screening of viral infection among female sexual workers by the Partners in Health that revealed that HPV among FSWs stands at 34% from three District, which are Kayonza, Burera, and Kirehe (PIH, 2021).
- The q is 1 minus p which is $(1-0.34=0.66)$ the probability of not reoccurring
- The d is the margin error of 0.05 (5%)
- 10% of the none-response rate was added to come up with the complete number of the respondents.

Basing on the calculation made during sample size determination. The sample size for quantitative data allowed the increment of 345 female sex workers who constitute 10% of the none-response rate. Thus, the total sample size was 379 female sex workers.

A simple random sampling technique was applied to select the 379 respondents from the whole target population of 674 female sex workers in Kayonza District. The sampling frame was entered into MS excel and then random numbers were generated to select randomly. Thus, all the female sex workers had equal chance to be chosen as the respondents in this study as asserted by Mugenda (2008). All the five centers for FSWs were included and proportional to probability population size.

Data collection methods

A pre-tested questionnaire was used to collect the information from the field. It was divided into four parts; part one covered the socio-demographic characteristics of respondents, part two comprised the questions that are concerned with lifestyle related factors and part three was composed of questions concerned with sexual related practices among the female sex workers. While, part four of the questionnaire was related to HPV status among female sex workers in Kayonza District, Rwanda. The collected information from the female sex workers was coded, cleaned and validated to enter into SPSS version 25.0 for the analysis.

The procedures of data collection started with seeking ethical approval and obtaining consent from the selected respondents. Then the selected female sex workers were briefed on the questionnaire. The researcher also explained to the respondents that the research is meant for the academic reasons to assure them that the information given in the research process was not disseminated for any other personal gain or contrary to academic ethics. The questionnaire was translated in Kinyarwanda. It was administered in a private room to ensure privacy and confidentiality. Some variables for instance HPV, HIV, STIs were extracted from the files.

Data Analysis

The data from the 379 sex female workers was analyzed after all the processes regarding data collection procedures, coding and entrance in SPSS Version 25. Descriptive analysis to produce mean, SD, frequency and percentages was used. The collected data was cross-tabulated and Chi-square to determine the factors (socio-demographic and economic factors, lifestyle factors and sexual practices) associated with HPV among female sex workers. The variables with P-value <0.05 was subjected to multivariate regression analysis during bivariate analysis where the adjusted odd ratios (AORs) was calculated with 95% of confidence interval (95%CI) in order to determine the variables independently associated with HPV. The p-value of <0.05 was considered significant. The presentation of findings was made through use of graphs and tables.

Ethical consideration

Before, the actual process of data collection the ethical clearance was obtained from Mount Kenya University. Permission was also sought from the Health Unity of Kayonza District. Consent was obtained from all respon-

dents. The researcher assured the respondents that the collected data were not used contrary to academic affairs meaning that their information was treated with confidentiality to avoid any corresponding risk to the respondents. The respondents were told that they don't have to mention any of the private address on the questionnaire to ensure that the information provided is secret as well as their names or any personal address.

Results

Socio-demographic characteristics of the female sex workers according to HPV

A total of 378 female sex workers out of 379 were included in the analysis. The prevalence of the HPV among sex female workers participated in this study was 34.1% (95%CI =29.36% - 39.15%). The highest percentage (34.1%) belong to the age group of 40 to 44 years followed by those aged 35 to 39 years (30.2%). Majority (67.7%) of the female sex workers were staying 5km and less from the health facilities. Most (64.3%) of the female sex workers were single. About half (51.9%) attained primary level of education while 47.6% never attended school. The proportion of HIV and vaginal infection were 25.7% and 3.2% respectively. Among these variables, there was significant association between level of education and HPV ($p = 0.003$) as well as HIV status and HPV ($p = 0.007$) (Table 1).

Table 1: Socio-demographic characteristics of the female sex workers according to HPV

| Variables | Total, n(%) | HPV positive, n(%) | HPV negative, n(%) | χ^2 value | p value |
|--|-------------|--------------------|--------------------|----------------|--------------|
| Age [in years] | | | | | |
| 24-29 | 27(7.1) | 7(25.9) | 20(74.1) | 3.31 | 0.507 |
| 30-34 | 52(13.8) | 17(32.7) | 35(67.3) | | |
| 35-39 | 114(30.2) | 34(29.8) | 80(70.2) | | |
| 40-44 | 129(34.1) | 50(38.8) | 79(61.2) | | |
| 45-49 | 56(14.8) | 21(37.5) | 35(62.5) | | |
| Estimated distance from health facilities | | | | | |
| ≤5km | 256(67.7) | 83(32.7) | 173(67.6) | 1.03 | 0.311 |
| >5Km | 122(32.3) | 46(37.7) | 76(62.3) | | |
| Level of education | | | | | |
| No formal education | 180(47.6) | 75(41.7) | 105(58.3) | 8.69 | 0.003 |
| Primary level and above | 198(52.4) | 54(27.3) | 144(72.7) | | |
| Marital status | | | | | |
| Single | 243(64.3) | 78(32.1) | 165(67.9) | 1.25 | 0.264 |
| Divorced/separated | 135(35.7) | 51(37.8) | 84(62.2) | | |
| History of vaginal infections | | | | | |
| Yes | 366(96.8) | 125(34.2) | 241(65.8) | 0.00 | 0.953 |
| No | 12(3.2) | 4(33.3) | 8(66.7) | | |
| HIV status | | | | | |
| Positive | 97(25.7) | 44(45.4) | 53(54.6) | 7.33 | 0.007 |
| Negative | 281(74.3) | 85(30.2) | 196(69.8) | | |

Source: Primary data, 2022

Lifestyle factors and sexual practices associated with HPV infection among female sex workers

Table 2 shows that 27.5% of the female sex workers were smokers and large percentage (97.9%) were taking alcohol. Respondents were also asked whether they were using drugs and 27.0% reported that they were taking drugs. Most of the respondents (71.2%) used to take shower every day. Majority (66.9%) claimed that they had only two meals in a day. About three quarter (73.3%) of the female sex workers started their first sext while they were less than 18 years. Majority (58.5%) had more than 30 customers and 85.7% had less than 10 regular customers. Respondents experienced sexual abuse were 3.4% and most (69.8%) had sex with less than 10 uncircumcised men. Condom use was assessed and 50.3% were using it always with regular customers while 98.4% using it always with irregular customers.

Female sex workers who were smoking had significantly ($p < 0.001$) higher proportion of HPV (49.0%) compared to those of non-smokers (28.5%). The proportion of HPV was also significantly lower ($p = 0.001$) among the female sex workers who were taking shower daily (29.0) than those who were not taking shower everyday (46.8%). Lack of using condom among female sex workers with regular customers was significantly more to acquire HPV infection compared to those using it always ($p = 0.001$).

Table 2: Lifestyle factors and sexual practices associated with HPV infection among female sex workers

| Variables | Total, n(%) | HPV positive, n(%) | HPV negative, n(%) | χ^2 value | p value |
|---|-------------|--------------------|--------------------|----------------|---------|
| Smoking | | | | | |
| Yes | 104(27.5) | 51(49.0) | 53(51.0) | 14.19 | <0.001 |
| No | 274(72.5) | 78(28.5) | 196(71.5) | | |
| Alcohol consumption | | | | | |
| Yes | 370(97.9) | 125(33.8) | 245(66.2) | 0.92 | 0.339 |
| No | 8(2.1) | 4(50.0) | 4(50.0) | | |
| Drug abuse/use | | | | | |
| Yes | 102(27.0) | 35(34.5) | 67(65.7) | 0.00 | 0.963 |
| No | 276(73.0) | 94(34.1) | 182(65.9) | | |
| Taking shower every day | | | | | |
| Yes | 269(71.2) | 78(29.0) | 191(71.0) | 10.92 | 0.001 |
| No | 109(28.8) | 51(46.8) | 58(53.2) | | |
| Frequency of having a meal per day | | | | | |
| Once | 48(12.7) | 19(39.6) | 29(60.4) | 0.74 | 0.692 |
| Twice | 253(66.9) | 84(33.2) | 169(66.8) | | |
| 3 times or more | 77(20.4) | 26(33.8) | 51(66.2) | | |
| Age at first sex | | | | | |
| < 18years | 277(73.3) | 99(35.7) | 178(64.3) | 1.20 | 0.273 |
| ≥18 years | 101(26.7) | 30(29.7) | 71(70.3) | | |
| Number of sex customers per month | | | | | |
| < 10 customers | 8(2.1) | 3(37.5) | 5(62.5) | 3.29 | 0.349 |
| 10 to 20 customers | 33(8.7) | 8(24.2) | 25(75.8) | | |
| 20 to 30 customers | 116(30.7) | 46(39.7) | 70(60.3) | | |
| > 30 customers | 221(58.5) | 72(32.6) | 149(67.4) | | |

Ever experienced sexual abuse/rape

| | | | | | |
|-----|-----------|-----------|-----------|------|-------|
| Yes | 13(3.4) | 5(38.5) | 8(61.5) | 0.11 | 0.737 |
| No | 365(96.6) | 124(34.0) | 241(66.0) | | |

Number of having sex with uncircumcised customers

| | | | | | |
|-------------|-----------|----------|-----------|------|-------|
| < 10 | 264(69.8) | 83(31.4) | 181(68.6) | 2.81 | 0.094 |
| 10 and more | 114(30.2) | 46(40.4) | 68(59.6) | | |

Condom use with regular customers

| | | | | | |
|---------------------|-----------|----------|-----------|-------|--------------|
| Yes, always | 190(50.3) | 53(27.9) | 137(72.1) | 14.93 | 0.001 |
| Yes, but not always | 158(41.8) | 57(36.1) | 101(63.9) | | |
| No | 30(7.9) | 19(63.3) | 11(36.7) | | |

Condom use with irregular customers

| | | | | | |
|---------------------|-----------|-----------|-----------|------|-------|
| Yes, always | 372(98.4) | 126(33.9) | 246(66.1) | 0.68 | 0.408 |
| Yes, but not always | 6(1.6) | 3(50.0) | 3(50.0) | | |

Source: Primary data, 2022

Multivariable analysis for factors associated with HPV among female sex workers

As shown in Table 3, female sex workers who never attended school were 2.8 times more likely to have HPV infection compared to those attended primary and above [AOR = 2.84; 95%CI = 1.74-4.62; p <0.001]. HIV positive female sex workers were about 2.4 times more likely to acquire HPV [AOR = 2.35; 95%CI = 1.40-3.94; p =0.003] than to those HIV negative. Smokers of female sex workers were 3.27 times more likely to get HPV [AOR = 3.27; 95%CI = 1.95-5.49; p <0.001] compared to those of non-smokers. The female sex workers who were taking shower daily were 0.45 times less likely to acquire HPV than those who were not taking shower everyday [AOR = 0.45; 95%CI = 0.27-0.73; p =0.001]. Female sex workers not using condom with regular customers were significantly 2.74 times more likely to acquire HPV infection compared to those using it always [AOR = 2.74; 95%CI = 1.14-6.59; p =0.024].

Table 3: Multivariable analysis for factors associated with HPV among female sex workers

| Variables | AOR | 95% CI | | p value |
|--|-----------|--------|-------|------------------|
| | | Lower | Upper | |
| Level of education | | | | |
| No formal education | 2.84 | 1.74 | 4.62 | <0.001 |
| Primary level and above | Reference | | | |
| HIV status | | | | |
| Positive | 2.35 | 1.40 | 3.94 | 0.001 |
| Negative | Reference | | | |
| Smoking | | | | |
| Yes | 3.27 | 1.95 | 5.49 | <0.001 |
| No | Reference | | | |
| Taking shower every day | | | | |
| Yes | 0.45 | 0.27 | 0.73 | 0.001 |
| No | Reference | | | |
| Condom use with regular customers | | | | |

| | | | | |
|---------------------|-----------|------|------|--------------|
| No | 2.74 | 1.14 | 6.59 | 0.024 |
| Yes, but not always | 1.22 | 0.74 | 2.00 | 0.432 |
| Yes, always | Reference | | | |

Source: Primary data, 2022

Discussion

The findings from the current study show that the prevalence of the HPV among female sex workers in Kayonza district was 34.1%. This rate is within the range of similar reported findings. For instance, Farahmand et al (2020) conducted a systematic review and meta-analysis on prevalence and genotype distribution of genital human papillomavirus infection in female sex workers in the world. The findings showed that the pooled prevalence of HPV infection among more than 20,000 female sex workers from 32 countries ranged from 5.5% to 84% with a mean of 42.6%. Studies from some countries, such as Iran, Singapore and Thailand reported unexpectedly low rates of HPV (Farahmand et al, 2020). This could be because of various reasons such as limited screening, the illegality of sex work, limited reporting systems and fear of stigmatization.

Similarly, Wu et al (2021), in another systematic review and meta-analysis of worldwide burden of genital human papillomavirus infection in female sex workers, covering 107 studies among 45 countries featuring all WHO regions, the pooled HPV prevalence stood at 39.5% among female sex workers although there were marked variations within WHO regions and specific countries. The highest rate was in the Western Pacific region (44.3%), followed by the African region (43.3%), European region (40.3%), South American region (35.4%), Eastern Mediterranean region (33.8%), and Southeast Asian regions (31.6%). The lowest prevalence rate was in the North American region (29.0%). At 34.1% the prevalence rate of HPV from the current study is notably below the average for the WHO Africa region of 43.3%. This lower prevalence may be related to the implementation of preventive programs such as primary cervical cancer screening, condom promotion, and HPV vaccination, which are effective in reducing the prevalence of HPV infection (Velazquez-Hernandez et al, 2019). Administration of HPV vaccines in school girls is part of Rwanda's national immunization program.

The findings from the current show that the vast majority of female sex workers were aged 35-44 years old with only a handful aged below 30 years. The age of sex workers in a pooled prevalence from a meta-analysis of studies from Asian countries was higher (≥ 45 years old) compared the findings from the current study. This can be attributed to the different demographic structures observed in those Asian countries compared to the demographic structure of Rwanda. For example, the mean age of Rwandans is 20 years (NISR, 2021) compared to the mean age of 42.2 years in Singapore and 48.4 years in Japan (Wu et al, 2021).

About half of the respondents from the current study have attained primary level of education while a sizeable number never attended school. The national literacy rate for Rwandan females is 69.39% (NISR, 2021). This indicates that the uneducated females may be getting involved in sex work because of lack of opportunities due to their limited level of education.

The findings from this study revealed that a little more than a quarter of the female sex workers were smokers and almost all of them were alcohol users with more than a quarter reporting use of other psychoactive drugs. This compares to Odigie & Okungbowa, (2019) who, while examining life style as a risk factor of human Papillomavirus co-infections with *Trichomonas vaginalis* in female sex workers in Ghana, found that use of alcohol and other psychoactive drugs was associated with an increased likelihood of being infected with HPV.

Female sex workers with HIV positivity in Kayonza had significantly ($p = 0.007$) more proportion of HPV than to those who were HIV negative with a quarter of the respondents being HIV positive. This is consistent with other findings in the region. For example, a study in Kenya examining the prevalence, incidence, and distribu-

tion of human papillomavirus types in female sex workers where HPV prevalence in HIV positive respondents was reported at 32.2% (Sweet et al, 2020). This significant association of HIV status to HPV prevalence can be explained by the depressed immune system of a HIV positive individual making her more vulnerable to opportunistic infections including HPV (Strickler et al, 2005)

Findings from this current study revealed that close to three quarters of the female sex workers had their maiden sex encounter during their teenage years. In the systematic review and meta-analysis of worldwide burden of genital human papillomavirus infection in female sex workers, covering 107 studies among 45 countries featuring all WHO regions, HPV prevalence was higher in studies reporting a mean age at sexual debut of less than 18 years compared to those debuting at 18 years or older (Wu et al, 2021). Early sex debut and early marriage to older men and polygamous men are prevalent in the African region and are known risk factors for HPV infection (Bayo et al, 2002).

Only about half of the female sex workers in the current study reported using a condom always with regular customers although just a handful reported not using a condom always with irregular customers. Female sex workers not using condom with regular customers were 2.74 times more likely to acquire HPV infection compared to those using it always although there was a sizeable number with HPV despite using condom always. Wu et al (2021), in a systematic review and meta-analysis of worldwide burden of genital human papillomavirus infection in female sex workers also found that the prevalence of HPV was just slightly lower in respondents who reported using condoms always. This is perhaps because unlike HIV, condom use only offers partial defense against genital HPV because it can still be spread via unprotected skin areas, in spite of consistent condom use (Manhart & Koutsky, 2002). Moreover, multiple sex acts with multiple clients can undermine the protective properties of condom use against HPV due its high infectivity rate.

Conclusion

The aim of this study was to determine the prevalence and factors associated to HPV among female sex workers in Kayonza District of Rwanda. The study concludes that the prevalence was high compared to the general population and this a great public health concern because HPV has no treatment and is the biggest cause of cervical cancer. The study also concludes that there are several modifiable risk factors for HPV such as education, condom use and drug abuse which when addressed can lower the risk of acquiring HPV.

Recommendations

1. Organized cytological screening and post-screening treatment programmes targeting female sex workers.
2. Integrated cervical cancer screening programmes in ongoing AIDS care services for HIV-infected female sex workers.
3. Provision of condoms to the female sex workers
4. Targeted health education to female sex workers about risk factors for HPV and prevention measures
5. Provision of HPV to this high-risk group of female sex workers.

Suggestions for further Study

1. This study may be continued by a longitudinal to more clearly establish the causal factors in relation to HPV.
2. A prevalence study targeting the genotype distribution of HPV among female sex workers to shed the light on the type of vaccines needed to prevent specific strains of HPV.

Authors' contribution

Mukesharurema Gerardine designed the study, collected, analyzed, interpreted the data and writes a manuscript.

Renzaho Jean Nepomuscene helped in training of data collectors, data collection and performed data entry. Richard Kalisa and Michael Habtu supervised the study, contributed to data analysis and manuscript writing. All authors have read and approved the manuscript for publication.

Declaration of conflict of interest

The authors declare no conflict of interest with regards to this research and authorship of this article.

Acknowledgment

The authors would like to thank Kayonza District administration for allowing us to conduct the study. We also thank all respondents for their time during data collection.

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