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# Prevalence and correlates of cervical HPV infection in a clinic-based sample of HIV-positive Hispanic women

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ABSTRACT

*Objectives:* Puerto Rico (PR), is the fifth highest jurisdiction of the United States of America (US) with respect to HIV prevalence and the leading in cervical cancer incidence. This cross-sectional study describes the prevalence and correlates of cervical HPV infection among a clinic-based sample of 302 women living with HIV/AIDS in PR.

*Methods:* Data collection included questionnaires, blood and cervical samples. Multivariable logistic regression models were used to estimate the magnitude of association (adjusted Prevalence odds ratio [aPOR]) between HPV cervical infection and other covariates.

*Results:* Mean age of participants was 40.3 years ( ± 10.3 SD). The prevalence of HPV infection was 50.3%; 41.1% for low-risk types and 29.5% for high-risk types. Having ≥ 10 lifetime sexual partners (aPOR = 2.10, 95% CI:1.02–4.29), an abnormal Pap (aPOR = 3.58, 95% CI:1.93–6.62), active genital warts (aPOR = 3.45, 95% CI:1.60–7.42), and CD4 counts ≤ 200 (aPOR = 4.24, 95% CI: 1.67–10.78) were positively associated with any cervical HPV infection. Similar results were observed for HR HPV infection.

*Conclusions:* A high burden of HPV co-infection exists among women living with HIV/AIDS in this population. Given the high incidence of HIV in PR and the higher risk of cervical cancer among women living with HIV/AIDS, HPV vaccination should be promoted in this population.

## 1. Introduction

Among persons living with HIV/AIDS (PLWHA), the burden of HPV-related cancers is higher than in the general population [1,2]. The same has been documented in Puerto Rico (PR), the fifth highest jurisdiction of the United States of America (US) with respect to HIV prevalence (600.2 per 100,000) [1,3]. In PR, cervical cancer is the most common HPV-related cancer among women with AIDS, with an incidence rate of 299.6 per 100,000 [1]. Furthermore, the incidence rates of cervical cancer (11.7 per 100,000 females) are higher in Puerto Rico than in the other US states and territories [4].

Greater likelihood of HPV incidence, prevalence and persistence in female PLWHA due to increased susceptibility, lower ability to clear infection and reactivation of infection due to immunosuppression, influences the increased risk of cervical cancer among them [5]. While the prevalence of cervical HPV DNA among US females enrolled in the 2003–2004 NHANES was 27% [6], the prevalence for cervical HPV infection among HIV positive women is higher (40–70%) [7]. In PR, prevalence estimates of HPV in women range from 29.4% to 45.5% in population and clinic-based studies, respectively [8,9]. Despite the higher burden of HIV in PR, no estimates of HPV infection in female PLWHA exist for this population. This study describes the prevalence, type distribution and correlates of cervical HPV infection among a clinic-based sample of female PLWHA in PR. This information is essential for understanding disease burden, efficacy of HPV vaccination programs and need for enforced cancer prevention strategies among Hispanic PLWHA.

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**Table 1**
Characteristics of a clinic-based sample of HIV positive women in Puerto Rico overall and by HPV status (n = 302).

| Characteristics | Overall n(%) | HPV-positive n(%) | HPV-negative n(%) | P-value* |
|---|---|---|---|---|
| *Socio-demographics* | | | | |
| *Age (mean = 40.3 years ± 10.3 SD)* | | | | 0.86 |
| 18–34 years | 95 (31.5) | 47 (30.9) | 48 (32.0) | |
| 35–49 years | 151 (50.0) | 78 (51.3) | 73 (48.7) | |
| ≥ 50 years | 56 (18.5) | 27 (17.8) | 29 (19.3) | |
| *Education (n = 295)* | | | | 0.84 |
| High-school or less | 187 (63.4) | 94 (64.0) | 93 (62.8) | |
| More than high school | 108 (36.6) | 53 (36.0) | 55 (37.2) | |
| *Marital status (n = 300)* | | | | 0.99 |
| Single | 158 (52.7) | 79 (52.7) | 79 (52.7) | |
| With partner | 142 (47.3) | 71 (47.3) | 71 (47.3) | |
| *Lifestyle* | | | | |
| *Age at first sexual intercourse* | | | | 0.55 |
| ≤ 15 years | 77 (25.5) | 41 (27.0) | 36 (24.0) | |
| > 15 years | 225 (74.5) | 111 (73.0) | 114 (76.0) | |
| *Lifetime no. of sex partners (n = 286)* | | | | 0.10 |
| 1–2 | 56 (19.6) | 22 (15.6) | 34 (23.5) | |
| 3–4 | 104 (36.4) | 52 (36.9) | 52 (35.9) | |
| 5–9 | 77 (26.9) | 36 (25.5) | 41 (28.3) | |
| ≥ 10 | 49 (17.1) | 31 (22.0) | 18 (12.4) | |
| *No. of sex partners in the last 12 months (n = 294)* | | | | 0.34 |
| 0 | 72 (24.49) | 32 (21.6) | 40 (27.4) | |
| 1 | 192 (65.31) | 98 (66.2) | 94 (64.4) | |
| ≥ 2 | 30 (10.20) | 18 (12.2) | 12 (8.2) | |
| *Current smoking status (n = 301)* | | | | **0.06** |
| Yes | 81 (26.9) | 48 (31.8) | 33 (22.0) | |
| No | 220 (73.1) | 103 (68.2) | 117 (78.0) | |
| *Oral Contraceptive use (n = 301)* | | | | 0.24 |
| No | 190 (63.1) | 91 (59.9) | 99 (66.4) | |
| Yes | 111 (36.9) | 61 (40.1) | 50 (33.6) | |
| *Clinical* | | | | |
| *Pap Results at baseline (n = 298)* | | | | **< 0.0001** |
| *Normal* | 207 (69.5) | 87 (58.0) | 121 (81.8) | |
| *Abnormal* | 91 (30.5) | 63 (42.0) | 27 (18.2) | |
| *History of abnormal Pap test (n = 299)* | | | | **< 0.0001** |
| No | 176 (58.9) | 72 (48.3) | 104 (69.3) | |
| Yes | 123 (41.1) | 77 (51.7) | 46 (30.7) | |
| *Active Genital Warts (n = 291)* | | | | **0.001** |
| No | 235 (80.8) | 105 (72.9) | 130 (88.4) | |
| Yes | 56 (19.2) | 39 (27.1) | 17 (11.6) | |
| *History of genital warts (n = 291)* | | | | **0.001** |
| No | 208 (71.5) | 90 (62.5) | 118 (80.3) | |
| Yes | 83 (28.5) | 54 (37.5) | 29 (19.7) | |
| *CD4 cell count (cells/mm$^3$) (n = 301)* | | | | **< 0.0001** |
| ≤ 200 | 45 (15.0) | 37 (24.3) | 8 (5.4) | |
| 201–499 | 113 (37.5) | 60 (39.5) | 53 (35.6) | |
| ≥ 500 | 143 (47.5) | 55 (36.2) | 88 (59.0) | |
| Viral load (n = 295) | | | | **0.003** |
| < 75 copies | 175 (59.3) | 76 (51.0) | 99 (67.8) | |
| ≥ 75 copies | 120 (40.7) | 73 (49.0) | 47 (32.2) | |
| *Current use of HAART (n = 301)* | | | | 0.48 |
| No | 71 (23.6) | 33 (21.9) | 38 (25.3) | |
| Yes | 230 (76.4) | 118 (78.1) | 112 (74.7) | |

Count varies due missing information for all variables.
* P-value from the chi-square test.

## 2. Methods

### 2.1. Study design and population

This cross-sectional study recruited 302 consecutive women aged ≥ 18 years receiving care at the Maternal-Infant Studies Center (CEMI-Spanish acronym) between October 2009 and January 2010. CEMI is a multidisciplinary longitudinal Ob/Gyn clinic at the University of Puerto Rico Medical Sciences Campus (UPR-MSC), dedicated to scientific research and offering clinical services to women living with or at risk for HIV. For this study, eligible women had to have a documented diagnosis of HIV infection, and have no prior history of cervical cancer. This study was approved by the Institutional Review Board (IRB) of the UPR-MSC.

### 2.2. Data collection procedures

Consecutive patients scheduled for routine clinical care and who met all eligibility requirements, were offered participation in the study. Upon signing the informed consent, participants completed two self-administered questionnaires that collected information on socio-demographics, lifestyles and clinical characteristics. The participants were then seen by the study clinician (Obstetrics and gynecology [OBGYN] specialist) who performed a pelvic exam for Pap test and took the HPV samples. A blood sample was also collected to determine viral load and CD4 cell counts. Study staff also collected and verified participant's clinical data within the medical record, including laboratory results, cytological results, CD4 cell count (≤ 200, 200–499 and ≥ 500) and HIV viral load ( < 75 vs. ≥ 75) count, and current use of highly active