Cervical Cancer Screening Among HIV-Infected Women in a Health Department Setting

Jennifer L. Logan, M.D., M.P.H., Maria Q. Khambaty, B.S., Karina M. D'Souza, M.P.H.,
and Lynette J. Menezes, Ph.D.

Abstract

HIV-infected women are at increased risk of developing invasive cervical cancer and present for care at a later stage of disease. Because of this susceptibility, the US Preventive Services Task Force and Centers for Disease Control and Prevention recommend that HIV-infected women receive two Pap smears during their first year after diagnosis, then annually thereafter. The aim of this study was to determine adherence to these screening guidelines and associations between demographic factors and receipt of Pap smears at a local health department in Florida. Demographic and Pap smear data were extracted from randomly selected medical records of 200 HIV-infected women receiving care between January 2000 and May 2006. Descriptive statistics and χ^2 associations were determined. Overall, 83% of women received at least one Pap smear in their first year after enrollment; 24.5% received the recommended two Pap smears. The women were predominantly minorities (57.4% African Americans; 22.8% Hispanics) and economically disadvantaged (mean income $8,180). First year Pap smear rate was significantly associated with type of insurance ($p = 0.0185$) and Pap smear facility ($p < 0.0001$), with a trend toward association with HIV risk behavior ($p = 0.0593$). First-year Pap smear rate was not associated with age, income, ethnicity, or incarceration history. Although this health department provided similar cervical cancer screening levels to those reported elsewhere, rates fall short of evidence-based guidelines. Future research must address low second Pap smear rates in the context of patient and provider barriers to improve early detection and prevention of cervical cancer in HIV-infected women.

Introduction

CERVICAL CANCER is the leading AIDS-related malignancy in women,[1,2] with HIV-infected women being three times more likely to develop cervical cancer compared to uninfected women.[3] HIV-infected women with invasive cervical cancer are more likely to present with advanced clinical disease, to have persistent or recurrent disease at follow-up, a shorter time to recurrence, a shorter survival time after diagnosis, and are more likely to die of cervical cancer.[4–9] Human papillomavirus (HPV), the etiologic agent found in 99.7% of invasive cervical cancers,[10] is common even among HIV-negative women (26.8% prevalence among U.S. women aged 14–59).[11] Up to 67% of HIV-infected women are infected with HPV[6,12] and HIV-infected women are more likely to be infected with multiple HPV strains.[13] Additionally, HIV-infected women more often have persistent infections,[14] especially as CD4$^+$ cell counts decrease.[8] Massad et al.[6] showed that 38.3% of HIV-infected women had abnormal cervical cytology and Cubie et al.[15] showed that HIV-infected women with normal cytology had a 25% prevalence of high-risk HPV types.

Cervical cancer is curable if detected at an early stage by Papanicolaou (Pap) smear screening, and screening has contributed to dramatic declines in cervical cancer incidence where this screening test is available. Pap smear screening has demonstrated high specificity and sensitivity in detecting cervical cytologic abnormalities in both uninfected and HIV-infected women[16,17] Based on level AII recommendations, the Centers for Disease Control and Prevention (CDC) and the Infectious Disease Society of America (IDSA) currently recommend that HIV-infected women should receive two Pap smears in the year following their HIV diagnosis; if both tests are unremarkable, then the woman only needs to be screened annually thereafter.[18] HIV-infected women with abnormal Pap smear results should be referred for colposcopy and directed biopsy.[18]

Despite these recommendations, HIV-infected women in the United States may not be receiving recommended cervical cancer screening. Although Pap smear rates for HIV-infected women (77–81%)[19,20] are comparable to those for the general population (80–86%),[21,22] screening rates are not ideal. Furthermore, no studies to date have evaluated the rate with which HIV-infected women receive second screening Pap

University of South Florida, Division of Infectious Disease and International Medicine, Tampa, Florida.

smears during their first year after HIV diagnosis. Given that HIV-infected women are more likely to develop cervical cancer, strategies to increase cervical cancer screening must be improved. Minorities and those of lower socioeconomic status are disproportionately affected by HIV,[23] and minority women[24] and those of lower socioeconomic status[25] are also disproportionately affected by cervical cancer. Because health departments disproportionately serve minority women and those of lower socioeconomic status, offering appropriate cervical cancer screening services as part of regular HIV care is especially important in health departments.

To our knowledge, no studies to date have examined cervical cancer screening rates and related characteristics of women receiving HIV care in health department settings. Furthermore, our study assesses second Pap smear rates to evaluate adherence to guidelines for women during their first year after HIV diagnosis. Identification of characteristics of HIV-infected women who do not receive Pap smears is needed to target screening practices for this underserved population of women who receive public assistance for HIV care, as local health departments can truly serve as a point source for HIV care and cancer prevention.

Methods

We assessed cervical cancer screening practices among female HIV-infected patients receiving care at a local health department in Florida. This pilot investigation was accomplished using a retrospective medical chart review. We obtained approval from the Institutional Review Boards at the University of South Florida and the Florida Department of Health.

Study location and patient selection

We conducted our study at a Ryan White-funded health department clinic that provides care for approximately 1500 patients living with HIV/AIDS (PLWHA) at any time. Eligible patients included HIV-infected women aged 18 or older who had enrolled at the clinic between January 1, 2000 and April 30, 2006 and who had received care for at least 12 months during the study period. The HIV clinic director generated a list of 464 eligible female patients, of whom 200 were selected by random number generation.

Data collection

Each of the 200 patient charts was given a unique study identification number. Trained study personnel extracted data from medical charts onto paper data collection instruments that included the patient's study identification number. No identifying information was recorded from the medical charts. Demographic data including age, race, and ethnicity (white, African American, and Hispanic were considered as distinct groups at this clinic), income, insurance, primary HIV risk behavior, and history of incarceration and cervical cancer screening data were collected. Self-reported HIV risk behavior is ascertained at the time of intake by an HIV clinic nurse based on the Centers for Disease Control and Prevention's HIV surveillance categories.

Following data collection, two study personnel independently entered all data from the data collection forms into two separate ACCESS databases (Microsoft, Redmond, WA).

The database manager and principle investigator then compared all data points in the two electronic databases using Statistical Analysis Software version 9.1.3 (SAS, Cary, NC). All discrepancies were resolved by manual review of data collection forms by the principal investigator.

Measures and statistical analysis

Statistical analyses were performed using Statistical Analysis Software version 9.1.3. Pap smear data, including dates of Pap smears, were included in the Access database. Frequencies were calculated from dates of completed Pap smear: the first Pap smear and second Pap smear were counted within the first year if they were performed within 365 days of enrollment. Demographic frequencies were computed and χ^2 analyses were used to test associations between Pap smear screening and demographic factors. Fisher's exact test determined correlations when cells had an expected frequency of five or less. In testing associations between insurance status and other factors, private insurance was dropped, as only one patient reported this, and Fisher's exact test was used for those analyses because of small numbers in Medicare and Medicare/Medicaid groups.

Results

Demographic factors

Patients enrolled in this study were generally of low socioeconomic status and predominantly minorities (Table 1).

Pap smear screening

Overall, 166 women (83%) received one or more Pap smears in their first year after enrollment and 49 women (24.5%) received the recommended two Pap smears. Of the 166 women who received cervical cancer screening during the first year after enrollment, 58 women (34.9%) had normal results, 12 women (7.2%) had benign changes, 45 women (27.1%) had abnormal cytology, and 12 women (7.2%) had

Table 1. Patient demographic characteristics

Demographic variable	Frequency
Race and ethnicity	
White, non-Hispanic	39 (19.8%)
African American	113 (57.4%)
Hispanic	45 (22.8%)
HIV risk behavior	
Blood products	1 (0.5%)
Heterosexual contact	173 (86.9%)
Injection drug use	21 (10.6%)
Unknown	4 (2.0%)
Insurance	
Private	1 (0.5%)
Need-based county plan	32 (16.2%)
Medicaid	48 (24.4%)
Medicare	5 (2.5%)
Medicare/Medicaid	6 (3.1%)
None (Ryan White only)	105 (53.3%)
History of Incarceration	35 (17.5%)
Mean age (range)	38.0 (19 to 80)
Mean annual income (range)	$8,180 ($0–$71,105)

TABLE 2. FACTORS ASSOCIATED WITH RECEIPT
OF PAP SMEARS

Factors	N	χ^2 Value	p Value
Type of insurance	196	17.17	0.02
HIV risk behavior	199	10.55	0.06
Age at enrollment	200	2.99	0.54
Income	200	7.64	0.31
Ethnicity	200	3.48	0.48
History of Incarceration	200	0.42	0.79

inadequate cervical sampling. Pap smear results were missing for 39 women (23.5%). Of 70 women who had a normal or benign initial Pap smear, 14 (20%) received a second Pap smear during the first year after enrollment. Of 57 women who had abnormal cytology or inadequate sampling, 23 (40.4%) received a second Pap smear during the first year after enrollment ($p = 0.0121$). No new cases of invasive cervical cancer were detected during enrollment.

Of the 45 abnormal Pap smears during the first year after enrollment, complete pathology was available for 25 patients: 10 atypical squamous cells of undetermined significance (ASCUS), 11 low-grade squamous intraepithelial lesions (LGSIL), and 4 high-grade squamous intraepithelial lesions (HGSIL). Receipt of Pap smears during the first year of enrollment was evaluated for associations with type of insurance, primary HIV risk behavior (at the time of HIV acquisition), age at enrollment, income, ethnicity, and incarceration history (Table 2). Receipt of Pap smears during the first year of enrollment was significantly associated with type of health insurance ($p = 0.0185$). Patients who received no Pap smears in their first year of enrollment were most likely to have no insurance (64.7%) and receive care solely through Ryan White Program funding than have other types of insurance such as private, Medicaid or Medicare. There was a trend toward association between number of Pap smears and primary HIV risk behavior ($p = 0.0593$), with injection drug users being more likely to have no Pap smears during their first year after enrollment. There were no significant associations between number of Pap smears received during the first year and age at enrollment, ethnicity, income level, distance of home from health department, or incarceration history.

Pap smear facility

In reviewing rates of Pap smear screening by facility where women had their first Pap smears, we found that women who received cervical cancer screening at one particular off-site gynecology clinic were more likely to receive the recommended two Pap smears during the first year of enrollment ($p < 0.0001$). To better understand whether this was due to more rigorous screening, versus better reporting of results, we performed two further analyses. First, we compared women who had missing Pap smear data by facility where their Pap smears were performed. This showed that the facility with the highest screening rates actually had the most missing Pap smear reports, making it unlikely that improved reporting accounted for increased rates of screening. Second, we thought that women with known cervical disease may be more likely to receive follow-up Pap smear screening at a gynecology clinic than the health department. To evaluate this

possibility, we examined first Pap smear results by Pap smear facility, and found that the proportion of women with abnormal first Pap smears did not differ by facility ($p = 0.8447$), making it unlikely that the patient's Pap smear facility was related to the patient's baseline cervical disease. Therefore, the increased rate of second Pap smear screening is likely due to differences in practices at that facility rather than patient differences.

Discussion

As an AIDS-defining illness, cervical cancer poses a significant but preventable risk to HIV-infected women. Although the initial Pap smear screening rate for our cohort of HIV-infected women was similar to two previous studies, the time periods, populations and data sources differed significantly. To our knowledge, our study is the first to report Pap smear screening in HIV-infected women that is based on patient clinical records during the first year after enrollment, and the first to assess Pap smear screening in an underserved population receiving HIV care in a local health department setting. Additionally, our study provides information about second Pap smears during the first year after HIV diagnosis.

Our study adds to the findings of Kaplan et al.[26] and Stein et al.[19] Kaplan et al.[26] found that 88% of HIV-infected women had received Pap smear screening at some point during enrollment (undefined length of time) at a Ryan White Title III facility. Stein et al.[19] found an 81% rate of receiving a Pap smear in the prior 12 months; however, this rate was based on self-report[19] and may be affected by recall bias.

Most women in our study were minorities from economically disadvantaged backgrounds. Thus, the finding that most HIV-infected women in our study received at least one Pap smear annually suggests that local health departments may be an important source of preventive care for poor HIV-infected women. However, our study also showed that most women did not receive the recommended two screening Pap smears during the first year after enrollment. In their study, Oster et al.[20] also noted that prevalence of HIV screening should have been higher for women enrolled less than 1 year in their study; however, they did not specifically quantify second Pap smear rates in their analysis. Failure to meet these evidence-based guidelines is concerning, and has not yet been examined in the literature.[19,27]

One potential explanation for low second Pap smear rates is lack of awareness among providers or patients regarding this practice guideline, which differs from cervical cancer screening recommendations for uninfected women. A questionnaire-based study of 2186 Swiss women[28] participating in the Swiss HIV Cohort Study (SCHS) showed that HIV-infected women treated by private infectious disease specialists were less likely to receive Pap smear screening compared to women treated by infectious disease specialists of the SHCS clinics.[28] In contrast, a retrospective chart review of 148 patients by Koethe et al.[29] showed that cervical cancer screening rates were lowest among university-based generalists (55%) and infectious disease specialists (47%) treating HIV-infected women, although the rates among infectious disease specialists increased to 64% the next year compared to 58% among generalists. In another study, Sullivan et al.[27] compared health services provided to HIV-infected patients in facilities funded by the Ryan White Program versus those seen in facilities not

receiving funding. They found that women receiving care at Ryan White-funded facilities were significantly more likely to receive annual Pap smears.[27] Our patients received care in a Ryan White Program funded health department that is staffed by infectious disease-trained nurse practitioners, and university-based infectious disease attending physicians and fellows. Although our annual rates of cervical cancer screening are comparable with those of uninfected women, the low second Pap smear rate requires further attention.

Large workloads and limited staff and funding may be barriers that prevent county health departments from offering more extensive gynecologic services onsite. There is evidence that HIV-infected women who receive primary and gynecologic care at a single location are 1.9 times as likely to receive Pap smear screening services[19] as women who obtain these services at distinct clinics. Oster et al.[20] also showed that HIV-infected women were less likely to receive Pap smear screening when pelvic examinations were performed outside of their usual source of HIV care. It is possible that the low levels of second Pap smear testing (or the absence of documentation of this information in medical charts) may occur because women obtain gynecologic care outside of their primary HIV care setting at the health department. In these situations, continuity and coordination of care must be directed by the primary care provider; for HIV-infected patients, the infectious disease clinician often serves in this role. It is, therefore, essential that clinics providing HIV care have mechanisms in place to ensure appropriate follow-up after patient referral for offsite preventive care.

Our study also showed a trend toward an association between injection drug use and failure to receive Pap smear screening during the first year after enrollment for HIV care. This finding is consistent with the finding of Klevens and colleagues[30] that women with AIDS and invasive cervical cancer were more likely to report a history of injection drug use.[30] Likewise, other studies show that HIV-infected women who use drugs are less likely to access and adhere to care, particularly antiretroviral therapy.[23,31] Together, these findings demonstrate that HIV-infected women who use drugs not only fail to receive screening and early treatment, but that they are less likely to access health care services in general, compared to HIV-infected persons with other risk behaviors. Furthermore, these findings reflect a need for targeted interventions for this group of vulnerable women.

The study sample included 200 randomly selected charts from a population of 464 eligible HIV-infected female patients receiving care at a local health department in Florida. A larger study would have greater power to detect associations between Pap smear rates and demographic factors and to detect changes in cervical cancer screening over time. Although efforts are made at the local health department to obtain reports from outside facilities, some patients may have received Pap smears that were not documented. This would lead to underreporting of true cervical cancer screening rates.

Although this study provided information about factors associated with cervical cancer screening, we did not directly assess patient-reported or provider-reported barriers to screening. Such information would help frame recommendations for improving access to services and motivating patients to seek cervical cancer screening. Given our findings and those of Stein et al.[19] and Oster et al.,[20] we propose that patients would better meet cervical cancer screening guidelines if these services were more conveniently available to patients in a single location at the time of routine HIV care visits.

Cervical cancer remains an important cause of morbidity and mortality in HIV-infected women in the United States. Although trials are currently underway to test HPV vaccine efficacy and immunogenicity in HIV-infected women,[32] early detection of cervical cancer via Pap smears will remain the gold standard into the foreseeable future for HIV-infected women. To decrease the disproportionate burden of disease in HIV-infected women, providers and public health professionals must work to ensure that routine Pap smear screening is universally available where HIV-infected women receive care.

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Address correspondence to:
Jennifer Logan, M.D., M.P.H.
3181 SW Sam Jackson Park Rd.
Mail Code: CB 669
Portland, OR 97239

E-mail: JenLogan1@gmail.com