

Acceptability of anal cancer screening tests for women living with HIV in the EVVA study

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ABSTRACT

Background Anal cancer is potentially preventable through screening. For screening to be implemented, the screening procedures must be acceptable to the affected population. The objective of the present study was to measure the acceptability of currently available anal cancer screening tests in a population of women living with HIV who had experienced the tests.

Methods The EVVA study (“Evaluation of Human Immunodeficiency Virus, Human Papillomavirus, and Anal Intraepithelial Neoplasia in Women”) is a prospective cohort study of adult women living with HIV in Montreal, Quebec. Participants were screened with cervical or anal HPV testing and cervical or anal cytology every 6 months for 2 years. High-resolution anoscopy (HRA) and digital anal rectal examination (DARE) were also performed systematically, with biopsies, at baseline and at 2 years. An acceptability questionnaire was administered at the final visit or at study withdrawal.

Results Of 124 women who completed the acceptability questionnaire, most considered screening “an absolute necessity” in routine care for all women living with HIV [77%; 95% confidence interval (CI): 69% to 84%]. Yearly anal cytology or anal HPV testing was considered very acceptable by 81% (95% CI: 73% to 88%); HRA every 2 years was considered very acceptable by 84% (95% CI: 77% to 90%); and yearly DARE was considered very acceptable by 87% (95% CI: 79% to 92%). Acceptability increased to more than 95% with a longer proposed time interval. Pain was the main reason for lower acceptability.

Conclusions Most participating women considered anal cancer screening necessary and very acceptable. Longer screening intervals and adequate pain management could further increase the acceptability of repeated screening.

Key Words HIV, human papillomavirus, HPV, women, anal cancer, screening acceptability, cancer prevention

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INTRODUCTION

The incidence of anal cancer is increasing in the general population, and men and women living with HIV are the population at highest risk^{1–3}. Like cervical cancer, anal cancer is caused by persistent infection with oncogenic human papillomavirus (HPV) types^{4,5}, which can lead to high-grade squamous intraepithelial lesions (HSILs), the precursor to invasive cancer⁶.

It is widely hypothesized that anal cancer is preventable with treatment of anal HSILs, based on analogies between the natural histories of anal and cervical cancer⁷, the known

high rates of anal and cervical cancers in populations with high rates of anal and cervical dysplasia, and the fact that detection and treatment of cervical HSIL dramatically reduced the incidence of cervical cancer with the adoption of routine Papanicolaou (Pap) testing in the 1960s⁷. Although the rate of progression of anal HSIL to invasive anal cancer remains uncertain⁸, there is growing evidence that treatment of anal HSILs reduces progression to cancer⁹. We also know that early detection and treatment of invasive anal cancer reduces mortality¹⁰.

Many experts encourage anal cancer screening^{11,12}, but very few countries have recommended or developed

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national anal cancer screening programs^{13–16}. Hesitation has been attributable mainly to insufficiency of the resources needed to support and maintain such programs. Additionally, although anal HSILs can be effectively treated¹⁷, evidence that treatment of HSILs reduces the incidence of anal cancer is scarce. Ongoing randomized controlled trials are assessing the efficacy of identifying and treating anal HSILs for prevention of invasive anal cancer (see NCT02135419 at <https://ClinicalTrials.gov>, <https://anchorstudy.org/>, and ISRCTN14067023 at <http://apps.who.int/trialsearch/Default.aspx>).

Meanwhile, even if treatment of HSILs is found to lower the incidence of anal cancer, a screening test must be acceptable to the population^{18,19}. Despite the high acceptability of anal cancer screening reported in HIV-positive men who have sex with men^{20–27}, transferability of acceptability data to women living with HIV cannot be assumed. Previous studies have assessed the willingness of women living with or without HIV to undergo anal cancer screening procedures^{28–32}. One study in a mixed-sex cohort (119 women) of non-specified HIV status assessed the pain felt during a high-resolution anoscopy (HRA) and willingness to undergo future examinations³³. However, the acceptability of cervical cytology, anal swabs for HPV testing or cytology, HRA, and digital anal rectal examination (DARE) at regular frequencies has never been measured and compared in women living with HIV who have experienced all procedures. The objective of the present work was to measure the acceptability of 3 anal cancer screening procedures in a cohort of women living with HIV who experienced the tests as part of a study.

METHODS

Study Design and Population

We assessed the acceptability of anal cancer screening within the EVVA study (“Evaluation of Human Immunodeficiency Virus, Human Papillomavirus, and Anal Intraepithelial Neoplasia in Women”), a prospective observational cohort study of 151 women living with HIV³⁴. Participants in the EVVA study were women 18 years of age and older who were living with HIV in Montreal and who were sufficiently proficient in English or French to provide consent and understand the questionnaire. Exclusion criteria were pregnancy at recruitment, invasive anal cancer in the past or at recruitment, and absence of a cervix (preventing cervical specimen collection).

We recruited women during routine care at 4 HIV clinics between February 2012 and July 2015. Study visits occurred every 6 months for 2 years. Each visit included questionnaires, chart reviews, cervical and anal cytology, and cervical and anal HPV testing. All participants also underwent HRA with DARE and biopsies at baseline and at 24 months (final visit), or more often if clinically indicated.

We added an acceptability questionnaire to the EVVA study protocol in May 2013. Subsequently, participants completed acceptability questionnaires at the last study visit or in the event of withdrawal from the study. We provided written questionnaires in French or English, depending on each participant’s preference. Assistance was available if literacy or language proficiency hindered comprehension.

The study was approved by the research ethics boards of the McGill University Health Centre and the Centre hospitalier de l’Université de Montréal. All participants provided voluntary written informed consent.

Screening Tests

Cervical and anal specimens for HPV testing and cytology were collected by a trained research nurse. To obtain cervical samples for cytology, a cytobrush and wooden cervical spatula were sequentially inserted through a vaginal speculum and rotated in the cervix; the process was repeated with a second cytobrush for cervical HPV testing. For anal cytology and HPV testing, 2 consecutive saline-moistened Dacron swabs were inserted 3–5 cm into the anal canal and gently rotated during removal to collect epithelial cells from the canal walls. The HRAs were performed by a trained anoscopist and included a DARE, visualization of the perianal region, and palpation of the anal canal with a gloved finger. Each HRA consisted of an examination of the anal canal through a clear plastic anoscope with a magnifying lens (colposcope) after application of 5% acetic acid and Lugol’s iodine. At least 2 biopsies targeted to areas of greatest concern were taken in all participants, using disposable bronchoscopy forceps or reusable baby Tischler forceps, after application of 2% xylocaine gel. To reduce discomfort after the HRA, participants were given docusate sodium and 5% xylocaine ointment for as-needed home use. Injected xylocaine was used as analgesia during HRA until May 2013, when the injection was replaced by the xylocaine gel. If anal HSIL⁶ was seen on histologic examination of the biopsy specimen, the HRA was repeated in 6 months, and if persistent HSIL was confirmed, women were offered treatment for anal HSIL through regular clinical services.

Questionnaires and Chart Review

A study coordinator collected sociodemographic and past medical data from chart reviews and from lifestyle and demographic questionnaires at every visit. To limit social desirability bias, participants could choose to complete the questionnaires with the study coordinator or alone. The study coordinator emphasized our adherence to confidentiality, the anonymity of responses, and the importance of truthful answers.

For the purposes of the present study, we defined acceptability as the extent to which individuals who experienced standardized screening procedures endorsed the integration of the same procedures into routine care. Because no pre-existing “gold standard” was available for measuring anal cancer screening acceptability in women living with HIV, we drew from validated questionnaires to create a measurement tool with maximum validity. Co-investigators and collaborators confirmed the face validity of the questionnaire. Using ordinal scales with a range of 0–10, the acceptability questionnaire assessed worry about anal cancer, pain with procedures, belief in the necessity of anal cancer screening, and the acceptability of the procedures at various hypothetical frequencies. Pain and acceptability of cervical Pap testing served as a benchmark for comparison, because cervical Pap tests are considered highly acceptable and are recommended as routine yearly screening for women living with HIV in Canada^{35,36}. Women

who endorsed low acceptability (acceptability < 5/10) for any procedure were asked to provide a reason. All women had the opportunity to provide additional comments at the end of the questionnaire.

Statistical Analysis

We report means and standard deviations or proportions, as appropriate, to describe demographic and clinical characteristics and acceptability results. The acceptability variable had a non-normal distribution, very polarized to the extremes. Consequently, we defined a new binary variable, setting acceptability greater than 5 out of 10 as “acceptable,” and acceptability of 5 or less out of 10 as “not acceptable.” To reach a conservative estimate of acceptability, we assigned the instances of acceptability rated as exactly 5 out of 10 to the “not acceptable” category. We used frequencies and proportions to compare women who considered all procedures “acceptable” (that is, acceptability ratings >5/10 for all frequencies) with women who considered 1 or more procedures “not acceptable” (that is, an acceptability rating ≤5/10 for at least 1 proposed

frequency). We used the Pearson chi-square to compare the high- and low-acceptability groups, with *p* values less than 0.05 considered statistically significant. Analyses were conducted using the Stata/IC software application (version 11.2: StataCorp LP, College Station, TX, U.S.A.).

RESULTS

Of 151 women recruited into EVVA, 11 (7.3%) withdrew before the acceptability questionnaire was implemented in May 2013. Of the remaining 140 women, 124 (88.6%) completed the acceptability questionnaire. The latter group included all 117 women who completed the final (24-month) visit (100%), and 7 of the 23 women who withdrew from the EVVA study after the acceptability questionnaire was implemented, but before the final visit (30.4%). The remaining 16 of the 23 who withdrew after the questionnaire was implemented (69.6%) either declined the request to complete it or were unreachable.

Table 1 depicts the baseline characteristics of participants who completed the acceptability questionnaire

TABLE 1 Baseline characteristics of women who did and did not complete the acceptability questionnaire in the EVVA study^a

Characteristic	Completed acceptability questionnaire [n (%)] ^b	
	Yes	No
Participants (n)	124	27
Age group at baseline		
18–29 Years	7 (5.7)	0 (0)
30–39 Years	26 (21.0)	7 (25.9)
40–49 Years	53 (42.7)	12 (44.4)
50–70 Years	38 (30.7)	8 (29.6)
Place of birth		
Canada	32 (25.8)	3 (11.1)
Africa	53 (42.7)	13 (48.2)
Caribbean	35 (28.2)	8 (29.6)
Other	4 (3.2)	3 (11.1)
Education completed		
High school or less	81 (65.3)	16 (59.3)
College or university	43 (34.7)	11 (40.7)
Ever smoked cigarettes		
Never	82 (66.1)	21 (77.8)
Past	20 (16.1)	2 (7.4)
Current	22 (17.7)	4 (14.8)
Ever injected drugs		
Never	110 (88.7)	26 (96.3)
Past	12 (9.7)	1 (3.7)
Current	2 (1.6)	0 (0)
≥10 Years since HIV diagnosis	61 (49.2)	14 (51.9)

Characteristic	Completed acceptability questionnaire [n (%)] ^b	
	Yes	No
Current CD4 cell count		
<200/μL	8 (6.5)	1 (3.7)
200–499/μL	44 (35.5)	9 (33.3)
≥500/μL	72 (58.1)	17 (63.0)
HIV viral load <50 copies/mL	98 (79.0)	22 (81.5)
Sexual preference		
Men	114 (91.9)	22 (81.5)
Women, both men and women, or missing answer	10 (8.1)	5 (18.5)
Lifetime anal sex partners (range: 0–20)		
Never had anal sex	87 (70.7)	23 (85.1)
1	20 (16.3)	3 (11.1)
≥2	17 (13.7)	1 (3.7)
Anal sex partners in the 6 months preceding baseline		
0	119 (96.0)	26 (96.3)
1	5 (4.0)	1 (3.7)
Vaginal sex partners in the 6 months preceding baseline		
0	59 (47.6)	10 (37.0)
1	61 (49.2)	16 (59.3)
2 or 3	4 (3.2)	0 (0)
Survivor of past sexual abuse	58 (48.3)	10 (37.0)
Prevalent anal HPV	94 (76.4)	19 (70.4)

^a “Evaluation of Human Immunodeficiency Virus, Human Papillomavirus, and Anal Intraepithelial Neoplasia in Women.”

^b Characteristic totals might not add to 151 because of missing values. HPV = human papillomavirus.

and those who did not. Most of the EVVA study participants (76.8%) were born outside of Canada; few had previously injected drugs (<10%) or were currently injecting drugs (<2%); 29% had ever had receptive anal sex; and few (<5%) had engaged in receptive anal sex in the preceding 6 months. Three quarters (75.3%) had a prevalent anal HPV infection at baseline. No appreciable differences in those characteristics were observed between respondents and non-respondents to the acceptability questionnaire (*p* values not shown).

Anal Cancer Worry and Wish for Routine Screening

We assessed participant perceptions of the need for routine anal cancer screening in women living with HIV, using 0–10 scales to measure level of worry about anal cancer and wish for routine screening (Figure 1). Regarding worry about anal cancer, 28.2% [35/124; 95% confidence interval (CI): 20.5% to 37.0%] were “not worried at all” (0/10), and 40.3% (50/124; 95% CI: 31.6% to 49.5%) were “extremely worried” (10/10). Most women (77.4%, 96/124; 95% CI: 69.0% to 84.4%) believed that screening was “an absolute necessity” (10/10) in routine care for all women with HIV.

Pain

Women rated the pain that they had experienced during anal cancer screening procedures from 0 (no pain at all) to 10 (worst pain ever felt). For comparison, they also rated the pain experienced during cervical cytology and cervical HPV testing (Figure 2). Median pain reported with cervical cytology and HPV testing, anal cytology and HPV testing, and DARE was 1 out of 10. For HRA, the grade of pain was distributed more widely along the scale, with a median grade of 5 out of 10.

Acceptability of Procedures

Figure 3 depicts the acceptability of anal swab, DARE, and HRA at various proposed frequencies on a scale from 0 (not acceptable; don't want to do it ever again) to 10 (very acceptable; so easy I could do it even more often) and compares the ratings with the rating for the annual cervical Pap, which 85.4% of participants (95% CI: 78.0% to 91.2%) considered very acceptable (10/10).

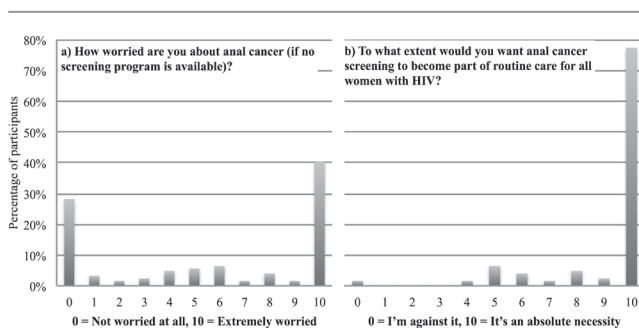


FIGURE 1 Worry about anal cancer and wish for routine screening for 124 participants in the EVVA (“Evaluation of Human Immunodeficiency Virus, Human Papillomavirus, and Anal Intraepithelial Neoplasia in Women”) study.

Acceptability of anal cytology and HPV testing was similar to that for yearly cervical Pap testing when proposed as yearly screening (81.1%; 95% CI: 73.1% to 87.7%), but those tests were even more acceptable than yearly cervical Pap tests when proposed as screening every 2 years (96.7%; 95% CI: 91.9% to 99.1%) or every 5 years (96.8%; 95% CI: 91.9% to 99.1%). The level of acceptability of DARE was similar to that of yearly cervical Pap testing at all frequencies (86.8% for yearly; 95% CI: 79.4% to 92.2%; 95.1% for every 2 years; 95% CI: 89.6% to 98.2%; and 95.9% for every 5 years; 95% CI: 90.8% to 98.7%). Although HRA was associated with more pain, HRA was considered highly acceptable every 2 years by 84.4% of respondents (95% CI: 76.8% to 90.4%), every 5 years by 95.1% (95% CI: 89.7% to 98.2%), and every 10 years by 96.0% (95% CI: 90.8% to 98.7%). Thus, HRA every 2 years approached the level of acceptability of a yearly cervical Pap test, and HRA every 5 or 10 years surpassed the acceptability of a yearly

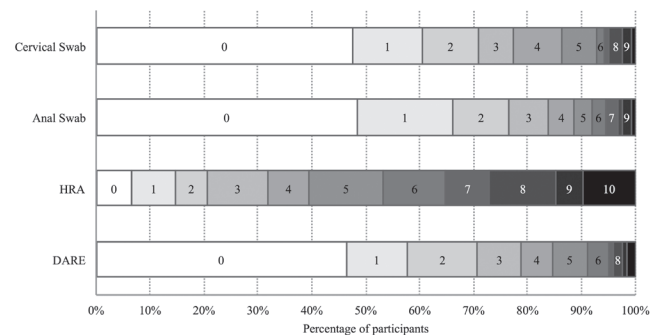


FIGURE 2 Grade of pain (0, no pain at all; 10, worst pain ever felt) reported during anal and cervical cancer screening by 124 participants in the EVVA (“Evaluation of Human Immunodeficiency Virus, Human Papillomavirus, and Anal Intraepithelial Neoplasia in Women”) study. HPV = human papillomavirus; HRA = high-resolution anoscopy; DARE = digital anal rectal examination; Swab = cytology and HPV testing.

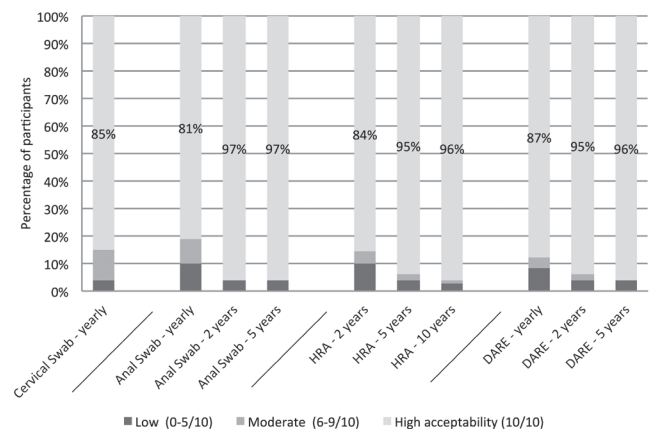


FIGURE 3 Acceptability of 3 anal cancer screening procedures, compared with yearly cervical Pap testing, at various proposed time intervals according to 124 participants in the EVVA (“Evaluation of Human Immunodeficiency Virus, Human Papillomavirus, and Anal Intraepithelial Neoplasia in Women”) study. HRA = high-resolution anoscopy; DARE = digital anal rectal examination; Swab = cytology and HPV testing.

cervical Pap test. At every hypothetical frequency, only 4.0% of women (5/124; 95% CI: 1.3% to 9.2%) scored the acceptability of HRA, anal cytology and HPV testing, or DARE as low ($\leq 5/10$).

Participant Characteristics Associated with Low Acceptability

We compared women who considered all screening procedures acceptable at all proposed frequencies (that is, acceptability consistently rated at $>5/10$) with women who considered at least 1 anal screening procedure not acceptable (that is, acceptability rated at $\leq 5/10$ for at least 1 proposed frequency, Table II). The only statistically significant association identified was between high acceptability and belief that anal cancer screening in women living with HIV was necessary. Although 36.4% of women expressing lower acceptability of anal procedures were survivors of sexual abuse, and 51.0% of the women expressing higher acceptability were, the difference was not statistically significant.

Reasons for Low Acceptability

When a participant rated a procedure's acceptability as 5 or less out of 10 at a particular frequency (for example, every 2 years), she was encouraged to provide a reason. The reported reasons for low acceptability of screening procedures were pain ($n = 4$ for anal cytology and HPV testing, $n = 9$ for HRA, $n = 5$ for DARE), embarrassment ($n = 1$ for anal cytology and HPV testing), and the duration of the procedure ($n = 2$ for HRA, $n = 1$ for DARE). One woman who had not disclosed any past sexual abuse in the sociodemographic questionnaire reported an intense, painful "pulsating sensation" for 1 day after the biopsies and felt as if she "had been raped." A fear that lesions would spread because of biopsies and a fear of discovering a new problem with screening were also mentioned by 2 other participants.

DISCUSSION

To our knowledge, the present study is the first to assess the acceptability of multiple anal cancer screening procedures in a cohort of women living with HIV who experienced those procedures. Almost all the participants believed that anal cancer screening in women living with HIV is an "absolute necessity," characterizing anal swab, DARE, and HRA as "very acceptable." The acceptability of procedures increased as the proposed frequency of screening decreased.

Pain was the main factor limiting acceptability, especially for HRA, which, in the EVVA study protocol, included systematic targeted biopsies. In another study in which 39% of participants had biopsies taken during HRA, higher scores for pain during HRA were reported by women than by men (median: 4/10 for women; 2/10 for men)³³. Screening procedures in a national program would most likely not include systematic biopsies with every HRA, and the test would therefore be less painful. However, considering that pain was reported even with anal swabs and DARE, use of topical anesthetics such as xylocaine gel could be considered, as needed, for all anal screening procedures to improve the acceptability of repeated screening.

The demographics of our study population are relatively representative of women living with HIV in the

TABLE II Characteristics of women living with HIV in the EVVA study^a who considered anal screening tests^b acceptable or not acceptable

Characteristic	Acceptable [n (%)] ^c		P Value
	Yes	No	
Participants	102	22	
Age ≥ 35 years	82 (80.4)	21 (95.5)	0.09
Born in Canada	24 (23.5)	8 (36.4)	0.21
Completed college or university	33 (32.4)	10 (45.5)	0.24
Smoked cigarettes (ever)	32 (31.4)	10 (45.5)	0.21
Injected drugs (ever)	11 (10.8)	3 (13.6)	0.70
Survivor of past sexual abuse	50 (51.0)	8 (36.4)	0.21
≥ 10 Years since HIV diagnosis	48 (47.1)	13 (59.1)	0.31
Past anal sex (ever)	30 (29.4)	7 (31.8)	0.82
Pain $>5^d$	47 (46.1)	14 (63.6)	0.14
Worry about anal cancer >5	59 (57.8)	8 (36.4)	0.07
Wish for routine screening $>5^e$	95 (93.1)	17 (77.3)	0.02

^a "Evaluation of Human Immunodeficiency Virus, Human Papillomavirus, and Anal Intraepithelial Neoplasia in Women."

^b Cytology and human papillomavirus (HPV) testing, digital anal rectal examination (DARE), and high-resolution anoscopy (HRA).

^c Acceptability was rated on a scale of 0 (not acceptable; don't want to do it ever again) to 10 (very acceptable; so easy I could do it even more often). "Acceptable" was defined as all acceptability scores being 6 or more out of 10 for all procedures at all intervals. "Not acceptable" was defined as an acceptability score of 5 or less out of 10 for at least 1 procedure at 1 proposed screening interval.

^d For any anal screening procedure or cervical Pap test.

^e Assessed using the question "To what extent would you want anal cancer screening to become part of routine care for all women living with HIV?" Responses were rated on a scale from 0 (I'm against it) to 10 (it's an absolute necessity).

province of Quebec, where 72% of new HIV diagnoses are made in women born in Africa or the Caribbean³⁷. Notably, compared with women living with HIV in other provinces in Canada^{38,39}, few of our participants identified as Indigenous ($<2\%$) and few reported a history of injecting drugs (11%). Additionally, our cohort was limited to women with a cervix because data collection included cervical sampling.

We found no associations between specific characteristics and lower acceptability in our cohort, either because of our small sample, selection bias, or true lack of associations. Previous studies have suggested that a history of sexual assault or other trauma might negatively affect uptake of anogenital cancer screening^{23,28,40}. However, we observed no such association in our cohort even though almost half our participants disclosed past sexual abuse. On the contrary, our results indicate that many women who have a history of previous trauma might want anal cancer screening. Based on principles of trauma-informed care, we recommend that, when deciding whether to offer anal cancer screening, providers be thoughtful about the high prevalence of trauma-related mental health conditions and history of sexual assault among women living with HIV⁴¹⁻⁴³. However, that knowledge alone should not prohibit screening. Indeed, we recommend avoiding

the assumption that all trauma is a barrier to anogenital cancer screening⁴³.

Although our study focused on acceptability among women who had experienced the screening procedures in a study setting, other research teams have documented the level of willingness to receive anal cancer screening in populations of women living with or without HIV. Battaglia *et al.*²⁸ assessed willingness to participate in anal cancer screening research in 200 women living with HIV who were recruited between 2011 and 2013 in two U.S. HIV clinics. The group included 16 women who had previously undergone HRA and 48 who had previously had an anal swab for cytology. The authors found that the proportion of the group willing to participate in research was 65%, and women who were older, who had previously used injectable drugs, or who had previously experienced HRA were more likely to accept screening. The most common barrier to participation was fear of pain. In a recent retrospective review, Lam *et al.*³² used chart review to assess the unacceptability of HRA in people living with HIV who completed a first-time HRA at Kaiser Permanente Northern California (2008–2013), tallying indicators of intolerability such as HRA performed under sedation, prescription for post-HRA opioid analgesia, or an emergency room visit within 1 week after the HRA. Based on those criteria, the authors found lower acceptability among women (5/36, 13.9%) than among men who have sex with men (80/1498, 5.3%) or men who do not have sex with men (10/323, 3.1%). Lam *et al.*³² also used a mailed survey to assess the acceptability of HRA; all survey respondents (1 woman, 47 men) indicated willingness to undergo HRA again if recommended. In a population of 106 people living with HIV in France, including 17 women, a study of HPV self-sampling reported 91% acceptability (that is, accomplishment of self-sampling)³¹. In women who were HIV-negative, only 28% of 404 women in one study were “very interested” in screening with anal cytology³⁰, and in another study, 67% of 370 women were “probably” or “definitely” willing to get an anal Pap test, unless their doctor recommended it, in which case, 93% were willing to proceed with the test²⁹.

The foregoing findings from multiple studies, when considered in tandem with the present work, suggest that willingness to receive anal cancer screening might be higher in women living with HIV than in women who are HIV-negative—at least in research settings. That discrepancy, if true, might reflect awareness gained about HIV-related cancers during the research process, or it might be attributable to other factors.

Despite the relative openness of members of high-risk groups to being screened for anal cancer^{44–47}, physician hesitation can be a barrier to implementation of anal cancer screening. For example, a survey administered to 36 HIV physicians in Australia about DARE for anal cancer screening of HIV-positive men who have sex with men revealed that 32% of the responding physicians perceived acceptability by patients to be a barrier to implementing yearly DARE in their practice. Additionally, 47% cited lack of time as a barrier, and only 22% felt confident in recognizing anal cancer using DARE⁴⁸. Another study that conducted focus group discussions in Hawaii further highlighted reluctance on the part of health and social service providers to discuss anal cancer⁴⁹.

The main limitation of our study is external generalizability. The results authentically reflect the perspectives of women living with HIV in Montreal, Quebec, who agreed to participate in an anal and cervical cancer screening study, who reviewed a consent form containing information about anal cancer risk and screening procedures, and who experienced the procedures at least once. The information provided to them might have influenced their perception of the necessity of the procedures. Selection bias is also present, because women who declined to participate in the anal cancer screening study were not included in the acceptability assessment. Additionally, 27 participants did not complete the acceptability questionnaire. We know that at least 5 of the 11 women who withdrew before implementation of the acceptability questionnaire withdrew for unrelated reasons. However, the reasons for withdrawal by the others are not as clear and could be related to the acceptability of the anal cancer screening procedures. Those nonresponses to the questionnaire might have altered the acceptability results. Based on those factors, acceptability results in our study are presumed to be higher than those for all women living with HIV.

Caution should be exercised when applying our findings at the individual level or across populations, because all screening carries potential psychosocial effects. Indeed, studies in men who have sex with men have reported a non-negligible psychological effect of awaiting or receiving anal cancer screening results²⁶. To our knowledge, the psychological effect of anal cancer screening has not been investigated in trans- or cisgender women, although the psychosocial effects of cervical cancer screening have been explored^{50–54}.

CONCLUSIONS

Almost all women living with HIV who participated in the EVVA study considered anal cancer screening to be very acceptable and believed that it should be part of routine care. That shared belief carries with it an urgent need for evidence supporting or refuting the benefit of anal cancer screening, so that women living with HIV can remain confident that they are receiving the best available care. The median level of pain associated with DARE and an anal swab was no greater than that associated with cervical Pap tests. Although pain was of greater concern for HRA, most women found HRA acceptable. Acceptability of all procedures increased to more than 95% with longer proposed time intervals between screening procedures.

Our findings are novel because they are based on women's firsthand experience with having undergone all procedures multiple times, rather than on consideration of a hypothetical or future testing experience. We therefore expect that screening uptake by women living with HIV will be high if anal cancer screening becomes the standard of care in that population. The anal cancer screening experiences of women living with HIV might be further optimized if providers reflect on the reasons, such as pain, for low acceptability on the part of some women, and if mitigation of those factors is instituted. That knowledge will be important for test implementation if anal cancer screening is eventually recommended in the HIV-affected population.

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CONFLICT OF INTEREST DISCLOSURES

We have read and understood *Current Oncology's* policy on disclosing conflicts of interest, and we declare the following interests: AdP's and MBK's institution has received funding from ViiV Healthcare, Merck, Gilead, and Janssen for HIV or hepatitis C treatment trials in which they were site principal investigators or co-investigators, and both received consulting fees from ViiV Healthcare and Merck. MBK has received grants from Merck (HIV Division) and ViiV Healthcare for research projects, and has also received consulting fees from Bristol–Myers Squibb and Gilead. LC has received consulting fees from Merck (HIV Division), Gilead, and ViiV Healthcare. FC has received grants from Roche Diagnostics and Merck Sharp and Dohme for research projects; speaker fees from Merck Sharp and Dohme and Roche Diagnostics; and consulting fees from Merck Sharp and Dohme. All other authors have no conflicts to disclose.

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