



Exploring anal self-examination as a screening tool for women at risk for anal cancer: awareness, interest, and barriers to behavioral uptake

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Abstract

Purpose Anal cancer is the second most common human-papillomavirus-related cancer in women, with women also at an elevated risk of incidence relative to men. Anal self-examination (ASE) is an efficient way for women to screen between provider visits for potential anal masses. While studied in male populations, no research has explored women's awareness of the self-test.

Methods In response, 345 women recruited from online advertisements and listservs were surveyed to assess their experiences using health care, history of Pap smears, knowledge of anal cancer, awareness and attitudes surrounding ASEs, and potential educational modalities to promote ASE enactment.

Results Results indicated the sample failed two key anal cancer knowledge tests (receiving a 68%/100% for risk factors and 61%/100% for signs/symptoms), and only 2.3% of participants had ever heard of ASEs before the survey. Most thought ASEs would be somewhat helpful as a screening tool, but little interest was shown towards future performance. Analyses revealed this disinterest was due to lack of knowledge, perceived discomfort with performing ASEs, and perceived irrelevance of ASEs.

Conclusions Future interventions should push for a stronger role of providers (e.g., gynecologists) in anal health, education, and screening. Additionally, campaigns should be crafted to promote the ASE as an easy, at-home screening tool that could trigger an early warning for anal disease.

Keywords Anal cancer · Anal self-examination · Cancer screening · HPV · Women's sexual health

Introduction

Human papillomavirus (HPV) is responsible for 5% of worldwide cancers, including cervical, anal, oropharyngeal, vaginal, vulvar, and penile cancers [1]. Anal cancer is the second most common HPV-related cancer in women, with 8,580 new cases annually and contributing to approximately

1,160 total deaths each year in the United States [2]. Almost twice as many women as men are diagnosed with the disease, as shown by the American Cancer Society's projections of 5,620 women relative to 2,960 men for 2018. This gender disparity may be due in part to higher rates of anal HPV and co-infection from cervical HPV among women in the general population [3]. Even higher rates exist among women with specific risk factors such as engaging in condomless receptive anal intercourse, having a history of anal fistulas or wounds, having previous abnormal cervical Pap smears, having had cervical cancer, and/or having a compromised immune system from human immunodeficiency virus (HIV) or immunosuppressives [3].

If caught early, anal cancer can be successfully treated through a combination of chemotherapy and radiation treatment [4]; however, anal cancer is rarely caught early. In one study comprised largely of women, 54% of participants were first diagnosed with stage III or IV anal cancer because of delayed diagnosis [5]. A systematic review suggested that

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such delays are often due to discomfort talking about the anorectal region to a health provider, educational levels, non-recognition of symptoms, and denial [6]. Considering the hazard of death from anal cancer jumps exponentially from Stage II (aHR of 2.01) to III (aHR of 4.58) to IV (aHR of 13.43) [6], increasing women's awareness and knowledge of anal cancer and establishing ways for women to screen for anorectal abnormalities are paramount.

As of yet, there are no standard guidelines for anal cancer screening [7]; however, for those at highest risk for anal cancer (e.g., those with specific strains of HPV or with compromised immune systems), an annual digital anorectal exam (DARE) and anal Pap smear are recommended [3]. DAREs are routine screening procedures found to be efficient detectors for palpating masses in both men and women [8]. DAREs are easily conducted but typically performed in a clinical setting by a health professional, which can be a barrier to individuals who have inconsistent or little access to healthcare [9]. Individuals can also perform DAREs on their own, referred to as anal self-examination (ASE) [10]. Arguably, individuals may be best suited to detect changes in their bodies over time by using ASEs, especially given the recommended length of time between colonoscopies—once every 10 years for those 45 or older [2]. As such, ASEs may be a cost-free method for women (and men) to detect palpable lumps that could develop between routine screenings, and thus prompting a visit to a health provider.

There have been many studies [3, 11–15] on the acceptability of various populations to seek provider-performed anal examinations (i.e., DAREs). To date, there have been only three studies exploring ASEs, which focused on its acceptability and uptake in higher risk male populations. Ong et al. [10], Butame et al. [16], and Nyitray et al. [17] all found strong degrees of efficiency, interest, and self-efficacy among HIV-positive and HIV-negative men who have sex with men to conduct routine ASEs. Yet, it remains unclear whether findings from such studies are generalizable to women's attitudes towards performing the screening technique. No studies have ever examined ASEs among women, leaving it unknown how much these individuals might be willing or able to self-screen. Therefore, the current study aimed to (1) describe the knowledge-base of women about anal cancer, (2) assess the prevalence of ASE performance and attitudes towards performing ASEs in the future, and (3) characterize women's preferences on educational modalities for promoting ASEs.

Methods

Participants and procedures

From July to October 2016, we hosted an online cross-sectional survey that targeted English-speaking, sexually active individuals who did not identify as male (i.e., cisgender women, transgender men, transgender women). Individuals accessed the survey through a link embedded in advertisements for the study. Links were disseminated through public health listservs, posted on various social media outlets and forums, and were promoted through Twitter. Individuals who clicked on the link were presented with a consent form page and required to click agree before they could access eligibility questions on gender identity and sexual activity. Ineligible participants (i.e., men, those that never had vaginal or anal sex) were thanked for their time and released from the survey. Following the 20-min survey, participants could volunteer to enter themselves into a raffle for one of five prizes worth 20USD. Additionally, we provided participants who completed the survey with a debrief webpage, which included a printable card explaining ASEs (see [Appendix](#)). The original sample recruited contained 435 participants. Due to the focus of this study on cisgender women, we excluded transgender men and transgender women. The analytic sample comprised 345 participants assigned female at birth who identified their gender as women. This study was approved by the IRB at New York Medical College.

Measures

Demographics

We measured self-reported age, race/ethnicity, education, and relationship status.

Sexual behavior and HIV/STI testing

We assessed the number of vaginal and anal sex partners participants had in the previous 6 months as well as participants' use of condoms with those partners. Participants then indicated the number of months since their last HIV and STI tests as well as whether they had been diagnosed with any of the following STI(s) within the past year: chlamydia, gonorrhea, crabs, scabies or pubic lice, genital herpes, genital warts or asymptomatic HPV, hepatitis (any strain), syphilis, or trichomoniasis. As a separate question, we asked for current HIV status.

Medical examinations and testing

Participants indicated whether they had ever seen different types of health care providers: a primary care provider, an obstetrician/gynecologist (OB/GYN), a gastroenterologist, and a nurse practitioner. They also indicated if, and at what age, they were vaccinated against HPV. In terms of medical exams and testing, we assessed the number of individuals who had ever had a cervical and/or anal Pap smear. Of those reporting having had either Pap smear, we asked if, and at what age, they had received abnormal Pap smear results. Finally, we asked those participants if they had any recurrences of those abnormal results.

Knowledge about anal cancer

Comprehension of anal cancer risk factors was measured through a previously published measure [14]. The scale consisted of 12 items (e.g., having multiple sex partners, having a history of abnormal Pap smears), measured on five-point Likert scales from 1 (*100% uncertain it is a risk factor*) to 5 (*100% certain it is a risk factor*). Items were summed, divided by 12, and then multiplied by 20 to create a score out of 100 points, to mimic academic knowledge tests. A participant scoring 100/100 (100%) received a perfect score; a participant scoring less than 65/100 (65%) essentially failed with unsatisfactory knowledge.

Existing measures were also used to assess comprehension of the signs/symptoms of anal cancer [10, 14]. The scale consisted of eight potential anal problems (e.g., having anal warts, having anal bleeding, having hemorrhoids). After each, participants were asked their certainty of that problem being a potential sign or symptom of anal cancer, from 1 (*100% uncertain it is a sign/symptom*) to 5 (*100% certain it is a sign/symptom*). Similar to the risk factors scale, items were summed, divided by eight, and then multiplied by 20 to create a score out of 100 points, to mimic academic knowledge tests.

Attitudes about ASEs

We asked whether participants had ever heard about and (as a separate question) performed an ASE. Following a brief explanation of the ASE, we asked two questions about the utility of, and interest towards, the behavior. Specifically, we asked if participants (a) thought ASEs would be helpful to screen for cancer and (b) had any interest in performing the exam. These were both scaled from 1 (*unhelpful; not interested*) to 5 (*helpful; interested*). We then asked all participants to rate eight reasons for why they might not be completely interested in future performance of ASEs: I do not have anal sex; I do not have HPV; I do not know enough about it; it might hurt; it sounds unhygienic; I would be too

embarrassed; I do not know what to look for; and I do not want to know if I have anal cancer. We also asked about individuals with whom they might feel comfortable performing an anal examination, including the aforementioned health care providers, themselves, and their sexual partners.

ASE education modalities

Finally, we gave participants a list of potential educational modalities (i.e., ways that ASE education might be broadcasted to individuals to increase awareness) and instructed them to check all options they thought might be efficacious. These were a lecture-style presentation, take-home instruction sheet with pictures, video demonstration on a website, and demonstration using a plastic bottom that has abnormalities, as well as an option for “I don’t really know of any helpful resources.”

Statistical analysis

In addition to descriptive analyses of the sample, we conducted multiple linear regression to examine whether knowledge about anal cancer risk factors and signs/symptoms were associated with demographic variables (i.e., age, race/ethnicity, education) and health-outcome variables (i.e., prior diagnosis of an abnormal cervical Pap smear, having had an anal Pap smear, and prior diagnosis of HPV). Second, we conducted exploratory factor analysis with Varimax rotation in order to reduce a multi-item variable (i.e., reasons for not completely being interested in performing an ASE). A minimum Eigenvalue of 1.0 was used as a cutoff, and selected items were clustered based on a minimum primary factor loading of 0.50 [18]; screen tests confirmed the validity of using the above criteria [19]. Factor scores for each factor were then regressed on demographic and health-outcome variables as well as knowledge about anal cancer (i.e., the risk factors scale and the signs/symptom scale). Third, we regressed participants’ interest in performing future ASEs on their preferred education modalities. Analyses were conducted with SPSS Version 20.0.

Results

Descriptive statistics

As shown in Table 1, the sample of women was largely white and well educated, with almost half (49.0%) having completed graduate school. The average age of the sample was 29, with most women falling between 21 and 37 years old. Most participants (76.5%) reported not being single. The mode number of vaginal sex partners was one, but about a quarter (23.8%) reported two or more partners. About 22%

Table 1 Description of the Sample ($n = 345$)

	Count	% of n	M	SD	Range
Age ($n = 342$)			29.0	7.9	18–69
Race/ethnicity ($n = 344$)					
White	252	73.3			
African-American/Black	22	6.4			
Hispanic/Latino	22	6.4			
Asian	16	4.7			
Other/mixed race	32	9.3			
Education					
Did not finish high school	1	0.3			
High school diploma or GED	5	1.4			
Vocational or technical degree	7	2.0			
Some college, but no degree	53	15.4			
College degree	110	31.9			
Graduate/professional degree	169	49.0			
Relationship status ($n = 341$)					
Single	81	23.5			
In a relationship/not living together	81	23.5			
In a relationship/living together	78	22.6			
Married	71	20.6			
Divorced	5	1.5			
Polyamorous	25	7.3			
Number of vaginal sex partners and percent of partners where condoms were used (previous 6 months)					
1	229	66.4	39.1%	48.9%	0–100%
2	37	10.7	43.2%	41.1%	0–100%
3	26	7.5	66.7%	29.8%	0–100%
4	7	2.0	75.0%	38.2%	0–100%
5+	12	3.5	73.3%	38.5%	0–100%
Number of anal sex partners and percent of partners where condoms were used (previous 6 months)					
1	70	20.3	30.0%	46.2%	0–100%
2	4	1.2	75.0%	28.9%	50–100%
3	3	0.9	44.4%	38.5%	0–66.7%
Last HIV test (in months ago; $n = 284$)			19.9	28.8	0–200
Last STI test (in months ago; $n = 299$)			15.9	24.8	0–200
STIs in the past year					
Chlamydia	18	5.2			
Gonorrhea	14	4.1			
HPV/genital warts	36	10.4			
Crabs/scabies/pubic lice	2	0.6			
Herpes	24	7.0			
Hepatitis (any strain)	10	2.9			
Syphilis	9	2.6			
Trichomoniasis	5	1.4			
No STIs in the past year	262	75.9			
HIV status					
HIV-negative	311	90.1			
HIV-positive	13	3.8			
I don't know	20	5.8			
Refuse to disclose	1	0.3			
Reported visiting providers					
Primary care provider	303	88.6			
OB/GYN	258	76.7			

Table 1 (continued)

	Count	% of <i>n</i>	<i>M</i>	SD	Range
Nurse practitioner	197	57.8			
Gastroenterologist	62	18.4			
HPV vaccination					
Yes, all three doses	163	47.2			
Age (in years) of first vaccination			18.2	4.8	0–41
Had received a Pap smear					
Cervical Pap	314	91.0			
Anal Pap (<i>n</i> = 332)	14	4.2			
Abnormal Pap Smears					
Cervical, and age (in years) diagnosed	95	30.3	24.6	6.9	15–57
Anal, and age (in years) diagnosed	1	7.1	19.0	–	

When the sample sized varied from 345, it is noted on the table next to the impacted variable

HIV Human immunodeficiency virus, *STI* sexually transmitted infection, *HPV* human papillomavirus, *OB/GYN* Obstetrician/Gynecologist

of the sample had engaged in anal sex in the past 6 months. Condom use was, on average, low during both vaginal and anal sex. The most widely reported STI contracted in the past year was HPV, followed by herpes. Almost 25% of the sample had reported at least one STI. Thirteen participants were HIV-positive.

Across the entire sample, the greatest number of participants reported having seen a primary care provider, followed by an OB/GYN; less than one in five reported having seen a gastroenterologist. Almost one-half of the sample had received the HPV vaccine. Regarding HPV screenings, 91.0% reported a cervical Pap smear, but only 4.1% of women sampled reported having had an anal Pap smear. Ninety-five (30.3%) of the 314 screened with a cervical Pap smear reported an abnormal result. One (7.1%) of the 14 screened with an anal Pap smear reported an abnormal result. Seventy-nine of the 95 women (83.1%) reported recurring abnormal Pap smears (not described in Table 1).

Knowledge about anal cancer: risk factors and signs and symptoms

On average, participants scored a 68.4% on the risk factors scale (SD= 12.4%; range 20–100%) and a 61.2% on the signs and symptoms scale (SD= 16.5%; range 38.3–93.3%), suggesting poor knowledge about anal cancer. Of the two multivariable models (one for risk factor knowledge, the second for signs and symptoms knowledge), only the first was significant, $F(9, 294) = 2.66$, $p = 0.006$, $R^2 = 0.08$. Within that model, only education was significantly related to knowledge of risk factors ($\beta = 0.21$, $p < 0.001$). Having been diagnosed with an abnormal cervical Pap, having had an anal Pap, and having a prior diagnosis of HPV were not significantly associated with increased knowledge.

Attitudes about ASEs

Few participants had ever heard of ASEs ($n = 8$, 2.3%) or performed them ($n = 12$, 3.5%). It was possible that the four participants who reported having performed an ASE but had never heard of it had engaged in the behavior without knowing that it had a name/was a medical self-exam until seeing it on the survey. Participants, after learning about ASEs from the survey, on average thought the behavior would be “somewhat helpful” in diagnosing anal cancer early for them ($M = 3.70$, $SD = 0.96$, 1–5). Despite this, individuals reported only being a “little interested” in performing an ASE ($M = 2.25$, $SD = 1.19$, 1–5). Table 2 describes the reasons for why participants were not interested in performing ASEs, from which three factors were derived: perceived discomfort with the exam, perceptions that the exam was not relevant, and lack of knowledge about the exam.

In the multivariable regression analyses of the three factors from Table 2 regressed on demographics, health-outcome variables, and both anal cancer knowledge scales, only the model for the lack of knowledge factor was significant, $F(11, 303) = 2.57$, $p = 0.004$, $R^2 = 0.09$, and had significant parameter effects (i.e., age: $\beta = -0.18$, $p = 0.003$; history of HPV: $\beta = -0.12$, $p = 0.05$; and anal cancer sign/symptoms knowledge: $\beta = -0.15$, $p = 0.03$). This model suggested younger women, those with prior diagnosis of HPV, and those with reduced knowledge of anal cancer signs and symptoms were more likely to report that they lacked knowledge about ASEs, leading to their disinterest in the exam.

Preferred performers of anal screenings and potential ASE educational modalities

Table 3 describes the distribution across the different individuals who participants stated they might feel comfortable

Table 2 Factor analysis with varimax rotation of reasons for not being interested in performing anal self-examination ($n = 345$)

Item	<i>M</i> (SD)	Factor 1: perceived discomfort	Factor 2: not relevant	Factor 3: lack of knowledge
It might hurt	2.5 (1.2)	0.68	0.28	0.26
It sounds unhygienic	2.0 (1.1)	0.84	0.18	0.11
I would be too embarrassed	2.0 (1.1)	0.88	0.08	0.07
I do not want to know if I have anal cancer	1.5 (0.89)	0.60	−0.01	−0.13
I do not have anal sex	3.3 (1.6)	0.11	0.88	−0.01
I do not have HPV	3.0 (1.4)	0.16	0.85	−0.02
I do not know what to look for	4.0 (1.1)	0.05	−0.05	0.83
I do not know enough about it	3.8 (1.2)	0.05	0.03	0.85

Range across all the items with means and standard deviations were 1 (*least important*) to 5 (*most important for disinterest*). Bold indicates the highest factor loading for each item

Table 3 Comfort with potential performers of anal examination and preferred education modalities ($n = 345$)

Response option	<i>n</i> (%)
Feel comfortable with the following people performing an anal examination on you?	
OB/GYN	280 (81.2)
Yourself	231 (67.0)
Primary care provider	194 (56.2)
Nurse practitioner	168 (48.7)
Gastroenterologist	152 (44.1)
Sexual partner	112 (32.5)
Best way to educate about ASE?	
Take-home instruction pamphlet	274 (79.4)
Video demonstration on a website	207 (60.0)
Demonstration using a plastic bottom with abnormalities	176 (51.0)
Lecture-style presentation	68 (19.7)
I don't really know of any helpful ways or resources	39 (11.3)

Participants could select multiple providers and multiple educational modalities, so rows are not mutually exclusive

performing an anal exam on them. OB/GYNs were the most popular performer to emerge from the data. Also described in Table 3, the most popular mode that participants thought would be effective to educate people about ASEs was the take-home instruction pamphlet, followed by a video demonstration online. The multivariable model for interest in future ASE performance regressed on all five potential ways to educate about ASEs was significant, $F(5, 339) = 5.98$, $p < 0.001$, $R^2 = 0.08$. The online video demonstration was most associated with interest ($\beta = 0.12$, $p = 0.05$), followed by the lecture-style presentation ($\beta = 0.11$, $p = 0.05$).

Discussion

The findings from our study highlight some major gaps regarding anal cancer prevention in women. They also spurred some low-cost solutions that could be implemented at the provider and patient levels. The first problem we identified was the dearth of knowledge about anal cancer among women. Despite being a well-educated sample, most women failed both anal cancer knowledge tests. Even more compelling, those at greater relative risk for anal cancer (i.e., those with abnormal cervical Pap smears, those who have been medically diagnosed with HPV) showed no increase in their knowledge-base, suggesting a disconnection at the provider level. A vast majority of participants reported having seen an OB/GYN, which in itself should facilitate HPV-related education. A subgroup of these participants received results indicative of elevated risk for developing anal dysplasia, either through having direct infection or through potential HPV-infection migration; yet, they did not appear to have received more education about the link between their abnormal screenings and anal cancer. OB/GYNs may perceive anal cancer to be a gastroenterological health concern (and therefore out of their purview), or they themselves may not have enough knowledge around anal cancer. With so few participants accessing gastroenterologists and so many accessing gynecologists (17% versus 73%, respectively, in the sample), the latter represent an opportunity to, at minimum, begin discussions about anal health and, at maximum, provide routine anal cancer screenings for higher risk patients. This approach is further supported by our finding that the most preferred performers of anal exams were OB/GYNs, with four out of five participants in the sample reporting feeling comfortable with them conducting such an exams. Even more to the point, participants endorsed OB/GYNs twice as much as gastroenterologists, whose actual clinical practice is to conduct anal screenings. With the current push towards patient-centered medical

approaches, these statistics strongly support a discussion of making anal health more of a concern within gynecology.

The second problem identified from the data was the low degree of willingness to self-examine. We found few participants reporting ever having heard of ASEs or performing them. This may be due to its poor promotion as a behavioral health tool. When educated by the survey about ASEs, participants reported it would be helpful at identifying anal cancer at an early stage but did not report much interest in actually self-screening. While these results would be unsurprising for a sample with few or no abnormal cervical Pap smears, 30% of our large sample reported at least one past abnormal Pap smear; of that group, 83% reported subsequent abnormal Pap smears. Three reasons emerged for this disconnect: perceived discomfort, perceived irrelevance of the exam, and perceived lack of knowledge about ASEs. Note that those reporting abnormal cervical Pap smears were neither more interested in performing ASEs nor did they vary on perceptions of self-exam irrelevance or low knowledge about the exam. Put simply, these individuals did not perceive themselves to be at an increased risk for anal cancer when in reality they might be. These findings suggest the need for more education following the delivery of abnormal Pap smear results, including information on the relationship between HPV and anal cancer, and potentially the introduction of ASEs as a means to monitor anal health privately and regularly. Activating anal cancer relevancy may be an easily implementable step towards increasing awareness and performance of ASEs among women.

Other potential solutions suggested by our findings were around the best way to educate women about the ASE aside from patient–provider direct education. Participants chose take-home instruction pamphlets as the most popular promotional tool. Introducing educational pamphlets at OB/GYN offices or primary care practices could be a simple strategy to promote the proper ways to perform ASEs. When considering the association between interest in ASE and educational modality, the online video demonstration became the most popular choice among those wanting to potentially start conducting self-exams. Digital eHealth campaigns could be generated to educate women about anal cancer. For example, step-by-step instructions for ASEs targeted at women could be linked to online patient portals used by medical providers, which could complement our suggested increased patient education during OB/GYN visits. An example of such information, which we gave to participants who completed our survey, is included in the [Appendix](#).

Limitations

There were a number of limitations involved with this study. In terms of measures, we relied primarily on close-ended questions and did not ask participants to elaborate on their

past experiences with anal cancer or screenings. We did not assess whether any anal health communication was ever discussed during a patient–provider episode. We also did not explore participants' personal experiences with other cancers, which may have impacted variables such as perceived helpfulness or interest in ASEs. We were not able to follow-up with participants to ask if taking the survey ignited curiosity to find out more information about ASEs. Participants' responses may have been affected by recall bias, as the survey required participants to think back to previous health care visits and experiences and sexual behaviors. They also may have held back responses due to discomfort in talking about their anal health.

Regarding our study sample, it is not unexpected for young women ($M = 29$ years old) to lack knowledge about anal cancer or interest in preventing it given that anal cancer is most frequently found in those older than 60 and actually very rare in women under 35 [2]. However, stimulating awareness of anal disease, cancer, and screening is an important introductory step that should begin at a young age and continue through the life course. In addition to destigmatizing the female anus, developing a self-screening routine that is low burden and convenient prior to elevated cancer risk can contribute to earlier detection and increased knowledge and awareness when these women inevitably age into a higher risk group.

Conversely, providers may be concerned that low-risk women and men who self-screen without proper medical training to discern what they are palpating may mistake anything that does not feel like smooth epithelium to be cancer, leading to false positives that could burden both those individuals and medical institutions. To reduce this outcome, health providers promoting and providing ASE education must also warn their patients that self-screening is a behavior that should not provoke rushed visitation to a gastroenterologist. Rather, if patients feel anomalous epithelium during a self-screen, they should know (1) that no immediate medical action is necessary unless there is pain, bleeding, or change in size or configuration, and (2) that they should bring their findings to the attention of a medical provider at the next routine or scheduled moment (either at a yearly gynecological exam or other routine visitation with a medical provider).

Conclusions

This research provides much needed insight into women's knowledge about anal cancer, the potential expanded role of gynecology in anal health, and the importance of promoting ASE as a screening tool. For individuals at varying risk for anal cancer, ASEs could serve as an important behavioral health tool. Considering this is the fourth published ASE study to date and the first focused on women,

there are multiple directions for follow-up inquiry. Future studies should explore how often, if ever, clinicians advise their at-risk patients to perform an ASE and how confident patients are after their medical provider recommends self-screening. Based on our findings, most women do not know much about this cancer, and normative beliefs and stigma about the anus may make it harder for people at higher risk to learn about the relationship between HPV and anal cancer and the signs, symptoms, and risk factors involved. Given virtually no current behavioral enactment and low interest in future performance of ASEs, there exists room for the formal introduction of ASE as a self-exam, not dissimilar to testicular or breast self-examination, for a first-line, early-warning defense. At a minimum, improving anal cancer knowledge scores in women should be a priority for primary care providers, nurse practitioners, gastroenterologists, and now OB/GYNs too. The low-complexity strategies endorsed by our study participants (i.e., providing online and offline educational ASE content) seem a logical next step for public health intervention in this area. Increasing the visibility and enactment of ASEs among women may go far in preventing later-stage anal cancer diagnoses and unnecessary deaths from this disease.

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Compliance with ethical standards

Conflict of interest All authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent A waiver of informed consent was granted by the institutional review board at the New York Medical College (L# 011915).

Appendix

ANAL SELF-CHECK 101

Are You **A-OK**? Just Follow These Quick Steps To Find Out:

.....

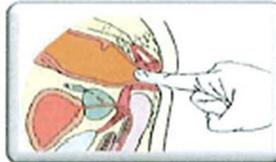
What You Will Need:

- 1 Latex Glove
 - Petroleum Jelly*
-

Let's Get To The Bottom Of This...

1. Put on glove!
2. Lubricate your index finger. (Finger Next to Your Thumb!)
3. Slowly push up into the anus from behind. Do the best you can.

See example below:



4. Stop pushing until about your knuckle is inside.
5. Gently rotate your finger while using the pad of your finger to press and feel all around the anal walls for any new **lumps, ulcers or pain**.
6. Slowly remove finger and carefully examine glove for any blood or unusual discharge.

REMEMBER: This self-exam is NOT meant to replace a doctor. If you notice any red flags such as bleeding or pain to please report any changes to your doctor.

Tips:

- Always trim your nails! You don't want to scratch yourself and risk an infection!
- Anal self-exams may be easier to perform standing in the shower, sitting in the toilet or lying down in bed.
- The anus should feel smooth and moist without bumps.

**Petroleum jelly not required if performing exam in the shower.*

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