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A Phase 2 clinical study to assess the feasibility of self- and partner anal exams to detect anal canal abnormalities including anal cancer

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Abstract

Objective: Anal cancer is a common cancer among men who have sex with men (MSM); however, there is no standard screening protocol for anal cancer. We conducted a Phase 2 clinical trial to assess the feasibility of teaching MSM to recognise palpable masses in the anal canal which is a common sign of anal cancer in men.

Methods: A clinician skilled in performing digital ano-rectal exams (DARE) used a pelvic mannequin to train 200 MSM, aged 27–78 years, how to do a self-anal exam (SAE) for singles or a partner anal exam (PAE) for couples. The clinician then performed a DARE without immediately disclosing results, after which the man or couple performed an SAE or PAE, respectively. Percent

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Author Contributions

AGN, L-YH, MWR, and EYC conceptualized the study and formulated the hypotheses. AGN, JTH, NO, MW, SM conducted the investigation. AGN, XZ, and SB did the statistical analysis. XZ provided data curation. AGN was responsible for funding acquisition, determining methodology and writing the paper. JTH, L-YH, SB, MW, SM, NO, XZ, ELB, MWR, and EYC critically reviewed and edited subsequent drafts.

Conflict of interest disclosures

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agreement with the clinician DARE in addition to sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated for the SAE, PAE, and overall.

Results: Men had a median age of 52 years, 42.5% were African American, and 60.5% were HIV-positive. DARE detected abnormalities in 12 men while the men's SAE/PAEs detected nine of these. A total of 93.0% of men classified the health of their anal canal correctly (95% CI 89.5–96.5). Overall percent agreement, sensitivity, and specificity was 93.0%, 75.0%, and 94.2%, respectively, while PPV, and NPV were 45.0%, and 98.3%, respectively. The six men who detected the abnormality had nodules/masses 3mm in size. More than half of men (60.5%) reported never checking their anus for an abnormality; however, after performing an SAE/PAE, 93.0% said they would repeat it in the future.

Conclusion: These results suggest that tumours of 3mm may be detectable by self- or partner palpation among MSM and encourage further investigation given literature suggesting a high cure rate for anal cancer tumours 10mm.

Keywords

Digital Rectal Examination; HIV; Anal Canal; Anus Neoplasms; Homosexuality; male; Early Detection of Cancer

The incidence rate of anal cancer among males steadily increased from 1973–2006 in the United States with an average annual percent increase of 3.3%.¹ While there is no proven screening for anal cancer, various biomarkers and high-resolution anoscopy are currently being investigated to screen for precancerous anal lesions;² however, there are no efficacy data for these methods, infrastructure is poor, and there is no efficacious treatment for precancerous lesions if they are found.³ Because anal cancer is a common cancer among HIV-positive gay, bisexual, and other men who have sex with men (MSM),⁴ and because most squamous cell anal carcinomas are palpable,⁵ annual digital ano-rectal exams (DARE) is standard of care with this population.⁶ In addition, consensus expert opinion recommends DARE for detection of tumours among HIV-negative MSM.^{7,8} Even so, DARE is severely underutilized. For example, 77% of persons with HIV in the US did not get an annual exam in 2011.⁹ Undiscovered tumours through lack of DARE and delayed DARE may substantially add to anal cancer morbidity, mortality, and cost since these outcomes are highly related to stage of diagnosis.¹⁰ For example, for anal cancer tumours 1cm, cure rates have been reported at >90% while tumours >5cm have a much poorer prognosis.^{11,12}

Given urgent calls to screen more MSM for anal cancer,¹³ we investigated if MSM can learn to examine their own anal canal or if partners can examine each other. If so, then detection and treatment of smaller malignant tumours among MSM may increase for those who do not or cannot access screening for precancers, due to, e.g., lack of infrastructure, lack of efficacy, or embarrassment.^{3,14,15} We posited that teaching MSM to do their own self-anal exams or, within couples, a partner anal exam was feasible for several reasons: Most anal canal malignancies in men are palpable;^{5,16} the full length of the anal canal (3–5cm) is shorter than the male index finger (~7–9cm in length) which makes the entire surface of the canal accessible to palpation;^{17,18} lay persons have been trained to teach DARE to clinicians using didactic instruction and pelvic models;¹⁹ lay persons already examine the anus for

disease;²⁰ and self-anal swabbing for sexually transmitted disease screening has been successful²¹ and acceptable among MSM.²² In addition, a recent qualitative study reported that HIV-positive MSM would find self-anal exams acceptable.²³

Our objective was to evaluate the feasibility of the SAE and PAE by assessing their accuracy and acceptability. We also assessed factors associated with concordance of SAE/PAEs and a clinician's DARE.

METHODS

Recruitment and protocol

We conducted a Phase 2 clinical feasibility study among MSM in Harris County, Texas, USA of self- and partner anal exams. Inclusion criteria targeted men, aged 27–80 years, who had no current doctor's diagnosis of anal condylomas, haemorrhoids, fissures, or anal cancer, and who could speak English. Men were excluded if they reported a DARE in the prior 3 months. We recruited persons 27 years and older since human papillomavirus (HPV) vaccination catch-up programs in the USA end at 26 years and because of low cancer incidence in younger men. Recruitment occurred in 2015–2016 and was stratified to enrol individuals and partners in couples who reported sex with men in their lifetime. Recruitment used flyers posted at three clinics (flyer text said the study was seeking ways to prevent anal cancer) and face-to-face recruitment by staff at the clinics. Recruitment also targeted the general MSM community using social media (e.g., Facebook and Growlr), flyers posted in gay venues like bars, publicity at mass events, and print media advertisements. Interested men called a study coordinator who made a preliminary eligibility assessment. The study protocol was approved (HSC-SPH-13-0671) by the Committee for the Protection of Human Subjects at the University of Texas Health Sciences Centre and written and informed consent was obtained from all participants.

All participants attended a single clinic visit for SAE/PAE training, a DARE performed by a clinician, an SAE/PAE performed by the participant, and survey completion. The clinician was a nurse practitioner with 3.5 years of NP experience focused on HIV care including completion of more than 2000 DARE's. After consenting, the men completed an initial pre-survey followed by brief anal cancer and SAE/PAE training provided by the clinician. The training included practice using two digital rectal exam mannequins (Kyoto Kagaku Co., Kyoto, Japan) to contrast a normal anal canal and one with a 7mm tumour. Verbal and written SAE/PAE instructions (Supplement) were provided. The clinician emphasized that the goal was to detect any palpable abnormality regardless of type (e.g., wart, haemorrhoid, fissure, or tumour); thus, we assessed SAE and PAE for multiple palpable anal conditions with the logic that if a mass or induration, regardless of aetiology, can be palpated, then malignant tumours may be palpated too. Prostate and distal rectal palpation was not taught.¹⁷ Finally, the clinician performed a DARE on the participant, recording a result of normal or abnormal, but did not communicate results to the participant at that time. For couples, both partners remained in the room during the DARE. For both individuals and partners, the clinician spoke to the men as she performed the DARE to describe what she was doing, e.g., "I'm now feeling 360° around your anal canal."

The clinician then left the men in private to conduct the exam on themselves, or their partners. Single men were encouraged to view the perianal region with a mirror or in a selfie taken with a smartphone. Several body positions for both individuals and partners were suggested (e.g., putting one leg on a chair, squatting, or bending over a table) with participants encouraged to use whatever position was most comfortable for them (Supplement). Men in couples were encouraged to ask for permission from their partner before beginning the exam. Each participant recorded his result as normal or abnormal, which allowed comparison of the clinician DARE and participant SAE/PAE results.

Men then completed an extensive computer-assisted self-interview after which participants met with the clinician to receive DARE results. Men with abnormalities were scheduled for treatment or provided referrals. Procedure safety was assessed with a general question about any pain during the visit. This question was expanded during the study so that a subset of the final 54 men doing study procedures were asked more focused questions about pain. If the participant reported an abnormality not observed by the clinician, the clinician offered a second DARE to check the initial DARE results. A total of four focus groups were also conducted with the participants.²⁴

To check the quality of the clinician's DARE, an HIV oncologist (EYC) observed the initial clinician DAREs and a total of 10% of the initial recruits into the study were also examined by a board-certified colorectal surgeon (SM) using DARE and standard anoscopy generally within two weeks after the clinician's DARE (high-resolution anoscopy was not performed since it detects precancerous lesions that are putatively nonpalpable). In 19/20 cases, the DARE result of the surgeon and clinician were the same. Participants were compensated \$40 for the clinic visit and \$50 for optional standard anoscopy.

Statistical methods

Tests of proportion were used to assess differences in characteristics between individuals and partners. The primary outcomes were the sensitivity, specificity, PPV, and NPV of SAE and PAE in addition to percent agreement between participant SAE/PAE and the reference standard of the clinician DARE. Clopper-Pearson confidence limits were calculated for each proportion. The sensitivity of DARE has been estimated at 90%.²⁵ For couples, each partner performed digital insertion on the other partner; thus, partners provided two participant results while the clinician produced two DARE results.

Concordance was used as the outcome for assessment of factors associated with participant and clinician exam agreement. For individuals, concordance was coded as one if the result of both clinician and participant was the same after performing a DARE and SAE/PAE, respectively. Concordance was coded as zero if clinician and participant disagreed. For partners, concordance was coded as one if both clinician and the partner performing digital insertion agreed on the results for the other partner and zero if the performing partner and clinician disagreed. For analysis of factors associated with concordance, prevalence ratios (PR), adjusted PR (aPR), and 95% CIs were calculated by bivariate and multivariable Poisson regression using a robust sandwich estimator of the variance.^{26,27} Factors chosen for multivariable analysis were included in modelling if they were not a variable in the causal pathway between exposure of interest and accuracy, and if they were significant in bivariate

analysis at $p < 0.25$. Age was included in all modelling as a potential confounder. Waist circumference was categorized as ≤ 102 cm and > 102 cm in accordance with prior literature identifying increased health-related problems among persons with > 102 cm waist size.²⁸

A priori calculations indicated that 200 participants provided 97% power to test the primary hypotheses that self- and partner anal exams would have moderate or substantial agreement with a clinician's DARE and that partner anal exams would have better agreement with the clinician DARE than would a self-anal exam (assuming 30% prevalence of abnormalities, $\alpha = 0.05$, with two-sided tests).

RESULTS

A total of 386 men expressed interest in the study through phone calls and email between February 2015 and March 2016. Of these, 27 (7.0%) declined participation and 105 (27.2%) men were ineligible or nonresponsive. Of 254 men scheduling appointments, 53 (20.9%) did not show, were ineligible at the time of appointment, or did not provide an outcome result leaving 200 men for analysis (Figure 1) including 148 individuals and 52 partners. A plurality of these men (45%) were recruited through a clinic or community centre, 25% through friend referral, 19% through social apps, and 11% through flyers (data not shown).

The median age was 52 years with 46.5% and 42.5% of participants Caucasian or African American, respectively. A total of 17.5% of men were Latino. Just under two-thirds of men were overweight/obese and 60.5% reported HIV infection (Table 1).

Most men (88.5%) agreed with the clinician's observation of no abnormality (true negatives). The clinician palpated an abnormality in 6.0% of men ($n = 12$) with nine of these men also reporting an abnormal palpation by SAE/PAE (true positives) (Table 1). The clinician described palpated abnormalities as likely condylomas ($n = 4$), scar tissue ($n = 3$), and 1 each: papule, nodule, haemorrhoid, skin tag, and flat mass. The nine abnormalities palpated by participants were ≤ 3 mm in diameter according to the clinician. The three false negatives were characterized by condylomas and papules ≤ 3 mm in diameter (data not shown). A total of 11 men reported an abnormality not observed by the clinician and eight of these agreed to a second confirmatory DARE during the same clinic visit. No abnormality was observed on the second DARE. In six of these eight men, the clinician palpated stool.

Sensitivity for the combined SAE/PAE was 75.0% (95% CI 42.8%–94.5%) while specificity was 94.2% (95% CI 89.8%–97.0%) (Figure 2). The negative predictive value of combined SAE/PAE was 98.3% (95% CI 95.2%–99.7%), while positive predictive value was substantially lower (45.0%, 95% CI 23.1%–68.5%).

There were few differences in characteristics and behaviours between individuals and partners. Partners used somewhat different body positions during the PAE than individuals' SAE (Table 1). Two-thirds of individuals said they used only one hand to perform the procedure. More than one-third of individuals (37.8%) and partners (40.4%) said they had used their fingers before to check their anus for disease. After being taught how to perform an SAE or PAE, 93.0% of men said they planned to do another in the future. After completing the exam, five men said they were not willing to do the SAE/PAE again due to

lack of concern about anal cancer, dislike of the exam, forgetting how to do the exam, embarrassment, dislike of potentially toughing faeces, and/or difficulty reaching the anus. Most men (92.5%) reported they would see a doctor if they detected an anus abnormality after doing an SAE/PAE. Similar proportions of men preferred the SAE/PAE exam and a doctor examination.

At the end of the clinic visit the clinician asked the men “if the procedure hurt” without reference to any particular procedure during the visit, e.g., DARE or SAE/PAE. No men reported bleeding although 15.0% reported that a procedure hurt. During the study, this question was expanded so that the final 54 participants were asked more detailed questions about pain. A total of 4/54 (7.4%) of these men reported any SAE/PAE pain with an average score for these four men of 1.75 on a scale of 0–5 where 0 indicates no pain. All four said the pain would not make them avoid the procedure in the future (data not shown).

Among individuals, concordance between clinician result and participant was 91.2% (95% CI 86.7%–95.8%) (Figure 2). In multivariable analysis individuals with a history of using fingers to check the anus for disease had increased concordance with clinician (PR 1.10, 95% CI 1.01–1.19, compared to persons who had never used their fingers to check their anus for disease) (Table 2). In addition, individuals who said they worried about anal cancer a lot were more likely to be concordant with the clinician compared to men who said they did not worry about anal cancer (PR, 1.09, 95% CI 1.01–1.18). Among partners, concordance was 98.1% (95% CI 94.3%–100.0%) which provided too little variance to assess factors associated with concordance.

DISCUSSION

To our knowledge, this is the first report of an effort to teach MSM to recognise an abnormality at the anus. A large majority of men doing an SAE/PAE were concordant with the clinician; however, a low number of clinician-observed abnormalities limited the study’s ability to derive more robust estimates of sensitivity and PPV.

Nevertheless, of 12 abnormalities identified by clinician, nine were also identified by participant. Most men (88.5%) matched the clinician result of no anal canal abnormality. While false negatives (1.5%) and false positives (5.5%) were rare, they could lead to missed disease, anxiety and unnecessary clinic visits for procedures like DARE. In most false-positive men, the clinician palpated stool which prompted changes to our educational protocol to differentiate the feeling between an anal canal-affixed mass and stool.

More than one-third of men reported checking their anus for disease in the past indicating their concern about anal disease and attempts to screen for disease, putatively without instruction on how to do an anal exam. Since lack of knowledge about anal cancer is associated with substantial anxiety after an abnormal screening result,²⁹ increased anal cancer educational efforts are needed for MSM in addition to education about self-palpation if subsequent studies confirm a high proportion of MSM already self-palpate for disease.

However, the best way to conduct a self-anal exam may not be fully understood. Two-thirds of individuals said they used only one hand to perform the procedure; nevertheless, a large

majority of men reported palpating 360° of the anal canal. It may be possible that an index finger and opposable thumb allow complete self-palpation of the anal canal. It is also possible that individuals were inaccurate in their claim of full palpation since self-palpation is likely more difficult than partner palpation. Nevertheless, the SAE/PAE may be well tolerated since the large majority reported no SAE/PAE pain.

Prior self-palpation out of concern for disease was associated with concordance with clinician results; thus, repeat palpation may increase men's familiarity with their anus, establish a baseline, and increase recognition of subtle changes in this soft and smooth mucosal tissue. Given a report of a 100% disease-specific cure rate for anal cancer tumours 10mm,¹¹ self-recognition of small tumours (e.g., 5mm-10mm) may reduce anal cancer morbidity and mortality.

Testicular self-exams are not currently recommended, in part, because scrotal tumours are often found accidentally.³⁰ The relative inaccessibility of the anal canal suggests accidental findings of small tumours may be less likely. For example, 77.5% of this study's participants reported that during bathing they either do not insert a finger into their anal canal or do not insert past the first knuckle (data not shown) and therefore would fail to reach the full length of the anal canal.

About one-half of men preferred the self- or partner anal exam rather than a doctor-performed exam which may speak to embarrassment associated with DARE³¹ and stigma regarding the anus;¹⁵ thus, SAE/PAEs may increase anal cancer screening access by providing an option to detect an abnormality that motivates a clinic visit.

Future studies need a larger sample to detect more abnormalities and involve multiple clinicians to assess replicability. The impact and predictors of false-positive results, e.g. for benign results like haemorrhoids, need more study given potential anxiety and economic implications.

The study assessed the men's ability to palpate an anal canal abnormality, not a malignant tumour; however, a properly-powered study to palpate malignant tumours would require >10,000 participants even in this high risk population. Also, it may be of value if MSM can palpate other pathology like anal condylomas since they increase risk for high-grade squamous intraepithelial lesions.³² If found effective, these exams could be used in low-resource settings that lack the option of high-resolution anoscopy and to overcome barriers to clinic DAREs, e.g., due to stigma.¹⁵

Given high anal cancer incidence among MSM, no uniform screening standard for anal cancer, and lack of infrastructure for proposed screening modalities (in both high and low-resource settings),¹⁴ these results suggest the SAE/PAE be further explored for detecting early-stage anal cancer when treatment is more successful.^{11,12} Larger studies are needed to assess harms and benefits of SAE/PAE and to provide robust estimates of sensitivity and PPV before either exam could be incorporated into an anal cancer screening program. If SAE/PAE benefits outweigh harms, translational and cost-effectiveness studies can answer questions about SAE/PAE frequency and optimal target populations which may be defined by HIV status, sexual behaviour, local resources, and patient preference. Nevertheless, it

could be a valuable community-led tool for both raising awareness and for screening for anal cancer.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Key Messages:

- Self-anal exams (SAE) and partner anal exams (PAE) taught by a clinician might support reductions in anal cancer morbidity and mortality.
- In this feasibility study, a large majority of men doing an SAE or PAE were concordant with the clinician's digital ano-rectal exam.
- These exams may address screening barriers associated with stigma regarding the anus and embarrassment with having a physician perform digital ano-rectal exams.

Figure 1. Recruitment and completed appointments for men conducting self- and partner anal exams, Houston, 2015–2016

Figure 2.
Accuracy estimates for all exams, self-anal exams and partner anal exams with 95% confidence intervals, Houston, 2015–2016

Table 1.

Characteristics of men conducting self- and partner anal exams, Houston, 2015–2016

	Total n=200 n (%)	Individuals n=148 n (%)	Partners n=52 n (%)
Descriptive and behavioural characteristics			
Age			
27–44	62 (31.0)	47 (31.8)	15 (28.9)
45–54	76 (38.0)	55 (37.2)	21 (40.4)
55–78	62 (31.0)	46 (31.1)	16 (30.8)
<i>Median; range</i>	<i>52; 27–78</i>	<i>52; 27–78</i>	<i>52; 27–76</i>
Race			
White	93 (46.5)	70 (47.3)	23 (44.2)
Black	85 (42.5)	63 (42.6)	22 (42.3)
Other	22 (11.0)	15 (10.1)	7 (13.5)
Ethnicity			
Hispanic	35 (17.5)	26 (17.6)	9 (17.3)
Non-Hispanic	162 (81.0)	119 (80.4)	43 (82.7)
Refuse/missing	3 (1.5)	3 (2.0)	0 (0.0)
Waist circumference, cm			
102	125 (62.5)	96 (64.9)	29 (55.8)
>102	74 (37.0)	51 (34.5)	23 (44.2)
Refuse/missing	1 (0.5)	1 (0.7)	0 (0.0)
<i>Median; range</i>	<i>97; 68–160</i>	<i>96; 68–160</i>	<i>100; 69–135</i>
Human immunodeficiency virus, self-report			
Positive	121 (60.5)	91 (61.5)	30 (57.7)
Negative	75 (37.5)	55 (37.2)	20 (38.5)
Refuse/missing	4 (2.0)	2 (1.4)	2 (3.9)
Cigarette smoking			
Never	96 (48.0)	71 (48.0)	25 (48.1)
Former	33 (16.5)	24 (16.2)	9 (17.3)
Current	69 (34.5)	51 (34.5)	18 (34.6)
Refuse/missing	2 (1.0)	2 (1.4)	0 (0.0)
DARE and SAE/PAE abnormalities			
True negative	177 (88.5)	130 (87.8)	47 (90.4)
True positive	9 (4.5)	5 (3.4)	4 (7.7)
False positive	11 (5.5)	11 (7.4)	0 (0.0)
False negative	3 (1.5)	2 (1.4)	1 (1.9)
Preferred anal sex position			
Insertive	54 (27.0)	36 (24.3)	18 (34.6)
Receptive	68 (34.0)	56 (37.8)	12 (23.1)
Both	65 (32.5)	45 (30.4)	20 (38.5)
Never had anal sex	5 (2.5)	5 (3.4)	0 (0.0)

	Total n=200 n (%)	Individuals n=148 n (%)	Partners n=52 n (%)
Refuse/missing	8 (4.0)	6 (4.1)	2 (3.9)
Body position for self- or partner anal exam ^a			
Bending over or laying on the table	115 (57.5)	66 (44.6)	49 (94.2)
Standing with one leg on chair	38 (19.0)	37 (25.0)	1 (1.9)
Squatting	31 (15.5)	31 (21.0)	0 (0.0)
Sitting on the edge of the chair	4 (2.0)	4 (2.7)	0 (0.0)
Other	11 (5.5)	10 (6.8)	1 (1.9)
Refuse/missing	1 (0.5)	0 (0.0)	1 (1.9)
Used two hands to do exam (individuals only)			
No	99 (66.9)	99 (66.9)	n/a
Yes	48 (32.4)	48 (32.4)	n/a
Refuse/missing	1 (0.7)	1 (0.7)	n/a
Ever used fingers to check own anus for disease			
No	121 (60.5)	92 (62.2)	29 (55.8)
Yes	77 (38.5)	56 (37.8)	21 (40.4)
Refuse/missing	2 (1.0)	0 (0.0)	2 (3.9)
Inserts a finger into own anus during bathing to clean ^a			
No	79 (39.5)	66 (44.6)	13 (25.0)
Yes	116 (58.0)	79 (53.4)	37 (71.2)
Refuse/missing	5 (2.5)	3 (2.0)	2 (3.9)
Acceptability, self-efficacy and health-seeking intentions			
Worried about getting anal cancer			
None	81 (40.5)	65 (43.9)	16 (30.8)
Little	58 (29.0)	43 (29.1)	15 (28.9)
Some	43 (21.5)	29 (19.6)	14 (26.9)
A lot	17 (8.5)	10 (6.8)	7 (13.5)
Refuse/missing	1 (0.5)	1 (0.7)	0 (0.0)
After practicing it, I am willing to do an [SAE or PAE] ^b			
Disagree	5 (2.5)	4 (2.7)	1 (1.9)
Neither agree nor disagree	3 (1.5)	2 (1.4)	1 (1.9)
Agree	187 (93.5)	139 (93.9)	48 (92.3)
Refuse/missing	5 (2.5)	3 (2.0)	2 (3.9)
I now know how to do an [SAE or PAE] ^b			
Disagree	9 (4.5)	9 (6.1)	0 (0.0)
Neither agree nor disagree	0 (0.0)	0 (0.0)	0 (0.0)
Agree	187 (93.5)	136 (91.9)	51 (98.1)
Refuse/missing	4 (2.0)	3 (2.0)	1 (1.9)
In the future, I plan to do an [SAE or PAE] ^b			
Disagree	3 (1.5)	2 (1.4)	1 (1.9)

	Total n=200 n (%)	Individuals n=148 n (%)	Partners n=52 n (%)
Neither agree nor disagree	6 (3.0)	4 (2.7)	2 (3.9)
Agree	186 (93.0)	138 (93.2)	48 (92.3)
Refuse/missing	5 (2.5)	4 (2.7)	1 (1.9)
Would see a doctor if I noticed a problem after doing an SAE [or PAE] ^b			
Disagree	6 (3.0)	4 (2.7)	2 (3.9)
Neither agree nor disagree	0 (0.0)	0 (0.0)	0 (0.0)
Agree	185 (92.5)	139 (93.9)	46 (88.5)
Refuse/missing	9 (4.5)	5 (3.4)	4 (7.7)
Preference for SAE, PAE or doctor-provided exam ^{a, c}			
SAE	73 (36.5)	67 (45.3)	6 (11.5)
PAE	26 (13.0)	4 (2.7)	22 (42.3)
Doctor-provided exam	90 (45.0)	69 (46.6)	21 (40.4)
Refuse/missing	11 (5.5)	8 (5.4)	3 (5.8)

^aDifference in the variable by individual/partner status assessed with chi-square, does not include refusals or missing values, and where $p < 0.05$.

DARE, Digital Ano-Rectal Exam; SAE, Self-Anal Exam; PAE, Partner Anal Exam.

^bIndividuals were only asked about self-anal exams and partners were only asked about partner anal exams.

^cPersons were asked about preference for SAE, PAE, or doctor-provided exam regardless of their current relationship status.

Table 2.

Bivariate and multivariable factors associated with concordance between DARE and self-anal exams among individuals (n=148), Houston, 2015–2016

Factors	Concordance %	PR	aPR ^a 95%CI
Age, years			
27–44	89	1.0	-
45–54	95	1.06	-
55–78	89	1.00	-
<i>continuous</i>		1.00	-
Ethnicity			
Hispanic	96	1.0	-
Non-Hispanic	90	0.93	-
Waist, cm			
102	94	1.0	-
>102	86	0.92	-
<i>continuous</i>		1.00	1.00 (0.99–1.00)
Preferred anal sex position			
Insertive	92	1.0	-
Receptive	93	1.01	-
Both	91	0.99	-
Never had anal sex	100	1.09	-
Ever used fingers to check own anus for disease			
No	88	1.0	1.0
Yes	96	1.10	1.10 (1.01–1.19)
Inserts a finger into own anus during bathing to clean			
No	86	1.0	-
Yes	95	1.10	-
Worried about getting anal cancer			
None	89	1.0	1.0
Little	93	1.04	1.01 (0.90–1.13)
Some	90	1.00	0.94 (0.82–1.09)
A lot	100	1.12	1.09 (1.01–1.18)
Preference for SAE or doctor-provided exam ^b			
SAE	96	1.0	-
Doctor-provided exam	87	0.91	-

^aPrevalence ratios adjusted by age and remaining variables in model.

^b“Partner-provided exam” removed for assessment of the association between “Preference for SAE or doctor-provided exam” and concordance among individuals.

PR, Prevalence ratio; aPR, Adjusted prevalence ratio; CI, Confidence interval; SAE, Self-Anal Exam.