

# UCSF

## UC San Francisco Previously Published Works

### Title

Pubic Hair Grooming and Sexually Transmitted Infections: A Clinic-Based Cross-Sectional Survey.

### Permalink

<https://escholarship.org/uc/item/1k07p0tr>

### Journal

Sexually Transmitted Diseases, 47(6)

### ISSN

0148-5717

### Authors

Gaither, Thomas W  
Fergus, Kirkpatrick  
Sutcliffe, Siobhan  
et al.

### Publication Date

2020-06-01

### DOI

10.1097/olq.0000000000001176

Peer reviewed

# Pubic Hair Grooming and Sexually Transmitted Infections: A Clinic-Based Cross-Sectional Survey

Thomas W. Gaither, MD, MAS,\* Kirkpatrick Fergus, BS,† Siobhan Sutcliffe, PhD,‡  
Benjamin Cedars, BS,\* Anthony Enriquez, BS,\* Austin Lee, BS,\* Nnenaya Mmonu, MD,\*  
Stephanie Cohen, MD, MPH,§ and Benjamin Breyer, MD, MAS†¶

**Background:** Pubic hair grooming has been correlated with a self-reported history of sexually transmitted infections (STIs). We examined this relationship further in a cross-sectional survey of patients attending an urban STI clinic in San Francisco in 2018.

**Methods:** Pubic hair grooming practices and detailed sexual histories were obtained. Sexually transmitted infections were confirmed via laboratory diagnosis or physical examination by a licensed provider.

**Results:** A total of 314 individuals completed the survey. The median age of participants was 31 years. In total, there were 247 (80%) men, 58 (19%) women, and 5 (2%) transgender participants. Of the 247 men, 177 (72%) identified as gay or bisexual. Twenty-five (82%) of 314 patients reported pubic hair grooming within the past 3 months. Seventy-eight (25%) patients were diagnosed with a new STI during their visit. There were no significant associations between reporting any anal or genital grooming and being diagnosed with an STI. However, anal groomers were 3 times as likely to be diagnosed with a rectal STI after adjustment (adjusted odds ratio, 3.0; 95% confidence interval, 1.2–7.5) compared with genital only

groomers and nongroomers. Participants who report removing all of their pubic hair more than 6 times within the past year had higher prevalence of genital STIs (33.3%, 6–10 times; 28.6%, >10 times) compared with participants who never groom all of their pubic hair (15.3%,  $P = 0.01$ ).

**Conclusions:** We found no association between recent grooming and genital STIs. Anal grooming was associated with rectal STIs in gay and bisexual men.

Pubic hair grooming is common in the United States among men and women.<sup>1,2</sup> In a nationally representative study in 2013, 84% of women and 50% of men reported pubic hair grooming; grooming locations included around the genitalia (for men, penile shaft and scrotum; for women, labia and mons pubis), inner thighs, perineum, and anus.<sup>1,2</sup> Motivations for grooming include genital hygiene, body image, partner preference, and sexual activity.<sup>1,3</sup> Pubic hair grooming is associated with more frequent sexual activity and a greater number of lifetime sexual partners.<sup>1</sup> The relationship between grooming and sexual activity seems to be stronger among men who have sex with men (MSM) than among men who have sex with women, especially for anal grooming.<sup>4</sup> In women, sexual orientation is not associated with grooming; however, in regard to sexual practices, grooming is associated with receiving oral sex.<sup>1,5</sup>

Because grooming is highly associated with sexual activity, several studies have examined the association between grooming and transmission of sexually transmitted infections (STIs). In a small case series, 14 immunocompetent women developed molluscum contagiosum after grooming their pubic hair.<sup>6</sup> In a convenience sample of 333 women in a clinic in Texas, 5% of women reported infections after removing their pubic hair; however, no distinction was made between soft tissue infections and STIs, which were all self-reported.<sup>7</sup> In our previous large-scale national, cross-sectional survey, pubic hair grooming was highly correlated with a self-reported history of cutaneous STIs, including herpes, human papillomavirus, syphilis, and molluscum.<sup>8</sup> We speculated that these findings might be explained by either grooming-mediated epidermal microtears, which might permit epithelial penetration by pathogens, or that grooming might be solely a marker of higher-risk sexual activity, as we were not able to control for sexual orientation or condom usage. In addition, STIs were self-reported. A more recent study by Luster et al.<sup>9</sup> found no association between pubic hair grooming and laboratory-based gonorrhea and chlamydia infections in college-aged women. This study was limited by a homogenous sample and a lack of an unexposed group (i.e., nearly 98.1% of the sample reported some pubic hair grooming).

In the present study, we aimed to further explore the possible association between pubic hair grooming and STI transmission by assessing grooming habits among individuals who presented to a citywide STI clinic in San Francisco and correlating these habits with the presence of STIs confirmed via laboratory diagnosis, where appropriate, or by physical examination by a licensed

From the \*Department of Urology, University of California, Los Angeles, Los Angeles; †Department of Urology, University of California, San Francisco, San Francisco, CA; ‡Department of Surgery, Washington University School of Medicine, St Louis, MO; and Departments of §Medicine and ¶Epidemiology and Biostatistics, University of California, San Francisco, San Francisco, CA

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

**Conflict of Interest and Sources of Funding:** The authors report no financial or commercial conflicts of interests with this work.

**Author contributions:** T.W.G. contributed to the completion of data analysis, drafting of the manuscript, and approval of the final manuscript; K.F., completion data analysis; drafting of the manuscript, and approval of the final manuscript; S.S., interpretation of data analysis, drafting of the manuscript, and approval of the final manuscript; B.C., data acquisition, drafting of the manuscript, and approval of the final manuscript; A.E., data acquisition, drafting of the manuscript, and approval of the final manuscript; A.L., data acquisition, drafting of the manuscript, and approval of the final manuscript; N.M., data acquisition, drafting of the manuscript, and approval of the final manuscript; S.C., data acquisition, data interpretation, drafting of the manuscript, and approval of the final manuscript; B.B., data acquisition, interpretation, drafting of the manuscript, approval of the final manuscript, and supervision of the project.

**Correspondence:** Thomas W. Gaither, MD, MAS, Department of Urology, University of California, Los Angeles, 300 Stein Plaza, 3rd Floor, Suite 331, Los Angeles, CA 90095. E-mail: tgaithercastellanos@mednet.ucla.edu.

Received for publication December 1, 2019, and accepted February 23, 2020.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text, and links to the digital files are provided in the HTML text of this article on the journal's Web site (<http://www.stdjournal.com>).

DOI: 10.1097/OLQ.0000000000001176

Copyright © 2020 American Sexually Transmitted Diseases Association. All rights reserved.

provider. Pubic hair grooming was defined as removing any pubic hair within the past 3 months. Detailed sexual histories were obtained in all participants. Understanding the relationship between grooming and STI prevalence could inform health education and risk reduction counseling messages for sexually active individuals, the majority of whom report pubic hair grooming.

## MATERIALS AND METHODS

### Study Population

This is a cross-sectional study designed to examine the association between pubic hair grooming practices and STI. After obtaining informed consent, patients were enrolled from April to May of 2018 at the San Francisco Department of Public Health City Clinic. The urban STI clinic serves a diverse patient population of San Francisco and offers care regardless of insurance status or ability to pay. Study staff conducted recruitment in person, approaching potentially eligible participants in the waiting room during recruitment hours. Recruitment occurred when staff was available. The number of patients approached for study participation was not calculated. Eligibility criteria included English speaker and age  $\geq 18$  years. To be included in the analysis, participants needed to complete the survey and have received STI testing in the study period. All patients were sexually active within the past 3 months.

### Assessment of Pubic Hair Grooming

Our primary exposure was pubic hair grooming practices over the past 3 months as measured in a self-reported survey used in previous studies (Appendix A, <http://links.lww.com/OLQ/A484>).<sup>1,2,4</sup> The instrument asked about ever grooming (yes/no), removing all hair (yes/no), frequency (daily, weekly, monthly, every other month, do not groom regularly), method (razor, electric razor, wax, scissors, electrolysis, laser, other), and anatomic region of hair removal. Groomers were defined as those who reported any hair removal or trimming over the past 3 months. We also categorized our exposure by anatomic region of hair removal (genital vs. anal grooming) to correlate with the presence of genital and rectal STIs, consistent with our theory that microtears promote STI acquisition. Similar to previous studies, we also repeated our analysis examining grooming frequency (daily, weekly, monthly, every other month, not regularly) and frequency of removing all pubic hair within the past year (never, 1 time, 2–5 times, 6–10 times, >10 times).<sup>8</sup>

### Assessment of STIs

Our primary outcome was a positive STI test result at the time of the clinic visit. Chlamydia and gonorrhea infections were confirmed with nucleic acid amplification testing via urine samples, vaginal swabs, or rectal swabs. Pharyngeal infections were not studied, as we did not anticipate pubic hair grooming to impact this. Primary syphilis was defined as having a genital ulcer (i.e., chancre) with treponemes seen on dark-field microscopy or a positive rapid plasma reagin. Open sores or wounds with negative dark-field microscopy or negative rapid plasma reagin were classified as “genital ulcers.” Genital herpes was diagnosed via clinical history, physical examination, and herpes simplex virus 2 polymerase chain reaction. Only patients without a history of herpes were included, as to report only new herpes infections. This is because herpes simplex virus serology alone does not indicate timing of infection. Scabies and genital warts were diagnosed by clinical history and physical examination. Bacterial vaginosis was diagnosed according to Amsel's criteria, which require 3 of the

following: (1) homogenous, thin white vaginal discharge; (2) clue cells on microscopic examination; (3) pH of vaginal fluid  $>4.5$ ; or (4) positive Whiff test result.<sup>10</sup> Sexually transmitted infections were further categorized by anatomic location: genital (urine chlamydia or gonorrhea, new herpes infection with penile or vaginal lesions, primary syphilis, genital warts, bacterial vaginosis) or rectal (rectal chlamydia, rectal gonorrhea, rectal warts, or rectal herpes without evidence of genital herpes). Similar to Osterberg et al.,<sup>8</sup> we also characterized STIs as cutaneous (genital ulcers, primary syphilis, herpes, genital warts, and scabies) or secretory (chlamydia and gonorrhea). HIV serology was not included in the current study. Participants were asked if they had a history of HIV on the grooming survey (Appendix A, <http://links.lww.com/OLQ/A484>).

### Covariates

Covariates were chosen a priori and included age (years) and number of sexual partners (past 3 months). The models were also stratified by sex and sexual orientation (heterosexual vs. gay/bisexual men), and thus were treated as effect modifiers. Lesbian and straight women were included within the same group because of low sample size ( $n = 58$ ). However, in a previous study, no major differences in grooming habits were identified between straight and lesbian women.<sup>1</sup> Use of condoms at last sexual encounter and receptive anal sex were included in a post hoc analysis.

### Statistical Analysis

Data analysis was performed in STATA version 13. We compared demographic and sexual history characteristics of groomers and nongroomers using  $\chi^2$  tests for categorical variables and  $t$  tests and Wilcoxon rank sum tests for continuous variables depending on the distribution of the data. Participants were also compared by grooming frequency and frequency of removing all their pubic hair. Crude associations between grooming practices and the presence of STIs were assessed by  $\chi^2$  tests. Multivariable associations adjusted for the aforementioned covariates were assessed by logistic regression for all STIs and separately for rectal and genital STIs. Both age and number of sexual partners were incorporated as continuous variables within the model. In a post hoc analysis of our positive findings, we repeated the model including condomless sex (yes/no) and anal sex (yes/no) to assess for residual confounding. These variables were not included in our original models to prevent overfitting.  $P$  values less than 0.05 were deemed statistically significant. The study was approved by the institutional review board at the last author's institution (IRB No. 17-23739).

## RESULTS

### Study Population

In the current study, 333 individuals consented to participate, and 314 (94%) completed the survey and provided information on biological sex. In total, there were 247 (79%) men, 58 (18%) women, and 5 (2%) transgender participants. The median age of participants was 31 years (interquartile range, 27–39 years). Forty-four percent of participants were white, 26% Hispanic/Latino, 17% Asian, 11% black/African American, and 2% other. Of the male participants, 177 (72%) identified as gay/bisexual. Of the female participants, 9 (16%) identified as lesbian/bisexual. Twenty-eight (9%) of participants reported a history of HIV, 91 (29%) were currently taking preexposure prophylaxis, and the median number of sexual partners within the past 3 months was 4 (interquartile range, 2–7). Reasons for the clinic

visit included the following: having an active symptom ( $n = 150$ ; 48%), having a partner recently diagnosed with an STI ( $n = 49$ ; 16%), routine STI screening ( $n = 83$ ; 26%), preexposure prophylaxis appointment ( $n = 62$ ; 20%), and/or follow-up ( $n = 10$ ; 3%). Some participants also visited for multiple reasons.

## Prevalence and Characteristics of Grooming

There were 257 (82%) of 314 participants who reported pubic hair grooming within the past 3 months. Of these groomers, 119 (46%) reported genital and anal grooming and 129 (50%) reported genital grooming only. Nine groomers (4%) reported only inner thigh grooming. No individuals reported anal only grooming. Table 1 compares demographic and sexual history characteristics between groomers and nongroomers. On average, groomers were younger than nongroomers (median age, 31 years compared with 34 years;  $P = 0.01$ ). A larger proportion of groomers were female (21%) compared with nongroomers (7%;  $P = 0.03$ ). There were fewer groomers with HIV than nongroomers (7% vs. 18%,  $P = 0.03$ ). Gay/bisexual men were the group most common to report genital and anal grooming (64%). Condomless sex was common, with 236 (75%) of 314 reporting condomless sex at their latest sexual activity. Groomers were marginally less likely to report condomless sex compared with nongroomers (74% vs. 85%,  $P = 0.06$ ).

## Prevalence of STIs

Seventy-eight (25%) patients were diagnosed with a new STI during their visit. Table 2 shows the number of STIs

diagnosed by grooming status and location. In general, there were no major differences in STI diagnoses between groomers and nongroomers, with the exception of genital gonorrhea. Eleven percent of nongroomers were diagnosed with genital gonorrhea compared with 2% of groomers. Rectal STIs were more common among those who groomed their genitals and anus compared with those who only groomed their genitals (12% vs. 4%).

## Associations Between Grooming and STIs

Table 3 shows the unadjusted and adjusted regression analysis stratified by sex and sexual orientation. As with the univariable associations, there were no significant associations between groomers and all STI transmissions. However, anal groomers were 3.0 times as likely to be diagnosed with a rectal STI after adjustment (95% confidence interval [CI], 1.2–7.5) compared with genital only groomers and nongroomers. In gay/bisexual men, this association remained significant (adjusted odds ratio, 2.7; 95% CI, 1.0–7.1). Heterosexual men and all women had insufficient outcomes for the analysis, as none of these individuals were tested for a rectal STI. In the post hoc analysis, after adjusting for age, number of sexual partners, condomless sex, and receptive anal sex within the past 3 months, individuals who groomed their anus were 3.1 times as likely to be diagnosed with a rectal STI (95% CI, 1.1–8.4). The model for the post hoc analysis can be seen in Table 4.

Figure 1 shows the percentage of participants with an STI stratified by frequency of any grooming and frequency of removing all pubic hair. In general, there were no statistically different distributions between frequency of pubic hair grooming and STI

**TABLE 1.** Demographic and Sexual History Characteristics of Patients Presenting to a Sexual Health Clinic by Grooming Status and Location, 2018

|                                                | Groomers                   |                                        |                                    |                         | P†   |
|------------------------------------------------|----------------------------|----------------------------------------|------------------------------------|-------------------------|------|
|                                                | All groomers*<br>(n = 257) | Genital and Anal Groomers<br>(n = 119) | Genital Only Groomers<br>(n = 129) | Nongroomers<br>(n = 57) |      |
| Age, median (IQR), y                           | 31 (26–37)                 | 30 (26–36)                             | 31 (27–39)                         | 34 (27–49)              | 0.01 |
| Sex, n (%)                                     |                            |                                        |                                    |                         |      |
| Male                                           | 198 (77)                   | 87 (73)                                | 106 (83)                           | 49 (89)                 | 0.03 |
| Female                                         | 54 (21)                    | 29 (25)                                | 21 (16)                            | 4 (7)                   |      |
| Transgender                                    | 3 (1)                      | 2 (3.6)                                | 1 (0.8)                            | 2 (4)                   |      |
| Race, n (%)                                    |                            |                                        |                                    |                         |      |
| Asian                                          | 45 (18)                    | 16 (14)                                | 29 (22)                            | 8 (14)                  | 0.18 |
| Black                                          | 24 (9)                     | 13 (11)                                | 11 (9)                             | 11 (19)                 |      |
| Hispanic/Latino                                | 63 (25)                    | 31 (26)                                | 29 (22)                            | 17 (30)                 |      |
| White                                          | 118 (46)                   | 56 (47)                                | 57 (44)                            | 21 (37)                 |      |
| Other                                          | 6 (2)                      | 2 (2)                                  | 3 (2)                              | 0 (0)                   |      |
| Sexual orientation‡, n (%)                     |                            |                                        |                                    |                         |      |
| Gay/bisexual male                              | 140 (56)                   | 74 (64)                                | 62 (49)                            | 37 (73)                 | 0.08 |
| Straight male                                  | 57 (23)                    | 12 (10)                                | 44 (34)                            | 10 (19)                 |      |
| Lesbian/bisexual female                        | 9 (3.6)                    | 7 (6)                                  | 2 (2)                              | 0 (0)                   |      |
| Straight female                                | 45 (18)                    | 22 (19)                                | 19 (15)                            | 4 (8)                   |      |
| No. sexual partners in last 3 mo, median (IQR) | 3 (2–6)                    | 5 (2–10)                               | 3 (1–5)                            | 5 (1–10)                | 0.36 |
| Days since last sexual encounter, median (IQR) | 5 (2–14)                   | 4 (2–7)                                | 5 (2–14)                           | 5 (1–8)                 | 0.29 |
| Condomless sex, n (%)                          | 188 (74)                   | 84 (72)                                | 97 (75)                            | 48 (86)                 | 0.06 |
| Groomed partner, n (%)                         | 126 (49)                   | 57 (48)                                | 65 (50)                            | 22 (39)                 | 0.38 |
| HIV status, n (%)                              |                            |                                        |                                    |                         |      |
| Yes                                            | 18 (7)                     | 8 (7)                                  | 9 (7)                              | 10 (18)                 | 0.03 |
| No                                             | 211 (82)                   | 100 (85)                               | 103 (80)                           | 41 (74)                 |      |
| Do not know                                    | 27 (11)                    | 10 (8)                                 | 17 (13)                            | 4 (7)                   |      |
| PrEP use, n (%)                                | 76 (35)                    | 42 (40)                                | 31 (28)                            | 15 (35)                 | 0.97 |

\*Groomers defined as those who report having removed or trimmed their pubic hair over the past 3 months.

†Comparing groomers with nongroomers.

‡Transgender participants were dropped from this analysis owing to small sample size.

IQR indicates interquartile range; PrEP = pre-exposure prophylaxis.

**TABLE 2.** STIs Diagnosed Among Patients Presenting to a Sexual Health Clinic by Grooming Status and Location, 2018

|                             | Groomers                   |                                        |                                    | Nongroomers<br>(n = 57) | <i>P</i> |
|-----------------------------|----------------------------|----------------------------------------|------------------------------------|-------------------------|----------|
|                             | All groomers*<br>(n = 257) | Genital and Anal<br>Groomers (n = 119) | Genital Only<br>Groomers (n = 129) |                         |          |
| Individual STIs             |                            |                                        |                                    |                         |          |
| Rectal gonorrhea, n (%)     |                            |                                        |                                    |                         | 0.67     |
| Positive                    | 5 (2)                      | 4 (3)                                  | 1 (1)                              | 2 (4)                   |          |
| Negative                    | 100 (39)                   | 60 (50)                                | 38 (29)                            | 24 (42)                 |          |
| Not tested                  | 152 (59)                   | 55 (46)                                | 90 (70)                            | 31 (54)                 |          |
| Rectal chlamydia, n (%)     |                            |                                        |                                    |                         | 0.33     |
| Positive                    | 14 (5)                     | 11 (9)                                 | 3 (2)                              | 1 (2)                   |          |
| Negative                    | 93 (36)                    | 54 (45)                                | 36 (28)                            | 25 (44)                 |          |
| Not tested                  | 150 (58)                   | 54 (45)                                | 90 (70)                            | 31 (54)                 |          |
| Genital gonorrhea, n (%)    |                            |                                        |                                    |                         | 0.006    |
| Positive                    | 5 (2)                      | 4 (3)                                  | 1 (1)                              | 6 (11)                  |          |
| Negative                    | 204 (79)                   | 100 (84)                               | 98 (76)                            | 40 (70)                 |          |
| Not tested                  | 48 (19)                    | 15 (13)                                | 30 (23)                            | 11 (19)                 |          |
| Genital chlamydia, n (%)    |                            |                                        |                                    |                         | 0.60     |
| Positive                    | 7 (3)                      | 4 (3)                                  | 3 (2)                              | 3 (5)                   |          |
| Negative                    | 202 (79)                   | 100 (84)                               | 96 (74)                            | 43 (75)                 |          |
| Not tested                  | 48 (19)                    | 15 (13)                                | 30 (23)                            | 11 (19)                 |          |
| Genital ulcer, n (%)        |                            |                                        |                                    |                         | 0.24     |
| Yes                         | 6 (2)                      | 2 (2)                                  | 4 (3)                              | 0 (0)                   |          |
| Genital herpes, n (%)       |                            |                                        |                                    |                         | 0.67     |
| Yes                         | 7 (3)                      | 3 (3)                                  | 4 (3)                              | 1 (2)                   |          |
| Bacterial vaginosis†, n (%) |                            |                                        |                                    |                         | 0.75     |
| Yes                         | 10/54 (18.5)               | 6/29 (21)                              | 4/17 (21)                          | 1/4 (25)                |          |
| Scabies, n (%)              |                            |                                        |                                    |                         | 0.64     |
| Yes                         | 1 (0.4)                    | 1 (1)                                  | 0 (0)                              | 0 (0)                   |          |
| Primary syphilis, n (%)     |                            |                                        |                                    |                         | 0.41     |
| Yes                         | 3 (1)                      | 2 (2)                                  | 1 (1)                              | 0 (0)                   |          |
| Genital warts, n (%)        |                            |                                        |                                    |                         | 0.64     |
| Yes                         | 10 (4)                     | 3 (3)                                  | 6 (5)                              | 3 (5)                   |          |
| Collapsed STI categories    |                            |                                        |                                    |                         |          |
| Any STI, n (%)              |                            |                                        |                                    |                         | 0.40     |
| Yes                         | 61 (24)                    | 34 (29)                                | 26 (20)                            | 17 (30)                 |          |
| Rectal STI, n (%)           |                            |                                        |                                    |                         | 0.92     |
| Yes                         | 19 (7)                     | 14 (12)                                | 5 (4)                              | 4 (7)                   |          |
| Genital STI, n (%)          |                            |                                        |                                    |                         | 0.22     |
| Yes                         | 41 (16)                    | 22 (18)                                | 17 (13)                            | 13 (23)                 |          |
| Secretory STI, n (%)        |                            |                                        |                                    |                         | 0.07     |
| Yes                         | 27 (11)                    | 19 (16)                                | 8 (6)                              | 11 (19)                 |          |
| Cutaneous STI, n (%)        |                            |                                        |                                    |                         | 0.47     |
| Yes                         | 26 (10)                    | 11 (9)                                 | 14 (11)                            | 4 (7)                   |          |

\*Groomers defined as removing any pubic hair within the past 3 months.

†Only women included in the analysis.

STI indicates sexually transmitted infection.

diagnoses. Participants who report removing all of their pubic hair more than 6 times within the past year had higher prevalence of genital STIs (33.3%, 6–10 times; 28.6%, >10 times) compared with participants who never groom all of their pubic hair (15.3%,  $P = 0.01$ ). This was most pronounced in female participants (42.9% for 6–10 times and 50.0% for >10 times compared with 27.3% for never grooming all of their pubic hair), although this did not reach statistical significance ( $P = 0.07$ ).

## DISCUSSION

This is a cross-sectional study of patients presenting to an STI clinic in San Francisco. We examined the relationship between groomed areas (genital vs. anal) and STI diagnosis by anatomic location (genital vs. anorectal). All estimates were adjusted for age and number of sexual partners and stratified by sex (male vs. female) and sexual orientation. The post hoc analysis was also adjusted for condom usage. Although no association was observed

overall between grooming and STIs in this STI clinic-based study, positive associations were observed when we explored associations by grooming area, STI anatomic location, and grooming frequency and removing all pubic hair. In particular, participants who reported anal grooming were 3 times more likely to be diagnosed with a rectal STI than participants who did not perform anal grooming. This association was only observed in gay and bisexual men, as none of the heterosexual male or female participants are routinely screened for rectal STI in the clinic. Participants who removed all pubic hair more than 6 times within a year represent a high-risk group for genital STIs.

In the current study, 82% of subjects groomed within the past 3 months. These are similar to what has been reported in previous literature.<sup>1,2</sup> Almost half of subjects (46%) reported anal grooming. Anal grooming has been associated with receptive anal practices, especially for MSM.<sup>4</sup> In contrast, motivations for anal grooming in women include “cleanliness” or “hygiene” rather than anal sex practices.<sup>1,11</sup>

**TABLE 3.** Associations Between Grooming Location and STIs Among Patients Presenting to Sexual Health Clinic by Sex and Sexual Orientation, 2018

|                           | Any STI        |                  | Rectal STI*    |                  | Genital STI*   |                  |
|---------------------------|----------------|------------------|----------------|------------------|----------------|------------------|
|                           | OR<br>(95% CI) | aOR†<br>(95% CI) | OR<br>(95% CI) | aOR†<br>(95% CI) | OR<br>(95% CI) | aOR†<br>(95% CI) |
| All participants          |                |                  |                |                  |                |                  |
| Genital and anal groomers | 1.4 (0.8–2.3)  | 1.4 (0.8–2.4)    | 2.8 (1.2–6.6)‡ | 3.0 (1.2–7.5)‡   | 1.2 (0.6–2.1)  | 1.1 (0.6–2.1)    |
| Genital only              | 0.6 (0.4–1.1)  | 0.7 (0.4–1.2)    | 0.4 (0.1–1.0)  | 0.4 (0.1–1.1)    | 0.6 (0.3–1.1)  | 0.6 (0.3–1.2)    |
| Male participants         |                |                  |                |                  |                |                  |
| Straight                  |                |                  |                |                  |                |                  |
| Genital and anal          | 1.8 (0.4–8.2)  | 2.4 (0.5–12.0)   | —§             | —§               | 2.6 (0.5–11.9) | 3.5 (0.7–19)     |
| Genital only              | 0.7 (0.2–2.4)  | 0.8 (0.2–3.4)    | —§             | —§               | 0.4 (0.1–1.7)  | 0.5 (0.1–2.3)    |
| Gay/bisexual              |                |                  |                |                  |                |                  |
| Genital and anal          | 1.3 (0.7–2.6)  | 1.3 (0.7–2.7)    | 2.8 (1.1–7.0)‡ | 2.7 (1.0–7.1)‡   | 0.8 (0.3–1.8)  | 0.8 (0.3–2.0)    |
| Genital only              | 0.6 (0.3–1.2)  | 0.6 (0.3–1.2)    | 0.5 (0.2–1.4)  | 0.6 (0.2–1.7)    | 0.5 (0.2–1.4)  | 0.5 (0.2–1.3)    |
| Female participants       |                |                  |                |                  |                |                  |
| Genital and anal          | 1.2 (0.4–3.9)  | 1.1 (0.3–3.8)    | —‡             | —‡               | 1.4 (0.5–4.2)  | 1.0 (0.3–3.4)    |
| Genital only              | 1.2 (0.4–4.2)  | 1.7 (0.5–6.0)    | — <sup>c</sup> | — <sup>c</sup>   | 0.8 (0.3–2.7)  | 1.1 (0.3–3.6)    |

‡*P* < 0.05.

§Insufficient number of outcomes for analysis.

†Adjusted odds ratio, all models adjusted for age and number of sexual partners.

\*Genital STIs include the following: genital gonorrhea, genital chlamydia, new herpes diagnosis, primary syphilis, genital warts, bacterial vaginosis (women only); rectal STIs include: rectal gonorrhea, rectal chlamydia, rectal warts, or rectal herpes simplex virus.

CI, indicates; OR, odds ratio; STI, sexually transmitted infection.

Rectal gonorrhea and chlamydia infections are on the rise, especially in MSM.<sup>12</sup> Furthermore, rectal gonorrhea and chlamydia infections place individuals at higher risk for HIV seroconversion and prompt treatment is necessary to mitigate this risk.<sup>13,14</sup> However, rectal STIs are often asymptomatic supporting the need for routine screening, especially in MSM.<sup>15</sup> Risk factors for rectal STI transmission include receptive anal sex and a variety of non-intercourse-receptive anal practices, such as fingering, rimming, or use of dildos.<sup>16</sup> Our results suggest that anal grooming could be an additional risk factor for rectal STI acquisition, although more research is necessary to confirm this finding. This corroborates with results of a previous study showing that receptive anal sex partners who groom were more likely to be diagnosed with STIs.<sup>4</sup> In that study, all STIs were self-reported and anatomical location of the infections was not described. It is unclear whether grooming increases the sensitivity of rectal swab testing. We provide no evidence that grooming is along the causal pathway of STI transmission. In addition, it is possible that there is reverse association, as patients with an STI may be more likely to then groom their anus.

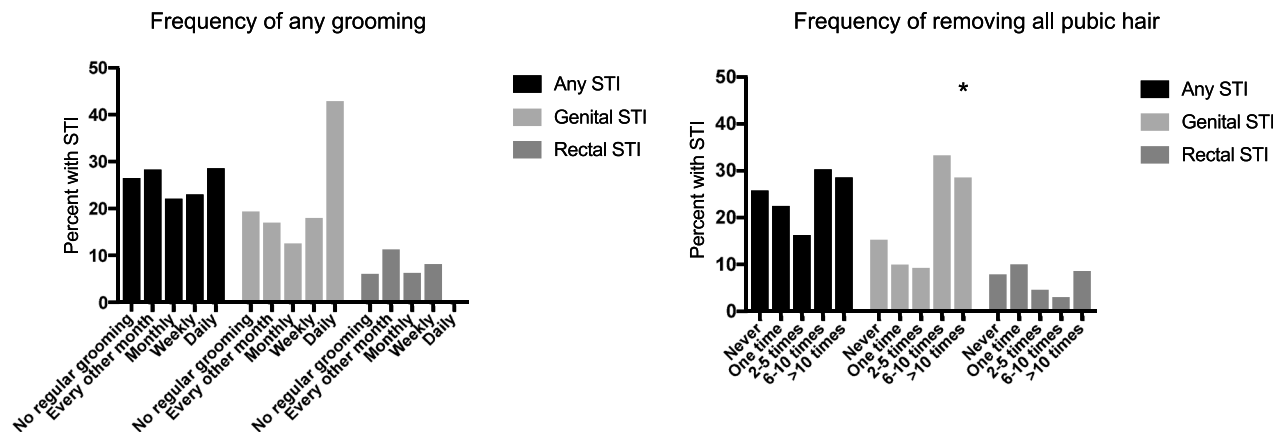
Although grooming was measured in respect to the last 3 months before STI diagnosis, we cannot determine the exact timing of transmission. The necessary factors for rectal transmission are currently unknown. A pilot study in Rhesus macaques has shown that there is an increase in local cytokines and rectal sloughing after STI acquisition.<sup>17</sup> Subsequently, these infections can cause microabrasions within the rectal epithelium, which may recruit HIV target cells and thus increase risk for HIV transmission. Anal grooming may also weaken the epithelial barrier or disrupt the local immune response. Regardless of cause and effect, anal grooming is a marker of receptive anal intercourse.<sup>4</sup> Therefore, anal grooming may be a risk marker for rectal STIs. Our results supports STI screening of MSM who groom their anus, especially as patient-reported exposure is not always a reliable indicator for risk.<sup>18</sup> Anorectal infections have been shown to be profoundly underdiagnosed especially among MSM, and thus, further awareness is necessary.<sup>19</sup>

Although we found no association between genital grooming and STI acquisition, we previously showed a strong

correlation between grooming and STIs.<sup>8</sup> The discrepancy may be for several reasons. One, it is possible that various sexual factors (i.e., more promiscuous sex or frequency of sex) are confounders within the relationship between genital grooming and STIs. These were not controlled for in our previous analysis. Another explanation is that our study was underpowered to detect differences in our outcomes, given the relatively lower STI prevalence in heterosexual men and women in our sample. In the study by Osterberg et al. 7580 respondents were included in the study sample. Third, our results could reflect secular trends within San Francisco and may not generalize to the US population. It is also plausible that the microabrasions caused by grooming in common areas of the genitalia (mons pubis, scrotum, etc) are too far from areas of transmission (i.e., urethra or vagina). Grooming is a common practice among sexually active individuals, and the prevalence of grooming in our sample (~80%) mirrors those in other studies.<sup>1,2,20</sup> Our results are consistent with those reported by Luster et al.<sup>9</sup> In this study, the authors found no association between pubic hair grooming and STI in a group of college female students. In this analysis, all associations were controlled for frequency of sex, income, race, and year in school. Lastly, removing all one's pubic hair more than 6 times within the past year was associated with genital STIs on the aggregate. This analysis was not significant when stratified by sex and sexual orientation, which could have been underpowered. In contrast, this could represent

**TABLE 4.** Post Hoc Analysis of the Association Between Rectal Grooming and Rectal STIs (n = 177)

|                            | Rectal STI, aOR (95% CI) |
|----------------------------|--------------------------|
| Genital and anal grooming  |                          |
| Yes                        | 3.1 (1.1–8.4)            |
| No                         | 1.0 (reference)          |
| Age                        | 1.0 (0.9–1.1)            |
| No. sexual partners        | 1.0 (0.9–1.1)            |
| Receptive anal intercourse | 0.5 (0.2–1.5)            |
| Condomless sex             | 1.5 (0.4–6.1)            |



**Figure 1.** Percentage of participants with an STI stratified by frequency of any grooming and frequency of removing all pubic hair.  
\*Distribution significant with  $\chi^2$  analysis,  $P < 0.05$ .

a highly sexually promiscuous group, which leads to higher exposure to STI-positive partners.

The HIV prevalence in groomers was considerably lower than that in the nongroomer group (7% vs. 18%,  $P = 0.03$ ). These were all patients with a diagnosis of HIV, as we did not study new HIV infections. The reason for the stark difference in prevalence is unknown and an unexpected finding. Decreased sexual activity has been observed after an HIV diagnosis.<sup>21,22</sup> Because grooming is highly associated with sexual activity, this is a plausible explanation for this finding. Dissatisfaction with body image and changes in attitude about one's body has also been observed in the HIV continuum, which is another possibility for this finding.<sup>23</sup> This finding could also be due to chance and requires replication.

This study has notable limitations. This is a convenience sample of one public health clinic, and the results may not be generalizable. Participants who refused to participate may be different from patients included in our study. Our study sample had more sexual partners within the past 3 months (median of 3) than what is reported at a national level.<sup>24</sup> This is a cross-sectional study, and temporality cannot be established. All STIs were laboratory confirmed, where possible; however, some diagnoses were based on physical examination and clinician judgment. Residual confounding is possible, as we did not collect variables such as frequency of sexual activity or transactional sexual experiences. The post hoc analysis may be subject to false positives from repeated statistical testing. The study may be underpowered, as some of our point estimates have a large CI range. Grooming was self-reported and not documented on physical examination; however, we do not anticipate much misclassification due to this. Grooming surveys were administered before clinic visits. Despite these limitations, this study examines the relationship between pubic hair grooming practices and laboratory confirmed STIs.

## REFERENCES

- Rowen TS, Gaither TW, Awad MA, et al. Pubic hair grooming prevalence and motivation among women in the United States. *JAMA Dermatol* 2016; 152:1106–1113.
- Gaither TW, Awad MA, Osterberg EC, et al. Prevalence and motivation public hair grooming among men in the United States. *Am J Mens Health* 2017; 11:620–640.
- Herbenick D, Schick V, Reece M, et al. Pubic hair removal among women in the United States: Prevalence, methods, and characteristics. *J Sex Med* 2010; 7:3322–3330.
- Gaither TW, Truesdale M, Harris CR, et al. The influence of sexual orientation and sexual role on male grooming-related injuries and infections. *J Sex Med* 2015; 12:631–640.
- Butler SM, Smith NK, Collazo E, et al. Pubic hair preferences, reasons for removal, and associated genital symptoms: Comparisons between men and women. *J Sex Med* 2015; 12:48–58.
- Vena GA, Cassano N. Molluscum contagiosum and pubic hair removal in male patients. *Int J STD AIDS* 2017; 28:1360.
- DeMaria AL, Flores M, Hirth JM, et al. Complications related to pubic hair removal. *Am J Obstet Gynecol* 2014; 210:528.e1–528.e5.
- Osterberg EC, Gaither TW, Awad MA, et al. Correlation between pubic hair grooming and STIs: Results from a nationally representative probability sample. *Sex Transm Infect* 2017; 93:162–166.
- Luster J, Turner AN, Henry JP Jr., et al. Association between pubic hair grooming and prevalent sexually transmitted infection among female university students. *PLoS One* 2019; 14:e0221303.
- Amsel R, Totten PA, Spiegel CA, et al. Nonspecific vaginitis: Diagnostic criteria and microbial and epidemiologic associations. *Am J Med* 1983; 74:14–22.
- McBride KR. Examining heterosexual Women's anal sexual health knowledge and product use. *J Sex Res* 2019; 56:1070–1082.
- Ramchandani MS, Golden MR. Confronting rising STIs in the era of PrEP and treatment as prevention. *Curr HIV/AIDS Rep* 2019; 16: 244–256.
- Bernstein KT, Marcus JL, Nieri G, et al. Rectal gonorrhea and chlamydia reinfection is associated with increased risk of HIV seroconversion. *J Acquir Immune Defic Syndr* 2010; 53:537–543.
- Jin F, Prestage GP, Imrie J, et al. Anal sexually transmitted infections and risk of HIV infection in homosexual men. *J Acquir Immune Defic Syndr* 2010; 53:144–149.
- Kent CK, Chaw JK, Wong W, et al. Prevalence of rectal, urethral, and pharyngeal chlamydia and gonorrhea detected in 2 clinical settings among men who have sex with men: San Francisco, California, 2003. *Clin Infect Dis* 2005; 41:67–74.
- Jin F, Prestage GP, Mao L, et al. Incidence and risk factors for urethral and anal gonorrhoea and chlamydia in a cohort of HIV-negative homosexual men: The Health in Men Study. *Sex Transm Infect* 2007; 83: 113–119.
- Henning TR, Morris M, Ellis S, et al. Development of a rectal sexually transmitted infection (STI) model in rhesus macaques using chlamydia trachomatis serovars E and L2. *J Med Primatol* 2017; 46:218–227.
- Chamberlain N, Crosby RA, Mena L, et al. Is patient-reported exposure a reliable indicator for anogenital gonorrhea and chlamydia screening in young black men who have sex with men? *Sex Transm Dis* 2017; 44:390–392.
- Schmidt AJ, Hickson F, Weatherburn P, et al. Comparison of the performance of STI screening services for gay and bisexual men across 40

- European cities: Results from the European MSM Internet Survey. *Sex Transm Infect* 2013; 89:575–582.
20. Herbenick D, Hensel D, Smith NK, et al. Pubic hair removal and sexual behavior: Findings from a prospective daily diary study of sexually active women in the United States. *J Sex Med* 2013; 10: 678–685.
21. Lambert S, Keegan A, Petrak J. Sex and relationships for HIV positive women since HAART: A quantitative study. *Sex Transm Infect* 2005; 81:333–337.
22. Schönnesson LN, Zeluf G, Garcia-Huidobro D, et al. Sexual (dis) satisfaction and its contributors among people living with HIV infection in Sweden. *Arch Sex Behav* 2018; 47:2007–2026.
23. Huntingdon B, Muscat DM, de Wit J, et al. Factors associated with general sexual functioning and sexual satisfaction among people living with HIV: A systematic review. *J Sex Res* 2019; 1–12.
24. Chandra A, Copen CE, Mosher WD. Sexual behavior, sexual attraction, and sexual identity in the United States: Data from the 2006–2010 National Survey of Family Growth. *Natl Health Stat Rep* 2011; 1–36.