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ORIGINAL PAPER

Health Care Provider Discussions Regarding HIV/Sexually Transmitted Infection Risk Factors and Associations with HIV/Sexually Transmitted Infection Screening Among Men

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Abstract

Little is known regarding the specific discussions health care providers (HCP) have with their patients and how these discussions may increase rates of HIV/STI screening. The main objective of this study was to examine the content of HCP-patient discussions and associations with HIV/STI screening while adjusting for patient characteristics. Using the 2017–2019 National Survey of Family Growth data, seven survey-weighted multivariable multinomial/binary logistic regression models were analyzed in men ages 15–49 years old (N = 4260). Patients had significantly higher odds of a lifetime HIV test when their HCP asked about number of sexual partners (adjusted odds ratio [aOR] = 2.325; 95% CI 1.379–3.919) and discussed HIV/AIDS (aOR = 4.149; 95% CI 2.877–5.983). Odds of a recent STI screening were higher among patients with HCP that asked about: sexual orientation (aOR = 1.534; 95% CI 1.027–2.291), number of sexual partners (aOR = 2.123; 95% CI 1.314–3.430), use of condoms (aOR = 2.295 95% CI 1.484–3.548), type of sexual intercourse (aOR = 1.900; 95% CI 1.234–2.925), and discussed HIV/AIDS (aOR = 1.549; 95% CI 1.167–2.056). Results may provide insight on how HCPs may potentially promote HIV/AIDS and STI screening among men and which patient groups are more likely to receive a discussion of risks factors from their HCPs.

Keywords HIV/AIDS · Sexually transmitted infections · Men · National Survey of Family Growth · Health care providers

Introduction

Human immunodeficiency virus (HIV) targets the immune system of the host, and if untreated, leads to acquired immunodeficiency syndrome (AIDS) (Centers for Disease Control & Prevention, 2021). Of the 32,600 incident cases of HIV in the United States in 2018, 82.5% were among men, with most cases among men ages 15 to 24 years old (Kreisel et al., 2021). While incidence rates of HIV continue to be a public health concern among adolescent and young adult populations, it is also increasing among older adults, justifying the need to investigate all ages (Davis et al., 2016). In 2018, one in six new HIV diagnosis occurred in men 50 years or older (Centers for Disease Control and Prevention, 2022a). Sexual minorities (those who identify as gay, bisexual, or non-heterosexual) and racial/ethnic minority men (those who are non-White) are still disproportionately affected HIV/STIs. In 2019, men who have sex with men (MSM) accounted for 65% of all new HIV diagnoses in the US (Centers for Disease Control and Prevention, 2022b). In 2019, African-American and Hispanic/Latino men were disproportionately affected with the two highest rates of HIV across all racial groups (Centers for Disease Control and Prevention, 2022b). Additionally, bacterial sexually transmitted infections (STIs) continue to be a significant problem among men in the US. In 2018, men had approximately 1.6 million, 697,000, and 121,000 incident cases of chlamydia, gonorrhea, and syphilis, respectively (Kreisel et al., 2021).

Early detection of HIV and other STIs are crucial to reducing AIDS-related morbidity and mortality (Nanditha et al.,

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2019), as well reducing the risk of contracting HIV due to the damage of mucosal tissue caused by STIs (Cohen, 1998). Recommendations specify that individuals ages 13 to 64 should be tested for HIV at least once, and those at higher risk, such as MSM, should be tested annually (DiNenno, 2017). However, there are numerous screening disparities. For example, one study (Wray et al., 2018) found that approximately 31% of an MSM population in the northeastern US (n = 1506) reported not being tested for HIV within the past year. Another study conducted from 2013 to 2016 suggested that rates of HIV testing among MSM increased, but were still not aligned with current guidelines recommending annually testing for high-risk populations (Sanchez et al., 2018). Disparities in testing have continued to be prominent among racial and ethnic minority MSM populations. One study noted that when compared to White MSM, African-American MSM, Hispanic/Latino MSM, and other racial/ethnic minority MSM groups had a higher prevalence of first-time testing (Clark et al., 2019), which indicated that these MSM minority groups are not receiving the care that aligns with the recommendations of screening at least once a year. Further, when compared to White heterosexual men, Asian bisexual men had lower odds of lifetime HIV testing, further demonstrating the extent of the screening disparities by race (Agénor et al., 2019).

Health care provider (HCP) discussions of HIV/STI prevention with their patients are critical in promoting routine HIV/STI screening as these discussions are associated with higher odds of receiving testing for both HIV and STIs (Meanley et al., 2015). However, there are numerous provider-level barriers to HCPs discussing and recommending HIV/STI screening. For example, studies reported that HCPs were not comfortable discussing HIV/AIDS with older adult patients (Davis et al., 2016), had a lack of HIV/AIDS knowledge (Sullivan et al., 2016), had a lack of HIV stigma training that facilitated negative provider HIV-related stigma (Davtyan et al., 2017; Stringer et al., 2016), and had a lack of knowledge about when and how to test for STIs as well as treatment for positive results (Barbee et al., 2015). Additionally, discomfort discussing patient sexual history and performing genital examinations are cited as provider barriers to effective STI screening (Barbee et al., 2015). These barriers to discussion of STI and HIV testing may also be compounded by provider perceptions of behaviors and risks based on the patient's disclosure of sexual histories and sexual orientation.

HCPs initiating discussions about STI and HIV screening is one of the first steps in the screening process. In addition to HCP comfort and knowledge in discussing HIV and STI screening and sexual histories, HCPs must also create a safe environment for patient disclosure of information about their sexual behaviors and sexual orientation. Lack of these discussions related to sexual history may lead to lower rates of screening, especially given that evidence has shown disclosure of sexual orientation with a HCP was associated greater odds of receiving a screening recommendation (Bernstein et al., 2008; Singh et al., 2018; Vincent et al., 2017). Lastly, disclosure of sexual behaviors to HCPs is associated with higher rates of HIV/STI screening (Stupiansky et al., 2017). These provider barriers related to knowledge, comfort, and creating an environment that facilitates patient disclosure may affect risk assessments and provider-patient discussion of sexual health—all of which can ultimately influence HIV/STI screening behavior.

Despite the current evidence, little is known on the specific interactions HCP have with their male patients, including the risk factors and content discussed during sexual health visits and how that may affect recommendations for screening. Thus, the main objective of this study was to examine the content of HCP-patient discussions and associations with HIV/STI screening while adjusting for patient characteristics (i.e., sexual orientation, race/ethnicity, and number of same/opposite-sex partners). The results from this study can inform future HCP interventions to standardize discussions of risk behaviors and STI/HIV screening among men.

Method

Data

National Survey of Family Growth (NSFG) data were collected by the National Center for Health Statistics (NCHS), a part of the CDC dedicated to providing information to guide decisions that improve the health of Americans (National Center for Health Statistics, 2020). NSFG is a complex, multistage probability-based sample designed to be representative of US household members aged 15–49 years old (National Center for Health Statistics, 2020) and is a source of national estimates on topics related to family and sexual health. Participants are recruited for NSFG via four-stage sampling including a selection of: (1) Metropolitan Statistical Areas (MSAs), counties, or groups of counties, (2) one or more Census blocks, with a minimum of 50 housing units, (3) households, and (4) one individual from each household to be interviewed by a female interviewer.

A total of 5206 men completed interviews from 2017 to 2019 with a 61.4% final weighted response rate. The 2017–2019 data cycle included over-sampling of people who were Black, Hispanic, and teenagers, i.e., 15–19 years old (National Center for Health Statistics, 2020).

Measures

Independent Variables

Independent variables of interest included age, race/ethnicity, sexual orientation, number of sexual partners of the same/opposite sex, a recent health care visit (within the past year), and discussions with a HCP regarding STIs and related risk factors.

We used the race/ethnicity variable recoded by the NCHS staff according to 1997 Office of Management and Budget (OMB) standards (National Center for Health Statistics, 2020). This recoded variable has previously been utilized by another study examining STI screening (Griner et al., 2020) and response options included: Hispanic, Non-Hispanic White, Non-Hispanic Black, Non-Hispanic Other or Multiple Race. Sexual orientation was assessed by two different variables, each of which were used with one-half of respondents at random. One was the NSFG version ("Do you think of yourself as…" with the following options: Heterosexual or straight; Homosexual or gay) while the other was the National Health Interview Survey version ("Which of the following best represents how you think of yourself?" with the following options: Gay; Straight, that is, not gay; Bisexual; Something else). A sensitivity analysis was conducted between these two sexual orientation variables, where differences in *p*-values and odds ratios between multiple models were examined. Based on these results showing no significant difference between the two, both variables were combined into one composite variable with the following options: Heterosexual or Sexual minority, which is comprised of: homosexual, bisexual, and something else.

Number of lifetime opposite-sex partners was recoded by NCHS staff prior to public release to include continuous numbers of sex partners, until 50 or more partners. Due to the data of this variable being highly skewed, a log transformation was conducted to reduce skewness. Number of same-sex partners in a lifetime had the following options: 1–9 partners as continuous numbers, until 10 or more partners.

Five questions assessed participants' discussions with an HCP (doctor or other medical care provider) regarding STIs and related risk factors. These items assessed participants' lifetime experience with HCPs and not necessarily their last interaction with one. HCP-HIV/AIDS discussion was assessed by the question "Has a doctor ever talked with you about HIV, the virus that causes AIDS?" The remaining HCP items were asked in the context of the last 12 months. The HCP-sexual orientation risk factor discussion item was "Has a doctor asked you about your sexual orientation or the sex of your sexual partners?" The HCP-number of sexual partners risk factor discussion was assessed by the question, "Has a doctor asked you about your number of sexual partners?" The HCP-condom use risk factor discussion was assessed by the question, "Has a doctor asked you about your use of condoms?" Lastly, the HCP-type of sex risk factor discussion was assessed by the question, "Has a doctor asked you about the types of sex you have, whether vaginal, oral, or anal?" The response options for HCP discussion variables were either "Yes" or "No".

Outcome Variables

Two outcome variables were used: lifetime HIV testing and past-year STI testing. Lifetime HIV testing was combined and recoded from multiple variables to provide the following options: (1) No HIV test reported; (2) Yes, only as part of blood donation; (3) Yes, only outside of blood donation; (d) Yes, in both contexts. It was decided to keep lifetime HIV testing as coded to explore which groups may receive HIV testing solely through a blood donation. Past year STI test was measured by the question, *"In the past 12 months, have you been tested by a doctor or other medical care provider for a sexually transmitted disease like gonorrhea, chlamydia, herpes, or syphilis?"* (yes/no).

Missing Data Imputation

Missing data regarding number of opposite-sex partners and for the HIV testing variable were imputed by NCHS staff using multiple regression imputation. Missing data for the race/ethnicity variable were imputed by NCHS prior to public data release via logical imputation (National Center for Health Statistics, 2020).

Study Sample

There were 5,206 men aged 15–49 in the NSFG dataset. Participants must have reported having sexual intercourse at least once in their lifetime to be eligible for the current study (n = 4,356). Further, participants who had missing data that were not imputed by NCHS (i.e., regarding sexual orientation, STI testing, discussions with HCPs, a recent health care visit, and age) were excluded. The final analysis sample consisted of 4260 men. A sensitivity analysis was conducted, using the same outcome variables (lifetime HIV testing and past-year STI testing) and covariates used in the multivariate logistic regression models. By comparing the maximum likelihood estimates and their *p* values between models (i.e., those excluded vs. included), it was determined that that those who were excluded from the study did not significantly differ from those who were included in the current study. Additionally, the proportions of men by race/ethnicity were directly compared with virtually no difference between the groups (i.e., those excluded vs. included).

Statistical Analyses

Sampling weights were applied for all analyses to account for survey design and make nationally representative estimates. Frequencies and proportions were used to describe categorical variables, whereas medians and standard errors were used to describe continuous variables.

Bivariate models with the outcomes of lifetime HIV testing and recent STI screening were conducted using: number of sexual partners, race/ethnicity, sexual orientation, a recent health care visit, and age. The multivariable multinomial logistic regression model used the outcome variable of lifetime HIV testing with all covariates included in the model: race/ethnicity, sexual orientation, age, a recent health care visit, number of sexual partners, and HCP-patient discussion variables. The reference group was no HIV test reported. In addition, a multivariable binary logistic regression model used the outcome variable recent STI testing with all aforementioned covariates in the model. Lastly, five binary logistic models consisted of the HCP-patient discussion variables as the outcome variables with five predictors: number of sexual partners, race/ethnicity, sexual orientation, age, and a recent health care visit. A p value of less than 0.05 was used to determine statistical significance. Prior to analyses, all logistic regression model assumptions were tested and met—we assessed the correlation between multiple variables for multicollinearity and found no variables with an absolute correlation coefficient greater than 0.63. Analyses were conducted using SAS® (v. 9.4, Cary, NC).

Results

Participant Characteristics

The median age of the sample was 32.8 years (standard error [SE] = 0.28, Table 1). Participants were predominantly Non-Hispanic White (56.2%) and identified as heterosexual (95.4%). In our sample, 27.3% of men never had an HIV test and 82.0% had not received STI screening in the past 12 months. The median number of lifetime female sexual partners was 5.3 ($SE = 0.14$). Among MSM (n = 285), the median number of lifetime male sexual partners was 1.5 ($SE = 0.13$). Most participants were not asked by their HCP about: their sexual orientation (85.4%), number of sexual partners (85.4%), use of condoms (81.4%), type of sexual intercourse (90.4%), and 71.4% reported their HCP did not discuss HIV/AIDS. Results of bivariate and multivariate analyses examining the factors associated with lifetime HIV testing and recent STI screening is shown in Tables 2 and 3 respectively.

Lifetime HIV Test

Results of the multivariable model are presented in Table 3. Lifetime HIV testing was significantly associated with HCP asking patients about the following factors: number of sexual partners for those who only had an HIV test outside of a blood donation (aOR: 2.325, 95% CI 1.379–3.919), number of sexual partners for those who had an HIV test in both contexts (aOR: 2.071, 95% CI 1.148–3.734), HIV/AIDS for those who only had an HIV test outside a blood donation (aOR: 3.556, 95% CI 2.406–5.257), and HIV/AIDS for those who had an HIV test in both contexts (aOR: 4.149, 95% CI 2.887–5.983).

In the same model, when compared to those not ever having tested for HIV, every additional increase in a same-sex partner was associated with an increased odds of: only having an HIV test through a blood donation (OR: 1.253, 95% CI 1.004–1.564), having an HIV test only outside a blood donation (OR: 1.496, 95% CI 1.195–1.872), and having an HIV test in both contexts (OR: 1.396, 95% CI 1.108–1.759). Furthermore, every additional opposite-sex partner was associated with an increased odds of having an HIV test outside of a blood donation (OR: 1.765, 95% CI 1.572–1.981), and having an HIV test in both contexts (OR: 2.001, 95% CI 1.744–2.295), when compared to those not ever having tested for HIV.

Race/ethnicity was significantly associated with HIV testing (Table 3). Hispanic men (aOR: 0.507, 95% CI 0.345–0.746) and Black men (aOR: 0.551, 95% CI 0.317–0.958) had lower odds of having an HIV test only outside of a blood donation. Black men (aOR: 2.035, 95% CI 1.458–2.840), and other or multiple race men (aOR: 1.604, 95% CI 1.028–2.503) were more likely to have had an HIV test only outside a blood donation when compared to those not ever having tested for HIV. Those who identified as a sexual minority were associated with 0.432 (95% CI 0.247–0.757) times the odds of having an HIV test only through a blood donation when compared to those not ever having tested for HIV. Lastly, every additional year increase in age was associated with increased odds of having an HIV test only through a blood donation (aOR: 1.030, 95% CI 1.014–1.047); having an HIV test outside a blood donation (aOR: 1.055, 95% CI 1.038–1.071); and having an HIV test in both contexts (aOR: 1.072, 95% CI 1.055–1.090) when compared to those not ever having tested for HIV.

Recent STI Screening

The multivariable model of recent STI screening, adjusted for number of lifetime sexual partners, race/ethnicity, sexual orientation, age, a recent health care visit, and HCP discussion of risk factors is presented in Table 3. In the multivariable model, those who were asked about their sexual orientation (aOR: 1.534, 95% CI 1.027–2.291), number of sexual

Table 1 HIV and STI screening among men age 15–49 by demographic variables (n, %)

	Ever had an HIV test					Recent STI screening (past 12 months)		
	Total (N = 4260)	No test reported (n = 1161)	Yes, only as part of blood donation (n = 803)	Yes, only outside of blood donation (n = 1173)	Yes, in both contexts (n = 1123)	Total (N = 4260)	Yes (n = 770)	No (n = 3490)
Race/ethnicity								
Hispanic	1060 (21.6)	371 (32.0)	153 (19.1)	322 (27.5)	214 (19.1)	1060 (21.6)	196 (25.5)	864 (24.8)
Non-Hispanic white, single race	2038 (56.2)	545 (46.9)	499 (62.1)	453 (38.6)	541 (48.2)	2038 (56.2)	253 (32.9)	1785 (51.1)
Non-Hispanic Black, Single Race	758 (12.4)	148 (12.7)	64 (8.0)	299 (25.5)	247 (21.9)	758 (12.4)	260 (33.8)	498 (14.3)
Non-Hispanic other or multiple race	404 (9.7)	97 (8.4)	87 (10.8)	99 (8.44)	121 (10.8)	404 (9.7)	61 (7.92)	343 (9.83)
Sexual orientation								
Heterosexual	4056 (95.3)	1112 (95.8)	776 (96.6)	1099 (93.7)	1069 (95.2)	4056 (95.4)	711 (92.3)	3345 (95.8)
Sexual minority	204 (4.6)	49 (4.2)	27 (3.4)	74 (6.3)	54 (4.8)	204 (4.6)	59 (7.7)	145 (4.2)
HCP-patient discussions								
HCP asked about sexual orientation								
Yes	702 (14.6)	156 (13.4)	77 (9.6)	247 (21.1)	222 (19.8)	702 (14.6)	331 (43.0)	371 (10.6)
No	3558 (85.4)	1005 (85.6))	726 (90.4)	926 (78.9)	901 (80.2)	3558 (85.4)	439 (57.0)	3119 (89.4)
HCP asked about number of sexual partners								
Yes	623 (14.6)	113 (9.7)	73 (9.1)	232(19.8)	205 (18.3)	623 (14.6)	327 (42.5)	296 (8.5)
No	3637 (85.4)	1048 (90.3)	730 (90.9	941 (80.2)	918 (81.7)	3637 (85.4)	443 (57.5)	3194 (91.5)
HCP asked about use of condoms								
Yes	791 (18.6)	168 (14.5)	81 (10.1)	284 (24.2)	258 (23.0)	791 (18.6)	414 (53.8)	377 (10.8)
No	3469 (81.4)	993 (85.5)	722 (89.1)	889 (75.8)	865 (77.)	3469 (81.4)	356 (46.2)	3113 (89.2)
HCP asked about type of sexual intercourse								
Yes	411 (9.6)	65 (5.6)	29 (3.6)	170 (14.5)	147 (13.1)	411 (9.6)	276 (35.8)	135 (3.9)
No	3849 (90.4)	1096 (94.4)	774 (96.4)	1003 (85.5)	976 (86.9)	3849 (90.4)	494 (64.2)	3355 (96.1)
HCP discussed HIV/AIDS								
Yes	1218 (28.6)	176 (15.2)	129 (16.1)	445 (37.9)	468 (41.7)	1218 (28.6)	408 (53.0)	810 (23.2)
No	3042 (71.4)	985 (84.8)	674 (83.9)	728 (62.1)	655 (58.3)	3042 (71.4)	362 (47.0)	2680 (76.8)
Recent health care visit (past 12 months)								
Yes	3058 (71.8)	784 (67.5)	552 (68.7)	852 (72.6)	870 (77.5)	3058 (71.8)	683 (88.7)	2375 (68.1)
No	1202 (28.2)	377 (32.5)	251 (31.3)	321 (27.4)	253 (22.5)	1202 (28.2)	87 (11.3)	1115 (31.9)
Number of lifetime sexual partners (median (SE))								
Opposite-sex	5.3 (0.14)	3.3 (0.18)	4.3 (0.28)	7.5 (0.62)	9.3 (0.52)	5.3 (0.14)	8.7 (0.78)	5.0 (0.15)
Same-sex (n = 285)	1.5 (0.13)	1.0 (0.95)	1.0 (0.42)	2.8 (0.81)	1.5 (0.15)	1.5 (0.13)	3.3 (0.98)	1.1 (0.17)
Age (median((SE))	32.8 (0.28)	28.9 (0.52)	32.3 (0.65)	34.5 (0.70)	35.8 (0.57)	32.8 (0.28)	30.2 (0.73)	33.4 (0.41)

partners (aOR: 2.123, 95% CI 1.314–3.430), use of condoms (aOR: 2.295, 95% CI 1.484–3.548), type of sexual intercourse (aOR: 1.900, 95% CI 1.234–2.925); or discussed HIV/AIDS with their HCP (aOR: 1.549, 95% CI 1.167–2.056) had a significant odds of having a recent STI screening compared to those who did not.

Hispanic men (aOR: 1.742, 95% CI 1.380–2.198). Black men (aOR: 2.978, 95% CI 2.114–4.194), and other or multiple race men (aOR: 1.723, 95% CI 1.149–2.584) had significant odds of having a recent STI screening compared to those who did not.

Statistically significant aORs from the same adjusted model (Table 3) for number of sexual partners: opposite-sex

Table 2 Bivariate logistic regression models predicting HIV and STI screening from number of lifetime sexual partners, race/ethnicity, sexual orientation, age, and a recent health care visit

	Ever had an HIV test (reference = no test reported)[a]						Recent STI screening (past 12 months; reference = No)	
	Yes, only as part of blood donation (n = 803)		Yes, only outside of blood donation (n = 1174)		Yes, in both contexts (n = 1123)		Yes	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Race/ethnicity (reference = non-Hispanic white, single race)								
Hispanic	0.483	0.332–0.702	1.201	0.852–1.692	0.639	0.399–1.025	**1.818**	**1.401–2.358**
Non-Hispanic black, single race	**0.501**	**0.289–0.869**	**2.216**	**1.576–3.114**	**1.505**	**1.124–2.016**	**4.478**	**3.445–5.820**
Non-Hispanic other or multiple race	0.917	0.597–1.410	1.295	0.862–1.944	1.165	0.772–1.759	**1.962**	**1.348–2.856**
Sexual orientation (reference = heterosexual)								
Sexual minority	**0.504**	**0.295–0.862**	1.612	0.974–2.668	0.966	0.610–1.529	**2.393**	**1.433–3.996**
Recent health care visit (past 12 months; reference = no)								
Yes	1.134	0.836–1.538	**1.297**	**1.013–1.660**	**1.656**	**1.232–2.226**	**4.014**	**2.781–5.792**
Number of lifetime sexual partners								
Opposite-sex	**1.185**	**1.052–1.334**	**1.894**	**1.713–2.095**	**2.226**	**1.979–2.504**	**1.469**	**1.339–1.612**
Same-sex	1.149	0.918–1.438	**1.508**	**1.225–1.855**	**1.393**	**1.125–1.725**	**1.201**	**1.111–1.298**
Age	**1.038**	**1.020–1.056**	**1.053**	**1.038–1.068**	**1.073**	**1.059–1.088**	0.970	0.955–0.986

Statistically significant ORs are given in bold along with the 95% CI

[a]Bivariate multinomial logistic regression

OR odds ratio

95% CI confidence interval for the OR

(aOR: 1.757, 95% CI 1.540–2.004) and same-sex (aOR: 1.138, 95% CI 1.031–1.257) as each additional opposite and same-sex partner was associated with 1.757 and 1.138 times the odds of having a recent STI screening compared to those who did not, respectively.

HCP-Patient Discussions

Five multivariable binary logistic regression models predicting HCP discussion of risk factors and HIV/AIDS from number of lifetime sexual partners, race/ethnicity, age, a recent health care visit, and sexual orientation were performed (Table 4). A recent health care visit (past 12 months) was significantly associated with higher odds of HCP discussing: sexual orientation (aOR: 8.864, 95% CI 5.902–13.311), number of sexual partners (aOR: 6.662, 95% CI 4.207–10.549, condom usage (aOR: 7.531, 95% CI 5.038–11.257), type of sexual intercourse (aOR: 7.066, 95% CI 4.483–11.137), and HIV/AIDS (aOR: 1.633, 95% CI 1.271–2.098).

Sexual orientation was significantly associated with an HCP inquiring about patients' type of sexual intercourse. Compared to heterosexual men, those who identified as a sexual minority were more likely to be asked about the type of sexual intercourse they were engaging in (aOR: 2.172, 95% CI 1.096–4.302).

Race/ethnicity was significantly associated with HCPs asking about patients' sexual orientation and number of sexual partners. Compared to White men, Black men were more likely to be asked about their sexual orientation (aOR: 2.263, 95% CI 1.620–3.160). Compared to White men, Hispanic men (aOR: 1.658, 95% CI 1.157–2.376), Black men (aOR: 2.364, 95% CI 1.664–3.359) and other/multiple race men (aOR: 1.622, 95% CI 1.076–2.445) were more likely to be asked about their number of sexual partners by their HCP.

Race and ethnicity was also associated with HCP discussion of sexual behavior with patients. Compared to white men, Hispanic men (aOR: 1.473, 95% CI 1.074–2.017) Black men (aOR: 3.011, 95% CI 2.240–4.048) and other/multiple race men (aOR: 1.681, 95% CI 1.123–2.515 were more likely to be asked about condom use. A similar trend is also seen in HCPs discussing about the type of sexual intercourse in: Hispanic men (aOR: 1.726, 95% CI 1.124–2.651), Black men (aOR: 4.644, 95% CI 3.128–6.895), and other/multiple race men (aOR: 1.735, 95% CI 1.005–2.994), compared to White men.

HCP discussion surrounding HIV/AIDS was also significantly associated with patients' race/ethnicity. Compared to White men, HCPs were more likely to discuss HIV/AIDS with Hispanic men (aOR: 1.302, 95% CI 1.015–1.671), and Black men (aOR: 2.026, 95% CI 1.579–2.599).

Table 3 Multivariable logistic regression models predicting HIV and STI screening from number of lifetime sexual partners, race/ethnicity, sexual orientation, age, a recent health care visit, and HCP discussion of risk factors

	Ever had an HIV test (reference = no test reported)[a]						Recent STI screening (past 12 months; reference = No)	
	Yes, only as part of blood donation (n = 803)		Yes, only outside of blood donation (n = 1174)		Yes, in both contexts (n = 1123)		Yes	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Race/ethnicity (reference = non-Hispanic white, single race)								
Hispanic	**0.507**	**0.345–0.746**	1.221	0.857–1.741	0.683	0.422–1.013	**1.742**	**1.380–2.198**
Non-Hispanic black, single race	**0.551**	**0.317–0.958**	**2.035**	**1.458–2.840**	1.339	0.974–1.842	**2.978**	**2.114–4.194**
Non-Hispanic other or multiple race	0.993	0.629–1.568	**1.604**	**1.028–2.503**	1.511	0.977–2.336	**1.723**	**1.149–2.584**
Sexual orientation (reference = heterosexual)								
Sexual minority	**0.432**	**0.247–0.757**	0.704	0.340–1.458	0.585	0.267–1.280	1.079	0.555–2.097
Recent health care visit (past 12 months; reference = No)								
Yes	1.086	0.784–1.504	1.137	0.851–1.520	1.385	0.970–1.977	**2.847**	**1.873–4.328**
Number of sexual partners (lifetime)								
Opposite-sex	1.126	0.989–1.281	**1.765**	**1.572–1.981**	**2.001**	**1.744–2.295**	**1.757**	**1.540–2.004**
Same-sex	**1.253**	**1.004–1.564**	**1.496**	**1.195–1.872**	**1.396**	**1.108–1.759**	**1.138**	**1.031–1.257**
Age	**1.030**	**1.014–1.047**	**1.055**	**1.038–1.071**	**1.072**	**1.055–1.090**	**0.978**	**0.963–0.994**
HCP-patient discussions								
HCP asked about sexual orientation								
Yes	0.718	0.431–1.195	0.923	0.577–1.476	1.059	0.624–1.796	**1.534**	**1.027–2.291**
HCP asked about number of sexual partners								
Yes	1.744	0.831–3.662	**2.325**	**1.379–3.919**	**2.071**	**1.148–3.734**	**2.123**	**1.314–3.430**
HCP asked about use of condoms								
Yes	0.666	0.390–1.135	0.766	0.487–1.204	0.796	0.517–1.224	**2.295**	**1.484–3.548**
HCP asked about type of sexual intercourse								
Yes	0.905	0.336–2.436	1.198	0.617–2.323	1.324	0.677–2.586	**1.900**	**1.234–2.925**
HCP discussed HIV/AIDS								
Yes	1.565	0.997–2.458	**3.556**	**2.406–5.257**	**4.149**	**2.877–5.983**	**1.549**	**1.167–2.056**

Statistically significant aORs are given in bold along with the 95% CI

[a]Multivariable multinomial logistic regression

aOR adjusted odds ratio

95% CI confidence interval for the OR

Finally, number of sexual partners patients reported, significantly impacted HCPs discussions with patients. Every additional increase in a patient's opposite-sex partner increased the odds of HCPs discussing: sexual orientation (aOR: 1.221, 95% CI 1.050–1.421), number condom usage (aOR: 1.187, 95% CI 1.070–1.318), type of sexual intercourse (aOR: 1.249, 95% CI 1.100–1.418), and HIV/AIDS (aOR: 1.357, 95% CI 1.217–1.513). Similarly, every additional increase in a patient's same-sex partner increased the odds of HCPs discussing: sexual orientation (aOR: 1.194, 95% CI 1.059–1.347), number of sexual partners (aOR: 1.148, 95% CI 1.037–1.271), condom usage (aOR: 1.188, 95% CI 1.053–1.339), type of sexual intercourse (aOR: 1.189, 95% CI 1.057–1.336), and HIV/AIDS (aOR: 1.283, 95% CI 1.117–1.472).

Discussion

The purpose of this study was to examine the content of HCP-patient discussions and associations with a lifetime HIV and recent STI screening. This study was among the first to utilize a nationally representative sample of men to examine content of HCP-patient discussions and associations with STI screening. This information is essential because HCPs play a crucial role in providing screening recommendations for their patients (Meanley et al., 2015; Pierce et al., 2018; Singh

Table 4 Multivariable binary logistic regression models predicting HCP discussion of risk factors and HIV/AIDS from number of lifetime sexual partners, race/ethnicity, sexual orientation, age, and a recent health care visit

	HCP discussion of…									
	Sexual orientation		Number of Sexual Partners		Condom usage		Type of sexual intercourse		HIV/AIDS	
	Yes		Yes		Yes		Yes		Yes	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Race/ethnicity (reference = non-Hispanic white, single race)										
Hispanic	1.341	0.984–1.829	**1.658**	**1.157–2.376**	**1.472**	**1.074–2.017**	**1.726**	**1.124–2.651**	**1.302**	**1.015–1.671**
Non-Hispanic black, single race	**2.263**	**1.620–3.160**	**2.364**	**1.664–3.359**	**3.011**	**2.240–4.048**	**4.644**	**3.128–6.895**	**2.026**	**1.579–2.599**
Non-Hispanic other or multiple Race	1.366	0.846–2.206	**1.622**	**1.076–2.445**	**1.681**	**1.123–2.515**	**1.735**	**1.005–2.994**	1.424	0.974–2.083
Sexual orientation (reference = Heterosexual)										
Sexual minority	1.386	0.806–2.383	1.664	0.937–2.954	1.013	0.523–1.964	**2.172**	**1.096–4.302**	0.738	0.366–1.410
Recent health care visit (past 12 months; reference = No										
Yes	**8.864**	**5.902–13.311**	**6.662**	**4.207–10.549**	**7.531**	**5.038–11.257**	**7.066**	**4.483–11.137**	**1.633**	**1.271–2.098**
Number of sexual partners (lifetime)										
Opposite-sex	**1.221**	**1.050–1.421**	1.002	0.858–1.171	**1.187**	**1.070–1.318**	**1.249**	**1.100–1.418**	**1.357**	**1.217–1.513**
Same-sex	**1.194**	**1.059–1.347**	**1.148**	**1.037–1.271**	**1.188**	**1.053–1.339**	**1.189**	**1.057–1.336**	**1.283**	**1.117–1.472**
Age	**0.936**	**0.920–0.951**	**0.950**	**0.936–0.963**	**0.918**	**0.902–0.933**	**0.920**	**0.897–0.944**	**0.959**	**0.949–0.969**

Statistically significant aORs are given in bold along with the 95% CI

aOR adjusted odds ratio

95% CI confidence interval for the OR

et al., 2018; Vincent et al., 2017). These findings suggest that men with HCPs that engaged in a conversation regarding STI risk factors had higher odds of having both a lifetime HIV and recent STI screenings. These findings move the field forward by providing information about the role providers may have in increasing HIV/STI screening rates among men in the US.

Conversations with HCPs were generally associated with higher odds of STI and HIV screening for all. On the contrary, patients who discussed condom usage with their HCP were more likely to have a recent STI screening than those who did not have this discussion. These findings further support the idea that preventive sexual health conversations HCPs have with their patients may significantly affect rates of screening, but the direction may be topic dependent. It remains unclear why condom use discussions were associated with lower rates of HIV screening; however, patients may or may not be in environments where they are comfortable being honest with their HCPs about various sexual health topics, which may explain the negative association. A recent study with data obtained from two national probability samples revealed that between 61.4 and 81.1% of patients avoided disclosing at least one type of medically relevant information, especially when the patient disagreed with the HCP's recommendation (Levy et al., 2018). A deeper investigation into the mechanisms behind these associations is warranted. Preventive sexual health conversations may be beneficial and providers should initiate these conversations with their patients to increase screening rates, given the significant role providers have in recommending screening (Ryan et al., 2018).

In addition to examining content of HCP-patient discussions, we analyzed patient characteristics associated with providers having a conversation about specific sexual health topics. Those who identified as a sexual minority were significantly less likely to have an HIV screening only as a part of blood donation compared to heterosexual men. This finding may indicate that heterosexual men are using blood donation as a form of testing that eliminates social stigma surrounding HIV. However, it is also important to note that sexual minority men have historically been prohibited from donating blood which may be the most likely reason for this finding. This warrants further research into understanding this potential relationship.

Among all racial and ethnic minority groups, Non-Hispanic Black men were the most likely to have their HCP discuss each risk factor with them, especially in regards to the type of sexual intercourse. While these conversations are essential in assessing HIV/STI risk, the reason for this significant disparity by race is unclear. A recent systematic review revealed that implicit bias against people of color was significantly related to interactions between patients and HCPs, treatment decisions and adherence, and patient health outcomes (Hall et al., 2015). Among people of color, medical mistrust may also be a contributing factor, particularly related to provider discussions about HIV and HIV testing. The relationship between medical mistrust and prevention behaviors related to HIV is complex and mediated by individual-level risks, poor communication, and patient-provider relationships (Bogart et al., 2019). Considering this, findings from our study may suggest provider bias in assessing and assuming risk factors may still be a public health concern, particularly in relation to HIV/STI risk behaviors. Further research is needed regarding the role of medical and provider mistrust and the racial disparities in HIV and STI screening discussions and education by HCPs (Zhang et al., 2020).

Study findings should be interpreted considering the following limitations. First, although the overall sample was large (N = 4260) and sampling weights were applied to make nationally representative estimates, there was a relatively small sample size for the sexual minority group (n = 204). There is a high likelihood that some of the participants included in these analyses were prescribed pre-exposure prophylaxis (PrEP) or may be currently taking HIV medication. This important contextual information is not currently collected in the NSFG, but may be critical to understand the true nature of HIV and STI testing and the relationship with HCP discussions. Finally, the cross-sectional study design prohibits the establishment of a causal relationship between variables and accuracy of recall and self-report related to HCP conversations and screening, both of which are limitations. Ideally, this self-report data would be corroborated with electronic medical records or insurance billing to confirm. To mitigate error from self-reporting screenings, one suggestion is to verify the self-report questions with provider data as is done in other national surveys, such as the National Immunization Survey – Teen (NIS-Teen) which verifies self-report of vaccination with provider documentation (Wolter et al., 2017).

Additionally, the measures included in the NSFG are limited. NSFG did not assess for having a recent HIV test; therefore, it is not in the same timeframe as other variables utilized in our models (i.e., recent health care visit and recent STI screening). Furthermore, NSFG does not collect data related to PrEP use which may impact HIV/STI testing as PrEP users are screened for STIs more frequently than nonusers as a part of their PrEP-related care (Ramchandani & Golden, 2019). For the outcome variable related to STI testing, some participants may have thought about other STIs aside from HIV while others may have included HIV in their considerations, which may have impacted the data. The NSFG had two different scales for number of lifetime opposite- and same-sex partners (i.e., 50 vs 10 point scale) so they cannot be compared directly. NSFG did not ask participants about their gender identity, but rather only focused on binary genders (i.e., men and women) which limits the identification of transgender and gender diverse participants in the sample and may impact the findings. Lastly, the race and ethnicity measure utilized

was based on the OMB standards, but lacks specificity about the identities represented in the study. Future work should consider clarifying these concepts and exploring the intricacies in these identities and behaviors.

Conclusions

This study was among the first to utilize a nationally representative sample men ages 15–49 to examine the role of HCPs may have in HIV/STI screening by inquiring about men's sexual health. Additionally, the investigation of the specific topics HCPs discuss with their male patients is a novel aspect. Previous studies have investigated HCP-patient conversations, but focused on only one measure (Bernstein et al., 2008; Singh et al., 2018; Vincent et al., 2017) or examined the role of HCPs in sex education with their patients (Pierce et al., 2018). The results from the current study may provide insight on how HCPs facilitate HIV/AIDS and STI screening among men and which patient groups are more likely to receive a discussion of risks factors with from their HCPs. Furthermore, these results may further support the need for more HCPs to utilize standardized guidelines for interactions with patients regarding sexual health such as *Sexual Health and Your Patients: A Provider's Guide* by the National Coalition for Sexual Health (Altarum Institute, 2016). This guidebook provides information on topics such as how to discuss sexual health, asking the essential sexual health questions, and delivering recommendations for preventative sexual health services (Altarum Institute, 2016). Future studies can use results from this study to design targeted HCP-centered interventions to promote equity in discussions and screening behaviors to ultimately reduce the negative health outcomes associated with HIV and STIs.

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Availability of Data and Materials National Survey of Family Growth data are publicly available and are housed on the CDC website.

Code Availability The SAS code utilized to conduct statistical analysis is available by request to the corresponding author.

Declarations

Conflict of interest All authors report no conflict of interest.

Ethical Approval Secondary analysis of this data was determined "not human subjects research" by the Institutional Review Board at the researchers' institution.

Consent to Participate Not applicable.

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