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ARTICLE

PERSPECTIVES on Sexual and Reproductive Health

Sexual choking/strangulation and its association with condom and contraceptive use: Findings from a survey of students at a university in the Midwestern United States

Debby Herbenick[1,2] | Tsung-Chieh Fu[1,2] | Callie Patterson Perry[1,3] | Lucia Guerra-Reyes[1,2] | Heather Eastman-Mueller[1,2] | Dubravka Svetina Valdivia[4]

[1]Center for Sexual Health Promotion, Indiana University School of Public Health, Indiana University, Bloomington, Indiana, USA

[2]Department of Applied Health Science, Indiana University School of Public Health, Indiana University, Bloomington, Indiana, USA

[3]Department of Public Health, College of Health Sciences, Des Moines University, West Des Moines, Iowa, USA

[4]Department of Counseling and Educational Psychology, School of Education, Indiana University, Bloomington, Indiana, USA

Correspondence
Debby Herbenick, Center for Sexual Health Promotion, Indiana University School of Public Health, Indiana University, Bloomington, IN, USA.
Email: debby@indiana.edu

Abstract

Introduction: Consensual sexual choking has become prevalent among young United States (US) adults. In sex between women and men, women are overwhelmingly the ones choked, perhaps reproducing traditional heteronormative power dynamics. No research has examined the relationship between being choked during consensual sex and the use of external condoms and other contraceptives.

Methods: We administered a cross-sectional campus-representative survey to 4989 undergraduate students at a large public Midwestern US university.

Results: Half of respondents ($n = 1803$) had ever been choked during sex. Having been choked was associated with a significantly lower likelihood of event-level condom use (OR = 0.32 [0.19, 0.54] for >5 times lifetime choking among men and OR = 0.35 [0.27, 0.45] for >5 times lifetime choking among women compared to those with no choking experiences) and in the past 6 months (OR = 0.42 [0.24, 0.72] for >5 times lifetime choking among men and OR = 0.59 [0.43, 0.81] for >5 times lifetime choking among women compared to those with no choking experiences). Also, having ever been choked was associated with a significantly greater likelihood of having used an implant/intra-uterine device in the past 6 months (OR = 1.85 [1.28, 2.68] for >5 times lifetime choking compared to those with no choking experiences).

Conclusion: Recognition that sexual choking is prevalent among young people has only recently emerged and educational programs are lacking. Study findings could be used to engage people in discussions about choking in relation to gender, power, and reproductive health agency.

KEYWORDS
condoms, contraception, sexual behavior, non-fatal strangulation

INTRODUCTION

Consensual sexual choking has become prevalent among young adults in the United States (US), Australia, Iceland, Italy, New Zealand, and the United Kingdom.[1–7] This sexual practice typically involves people using one or both hands, and less often a limb or ligature, to apply external pressure to the neck.[8–11] Sexual choking can limit blood flow and/or air flow,[1–3] making it a form of strangulation and leading to cerebral hypoxia or anoxia. Although technically a form of neck compression or strangulation, this sexual practice is widely called "choking" by people who engage in it as well as in pornography, social media, and online magazine and website articles.[8–11]

Sexual choking is usually consensual and is disproportionately experienced by women as well as sexual and gender minorities.[1–3,7–11] While sometimes considered a sexual practice associated with kink or bondage and discipline, dominance and submission, sadism and masochism (BDSM) communities,[12,13] sexual choking has become normative and mainstream among young people, and even described in mainstream culture as "vanilla" in recent years. In research examining young US adults' experiences with sexual choking in the general population, most people describe generally positive, pleasurable experiences with choking or being choked. However, some people report negative or frightening experiences with sexual choking. These negative experiences tend to reflect instances of a person being choked without first being asked, in ways they did not expect (e.g., using two hands instead of one), at greater intensities than they expected, or in ways that reflected unequal power dynamics.[3,8–11,14] These are not mutually exclusive groups of people as some describe both positive and negative experiences with choking and/or being choked.

Regardless of a person's subjective experience of having been choked, a history of having been choked/strangled during sex has been associated with physical, psychological, and neurological sequelae, including bruising, difficulty breathing, vision changes, poorer mental health, loss of consciousness, and even death.[13,15–19] In a random sample survey of undergraduate and graduate/professional students at one US college campus, of those who had ever been choked during sex (the vast majority of which were described as consensual), women and gender diverse students were significantly more likely than men to report having ever felt scared while being choked (30% transgender/nonbinary students, 16% women, 9% men).[14]

Indeed, neurologists have cautioned against any form of neck compresson.[20] Beyond direct physical consequences, there may be other potential health consequences of having been choked/strangled during sex. For example, in the context of intimate partner violence (IPV), strangulation has been described as a behavior of coercive control. Coercive control is a form of psychological abuse that aims to demonstrate power or domination through violent tactics.[21] In intimate relationships, coercive control may involve a person promoting expectancy of harm or placing victims in a vulnerable position where they feel unable to seek help. Indeed, rough sex that is nonconsensual, done harder than consented to, or that causes fear, physical discomfort, or injury has been described as one means that people may use to give "shape and credibility" to their threats and/or to assert dominance or control over a partner.[22]

But consensual sexual choking/strangulation and IPV strangulation are qualitatively different experiences. In both US and Australian studies, people who have been consensually choked during sex describe feeling neutral or positive about it and some young women who have been choked during sex describe initiating or asking to be choked.[5,6,9] Yet, in a probability survey of US undergraduates, about half of people who have been choked/strangled reported having at least some experience with being non-consensually choked.[2] And in an online survey that reported on a convenience sample of 227 Icelandic adults, 33% had been choked without establishing consent prior to the act and 27% had been choked both with and without consent.[5] The fact that contemporary forms of sexual choking are so often engaged in without prior discussion or communication is in conflict with kink and BDSM community principles focused on explicit communication, consent, and negotiation of limits and boundaries[23]; indeed, this has been among the challenges that researchers have noted as sexual practices that were once considered kinky are now becoming mainstream.[10,24]

Choking/strangulation and condom/contraceptive use

In the context of IPV, having been strangled and experiencing other types of violence have been associated with reduced sexual and reproductive agency and less consistent external (penile) condom and contraceptive use.[25–28] However, no existing research has examined whether being choked during consensual sexual encounters is related to condom/contraceptive use. This is important to examine given that both sexually transmitted infection (STI) rates and rough sex behaviors (and especially choking/strangulation) have increased over the past 10–15 years and especially among young adults.[8,29–31] It is possible that some individuals who are choked during consensual sex may feel afraid, or less able, to ask for or insist on external condom use during their sexual encounters and that multiple experiences of being choked (again, even during consensual sex) may be associated with greater feelings of vulnerability or decreased agency. For people (and especially men) doing the choking, their partners may feel less likely to ask for, or insist on, external condom use, thus decreasing the likelihood of event-level condom use. Even when choking occurs in a consensual intimate encounter, people still commonly describe feeling aware of power differential related to gender, physical size, and strength.[8,9] Thus, it is possible that being choked during sex—and especially repeatedly over time—may lead people to feel like they have less agency in their sexual lives.

The purpose of this exploratory research with undergraduate students at one US university was to examine the association between prior history of having been choked during consensual sex and external condom use at most recent sexual event.

METHODS

Participants

We used data from the 2020 Campus Sexual Health Survey (CSHS), a confidential online campus-representative survey of 4989 undergraduate students at a Midwestern university that we conducted in January/February 2020, prior to the COVID-19 pandemic (i.e., residential students were still living on campus and classes were meeting regularly). We have described the detailed methods elsewhere.[30] In brief, campus administrators had provided the campus survey research center with a list of 15,478 randomly sampled students ages 18 and older and emailed invitations to participate in the research to 15,432 students. Students received up to three email reminders to participate in the survey. Upon clicking the survey link, students could read information about the study (e.g., that it pertained to sexual health and was a confidential online survey). Those who consented could proceed to take the survey. The institutional review board at Indiana University reviewed and approved study protocols and measures.

We collected cross-sectional online survey data over 3 weeks. The survey took an average of 18 min to complete. Participants could provide their email address after completing the survey for a chance to win one of 250 e-gift cards of \$20 ($n = 200$), \$50, ($n = 40$), or \$100 ($n = 10$). To correct for non-response and more closely reflect the campus student population, survey research center staff created post-stratification weights using year in school, student classification (race/ethnicity and international status), and sex/gender. The research center staff then cleaned the data, removed any identifying information from participants' responses, and shared a de-identified data set with our research team.

Measures

Participant characteristics

We asked participants to indicate their gender/sex using the following options: woman, man, transgender woman, transgender man, gender nonbinary/non-conforming, or prefer to describe (textbox). We assessed sexual identity using the question, "Do you consider yourself to be?" with these response options: heterosexual/straight, gay/lesbian, bisexual, asexual, and something else (textbox). We asked participants to indicate their romantic status (single, dating several people, dating one person, in a relationship). We also examined university-provided variables including student classification (white, Black/African American, Asian, international student, or Other/2+ races), year in school (first year, sophomore, junior, senior), enrollment status (part-time/full-time), and housing status (on campus, off campus/no roommate, off campus/roommates, at home/other).

Lifetime experiences of being choked

We assessed lifetime experiences of being choked during sex using the question: "Thinking about your whole life, about how many times has someone choked you as part of sex?" Response options were: never, once or twice, 3–5 times, and more than 5 times.

Contraceptive use in past 6 months

We assessed participants' contraceptive use by asking: "During the past six months, when you were having penile-vaginal intercourse, which of the following types of protection (contraception) have you or your partner used (select all that apply)?" Response options included: (1) condom (male condom), (2) female condom, (3) birth control pill, (4) Nuva Ring (vaginal ring), (5) birth control patch, (6) birth control shot, (7) implant, (8) IUD [intra-uterine device], (9) cervical cap or diaphragm, (10) spermicidal gel, jelly or foam, (11) sympto-thermal, rhythm or natural family planning method, (12) withdrawal ("pulling out", removing penis before ejaculation), (13) unsure, (14) other, and (15) none of these.

Event-level characteristics

To assess external condom use at most recent consensual sexual event, we asked: "You indicated that you had penile-vaginal intercourse or anal intercourse during this sexual event. Did you or your partner use a condom during this most recent act of vaginal or anal intercourse?" (yes/no). We asked participants who did not use a condom: "Why was no condom used (select all that apply)?" Response options were: we didn't have one available; we were using another effective method of birth control; I wasn't worried about getting an STI or HIV from this person; I trust them; I love them; I wanted to use a condom but didn't feel comfortable telling them that; and let me describe (textbox). We also asked participants who their partner was (relationship partner, dating partner, friend, someone I just met/other).

Statistical analysis

We restricted our analyses to individuals who reported partnered sexual activity within the past year. We excluded from the analysis those who did not report their choking history as well as individuals reporting a transgender or nonbinary gender due to small sample size. We recategorized lifetime choking experiences into three groups: never, 1–5 times, and more than 5 times, given that prior research has found associations between having been choked/strangled frequently and both mental and physical health.[15–17] We examined lifetime experiences of choking in relation to external condom use at the most recent sexual event stratified by gender; we used chi-squared tests to identify statistically significant differences between choking and condom use. We conducted separate analyses for the various reasons for external condom non-use at most recent sexual event. As we had no a priori hypotheses for reasons for condom non-use, a Bonferroni correction was applied and $p < 0.008$ was considered significant. We used weighted logistic regression to assess the association between

TABLE 1 Weighted demographic characteristics and lifetime choking experiences of university students by gender, Midwestern US ($N = 3638$).

	Total respondents ($N = 3638$)	Men ($N = 1749$)	Women ($N = 1890$)	
	n (%)	*n* (%)	*n* (%)	*p*-value
Student classification				0.014
White	2626 (72.4)	1281 (73.4)	1345 (71.5)	
Black	153 (4.2)	53 (3.0)	100 (5.3)	
Hispanic	277 (7.6)	128 (7.3)	150 (8.0)	
Asian	194 (5.4)	97 (5.5)	97 (5.2)	
International	206 (5.7)	114 (6.5)	91 (4.9)	
Other/2+ races	172 (4.7)	73 (4.2)	98 (5.2)	
Year in school				0.205
First year	553 (15.2)	283 (16.2)	270 (14.3)	
Sophomore	863 (23.7)	422 (24.1)	441 (23.3)	
Junior	856 (23.5)	416 (23.8)	440 (23.3)	
Senior	1367 (37.6)	628 (35.9)	739 (39.1)	
Enrollment				0.450
Full-time	3483 (95.7)	1679 (96.0)	1804 (95.5)	
Part-time	156 (4.3)	70 (4.0)	86 (4.5)	
Housing				0.222
On campus	1380 (37.9)	647 (37.0)	733 (38.8)	
Off campus – no roommate	208 (5.7)	89 (5.1)	119 (6.3)	
Off campus – roommates	1951 (53.6)	966 (55.3)	985 (52.1)	
At home or other	99 (2.7)	45 (2.6)	53 (2.8)	
Sexual identity				<0.001
Heterosexual	3061 (84.2)	1539 (88.1)	1522 (80.6)	
Gay or lesbian	161 (4.4)	113 (6.5)	48 (2.6)	
Bisexual	376 (10.4)	91 (5.2)	285 (15.1)	
Asexual/other	37 (1.0)	4 (0.2)	33 (1.8)	
Lifetime choking experiences				<0.001
Never	1835 (50.5)	1206 (69.0)	630 (33.3)	
1–5 times	952 (26.2)	418 (23.9)	535 (28.3)	
>5 times	851 (23.4)	125 (7.2)	725 (38.4)	

lifetime choking experiences and external condom use at the most recent sexual event, adjusting for the following covariates: partner type, student classification, year in school, and housing status.

We also examined lifetime choking experiences and contraceptive use in the past 6 months stratified by gender. We conducted separate analyses for the following groups of contraceptives: (1) condom (male); (2) female condom; (3) contraceptive pill, ring, patch, shot; (4) implant or IUD; (5) cervical cap or diaphragm, spermicidal gel, jelly, or foam; (6) sympto-thermal, rhythm, or natural family planning method; (7) withdrawal; (8) unsure or other; and (9) none of these. We used chi-squared tests to identify differences with each type/group of contraceptives and choking experiences within gender. We then further examined contraceptive types that were statistically significantly associated with choking using logistic regression adjusting for the following covariates: romantic status, student classification, year in, and housing. We used Stata version 15 to conduct all analyses.[32]

RESULTS

Of 4989 total respondents, 4158 (83%) reported partnered sexual activity within the past year. Of these, we excluded 371 (9%) due to missing data on lifetime choking experiences and 62 (2%) due to the small sample size of those reporting a nonbinary gender identity. The final analytic sample was 3725 individuals (weighted $N = 3638$). All results hereinafter describe the weighted data.

Of the 3638 total respondents, 72% were white, 96% were enrolled full-time, and over half lived off campus with roommates (Table 1). Over 80% reported being heterosexual, more men reported being gay than women who reported being gay or lesbian (7% of men vs. 3% of women), and more women reported being bisexual than men (15% of women vs. 5% of men). Significantly more women reported having been choked during sexual activities (67% women vs. 31% men). Of those who had ever been choked, women

TABLE 2 Lifetime Frequency of Being Choked/Strangled during sex, condom use at most recent sexual event, and reasons for condom non-use by gender among Midwestern US university students ($N = 2582$).

	Lifetime choking among men				Lifetime choking among women			
	Never	1–5 times	>5 times	*p*-value	Never	1–5 times	>5 times	*p*-value
	n (%)	*n* (%)	*n* (%)		*n* (%)	*n* (%)	*n* (%)	
Condom use during most recent sexual event				<0.001				<0.001
Yes	451 (57.3)	145 (44.2)	31 (29.5)		172 (55.0)	188 (45.2)	193 (30.5)	
No	337 (42.7)	183 (55.8)	75 (70.5)		140 (45.0)	227 (54.8)	440 (69.5)	
Reasons for condom non-use								
We didn't have one available	48 (14.3)	27 (14.9)	13 (17.3)	0.841	16 (11.5)	31 (13.6)	51 (11.7)	0.684
We were using another effective method of birth control[a]	274 (82.9)	129 (78.7)	52 (86.0)	0.440	118 (84.3)	182 (80.0)	365 (83.0)	0.454
I wasn't worried about getting an STI or HIV from this person	181 (53.8)	111 (60.9)	44 (59.8)	0.335	69 (48.9)	119 (52.3)	262 (59.6)	0.020
I trust them	170 (50.6)	99 (53.9)	47 (63.5)	0.200	75 (53.7)	115 (50.8)	258 (58.5)	0.092
I love them	118 (35.2)	68 (37.2)	30 (40.7)	0.715	51 (36.4)	74 (32.7)	160 (36.4)	0.543
I wanted to use a condom but didn't feel comfortable telling them that	1 (0.4)	2 (1.4)	0 (0.0)	0.381	5 (3.3)	9 (3.9)	10 (2.3)	0.386
Other	20 (6.0)	12 (6.8)	7 (9.5)	0.610	9 (6.2)	14 (6.3)	38 (8.6)	0.406

[a]Results for men includes only those who reported penile-vaginal intercourse at the most recent sexual event.

also reported higher frequencies of having been choked during sexual activities. That is, far more women than men had been choked more than five times during sex (38% women vs. 7% men).

In terms of sexual orientation, men who self-identified as gay or bisexual reported more frequent experiences of having been choked during sex as compared to heterosexual men: 21% of heterosexual men, 50% of gay men, and 31% of bisexual men reported being choked 1–5 times during their lifetime; 6% of heterosexual men, 19% of gay men, and 18% of bisexual men reported being choked >5 times during their lifetime (data not shown). Among women, more bisexual women (50%) reported being choked >5 times during sex during their lifetime than heterosexual (36%) or lesbian women (37%). The percentage of women who reported having been choked 1–5 times was similar across self-identified sexual orientation: 29% heterosexual, 23% lesbian, and 27% bisexual women.

Choking and event-level external condom use

Lifetime experiences of having been choked during sex were significantly associated with condom use at the most recent vaginal or anal intercourse event among men and women (Table 2). Among women and men who had been choked more than five times in their lifetime, only about 30% reported using a condom at their most recent intercourse event, while over half of those who had never been choked reported using a condom at their most recent intercourse event. For both women and men, no significant different were found among reasons for not using condoms and lifetime choking experiences. As shown in Table 3, after adjusting for partner type, student classification, year in school, and housing, lifetime experience of having been choked was statistically significantly associated with lower likelihood of external condom use at the most recent sexual event for both women and men.

Choking and contraceptive use in the past 6 months

Lifetime experiences of having been choked were significantly associated with the use of external condoms and some other contraceptive methods over the past 6 months (Table 4).

For both women and men, those who had ever been choked more than five times were significantly less likely to report external condom use in the prior 6 months. Specifically, about two-thirds of participants who had been choked more than five times reported having used a condom whereas about three-quarters of those who had never been choked (or choked 1–5 times) reported having used a condom in the past 6 months. For men but not women, having been choked was significantly and positively associated with the use of internal condoms; however, the cell sizes were very small (e.g., due to so few people reporting internal condom use).

For both women and men, a history of having been choked was significantly associated with implant/IUD use in the past 6 months, with those who reported having ever been choked being more likely to report that they and their partner used an implant/IUD. Women and men who had been choked more than five times were the most likely to report implant/IUD use (23% women, 37% men). For women (but not men), those who had been choked were significantly more likely to report that they had used withdrawal in the prior 6 months (42% of those choked >5 times, 39% of those choked 1–5 times, 25% of those never choked). There were no significant differences in

TABLE 3 Lifetime frequency of being choked/strangled during sex and its associations with condom use at most recent sexual event by gender among Midwestern US university students ($N = 2569$).

	Men			Women		
	aOR	(95% CI)	*p*-value	aOR	(95% CI)	*p*-value
Lifetime choking						
Never	1.00	—	—	1.00	—	—
1–5 times	0.59	(0.43, 0.81)	0.001	0.63	(0.48, 0.83)	0.001
>5 times	0.32	(0.19, 0.54)	<0.001	0.35	(0.27, 0.45)	<0.001

Note: Results in table adjusted for partner type (relationship partner, dating partner, friend, someone I just met/other), student classification (White, Black, Hispanic, Asian, international, other/2+ races), year in school (first year, sophomore, junior, senior) and housing (on campus, off campus with no roommate, off campus with roommate(s), at home or other).
Abbreviations: aOR, adjusted odds ratio; CI, confidence interval.

TABLE 4 Lifetime choking experiences and contraceptive use in the past 6 months by gender among Midwestern US university students ($N = 2227$).

	Lifetime choking among men				Lifetime choking among women			
	Never	1–5 times	>5 times	*p*-value	Never	1–5 times	>5 times	*p*-value
	n (%)	*n* (%)	*n* (%)		*n* (%)	*n* (%)	*n* (%)	
Condom	513 (78.0)	193 (73.9)	54 (60.6)	0.006	207 (77.1)	280 (77.6)	403 (68.3)	<0.001
Internal/female condom	1 (0.2)	4 (1.4)	2 (2.8)	0.022	2 (0.9)	3 (0.8)	6 (1.0)	0.981
Birth control pill, ring, patch, shot	429 (65.2)	177 (67.6)	63 (70.8)	0.592	177 (66.1)	233 (64.4)	391 (66.3)	0.797
Implant or intrauterine device	135 (20.5)	90 (34.3)	33 (36.8)	<0.001	35 (13.2)	66 (18.2)	135 (22.9)	0.001
Cervical cap or diaphragm; spermicidal gel, jelly, or foam	10 (1.5)	9 (3.4)	1 (1.4)	0.229	2 (0.9)	8 (2.1)	10 (1.7)	0.402
Sympto-thermal, rhythm, or natural family planning method	2 (0.4)	2 (0.6)	1 (1.4)	0.548	0 (0.0)	4 (1.1)	6 (1.1)	0.157
Withdrawal	218 (33.2)	97 (37.2)	39 (44.1)	0.154	68 (25.)	140 (38.7)	246 (41.7)	<0.001
Usure or other	13 (2.0)	10 (3.8)	2 (2.8)	0.389	2 (0.6)	3 (0.9)	3 (0.5)	0.747
None of these	6 (0.9)	7 (2.7)	1 (1.4)	0.202	2 (0.9)	3 (0.9)	9 (1.6)	0.428

relation to choking and the use of the contraceptive pill, ring, patch, or shot; the cervical cap or diaphragm, spermicidal gel, jelly or foam; natural family planning methods; or the few participants who were unsure which methods, if any, were used or who indicated using other methods, or no method at all.

After adjusting for romantic status, student classification, year in school, and housing, we further assessed whether lifetime choking experiences were associated with use of external condoms, implants or IUDs, and withdrawal in the past 6 months (Table 5). For men, having been choked more than five times was significantly associated with a lower likelihood of external condom use in the past 6 months compared to those who have never been choked (aOR = 0.42; 95% CI: 0.24, 0.72). Also, having ever been choked was significantly associated with greater likelihood of indicating that they and their partner had used a contraceptive implant or IUD during penile-vaginal intercourse in the past 6 months.

For women, having been choked more than five times was significantly associated with a lower likelihood of external condom use in the past 6 months compared to those who have never been choked (aOR = 0.59; 95% CI: 0.43, 0.81). Also, women who had been choked more than five times were significantly more likely than those who had never been choked to report implant/IUD use in the prior 6 months (aOR = 1.85; 95% CI: 1.28, 2.68). In addition, women who had ever been choked during sex (whether 1–5 times or more than 5 times) were significantly more likely to report having used withdrawal in the prior 6 months.

DISCUSSION

Using data from a cross-sectional, representative survey from a single university, we examined the association between having been choked during sexual activities and external condom and contraceptive use. In this study, we built on existing research on sexual choking by examining the relationship between having been choked during sex and condom/contraceptive use, given the latter's critical role in sexual and reproductive health and agency.

We found that a history of having been choked during sex was associated with a lower likelihood of reporting external condom use, both at students' most recent sexual event and during the prior

TABLE 5 Associations between lifetime choking experiences and contraceptive use in the past 6 months by gender ($N = 2218$).

	1–5 times versus never			>5 times versus never		
	aOR	(95% CI)	*p*-value	aOR	(95% CI)	*p*-value
Men						
Condom	0.79	(0.53, 1.18)	0.256	0.42	(0.24, 0.72)	0.002
Implant or intrauterine device	1.92	(1.32, 2.81)	0.001	1.91	(1.10, 3.31)	0.022
Withdrawal	1.19	(0.84, 1.68)	0.337	1.42	(0.85, 2.37)	0.175
Women						
Condom	0.96	(0.67, 1.36)	0.807	0.59	(0.43, 0.81)	0.001
Implant or intrauterine device	1.45	(0.97, 2.19)	0.072	1.85	(1.28, 2.68)	0.001
Withdrawal	1.85	(1.35, 2.53)	<0.001	2.03	(1.51, 2.72)	<0.001

Note: Results in table adjusted for romantic status (single, dating several people, dating one person, in a relationship), student classification (White, Black, Hispanic, Asian, international, other/2+ races), year in school (first year, sophomore, junior, senior) and housing (on campus, off campus with no roommate, off campus with roommate(s), at home or other).
Abbreviations: aOR, adjusted odds ratio; CI, confidence interval.

6 months. This finding could be due to reproductive coercion[33] which should be examined in subsequent research. Another possible explanation is that this finding could reflect lower sexual or reproductive agency that both makes it more difficult to refuse being choked (if or when they don't want to be) and that also makes it more difficult to insist upon external condom use in a given sexual event (if or when a person wants to use a condom). Indeed, a partner with greater power in a relationship tends to have more influence over condoms and other contraceptive decisions.[34] Using experimental vignettes, Woolf-King & Maisto (2008) evaluated gender differences in condom use intentions in relation to relationship power, and when presented with low-power vignette (describing a scenario in which a partner has more control), participants expressed that it would be more difficult to implement external condom use.[35] Women (especially young women) have historically felt disempowered with regard to initiating condom use with sexual partners.[36,37] Men, on the other hand, are often seen as holding both relationship power[38–40] and responsibility for condom availability and use.[41] This could also reflect lower sexual or reproductive agency that is caused by or contributed to by a history of having been choked/strangled.

Alternatively, there may also be other confounding variables that we did not examine in the present survey—such as sensation seeking, risk-taking, alcohol use, or submissiveness—that could help to explain greater engagement in choking as well as a lower likelihood of external condom use. Subsequent research should examine each of these to understand their relationship with engagement in choking and other forms of rough sex.

A second major finding from our research had to do with the relationship between a history of having ever been choked and a greater likelihood of implant/IUD use. Because decision-making related to implant/IUD use occurs well in advance of sex and not during a given sexual event (and is generally more controlled or directed by women seeking implant or IUD insertion), this association may reflect a person or couple's choices more generally about sex. In this sample of mostly young college students, using an implant or IUD may reflect a longer history of being sexually active with partners, greater confidence that one will continue to be sexually active into the future, or greater levels of emotional closeness with one's partner. Indeed, some research suggests that sexual choking has been associated with higher levels of trust.[42] In interviews with undergraduate and graduate students who have engaged in choking, some women who had been choked indicated that engaging in sexual choking/strangulation reflected a sense of trust between them and their partner(s).[8]

Finally, we found that, for women in this sample, a history of having been choked was related to a greater likelihood of using withdrawal in the prior 6 months. This could be related to the lower likelihood of condom use (e.g., if no condom is used, then the dyad may use withdrawal as a way to keep semen out of the vagina). Similarly, it could reflect a desire for greater physical sensations during sex, whether through choking or direct contact with the penis. It may also be that the positive relationship between choking history and withdrawal is related to risk-taking or being sexually submissive. Alternatively, this relationship could reflect greater propensity for sexual exploration that might be associated with engaging in choking and also engaging in various forms of ejaculation as a sexual practice (not just a contraceptive practice).

Limitations

Our research is subject to several limitations. First, our study was exploratory and cross-sectional. While we were able to examine associations between a history of having been choked during sex and external condom/contraceptive use, we are unable to examine causation; prospective research is needed to examine directionality. Also, we lack context to understand what the study findings mean in the context of gender and power. For example, we did not measure participants' perceptions about whether their partner wanted/didn't want or voiced that they did or didn't want to use condoms for any reason. We also cannot disentangle the relationship between choking and

condom/contraceptive use from overall sexual submissiveness or lower sexual and reproductive agency. Subsequent research is needed that includes measures of sexual empowerment, pregnancy intentions, reproductive coercion, alcohol use, risk-taking, and/or sensation-seeking.

In the present study, we assessed sexual consent for participants' most recent sexual events. However, given that many people have been choked many times as part of sexual activities, we did not examine which of these experiences were consensual versus nonconsensual or unclear in terms of consent. Subsequent research would benefit from examining choking, consent, and condom/contraceptive. Further, our study did not assess participants' prior experiences with IPV. Subsequent research is needed to understand the subset of individuals who engage in sexual choking and who have also experienced IPV. Preliminary research suggests that undergraduate students who had prior sexual victimization histories were more likely to engage in sexual choking/strangulation and engage in sexual choking/strangulation even when they did not enjoy it.[43] Also, some scholars have interrogated strangulation that occurs as part of sex as compared to outside of sex, noting that the normalization of sexual choking/strangulation may facilitate some people using choking/strangulation as part of coercive control or partner abuse.[44]

Finally, our sample was largely comprised of cisgender and heterosexual individuals. Although men who had been choked during sex were more likely to use internal condoms, this finding likely reflects the fact that gay and bisexual men are more likely to be choked/strangled during sex as compared to heterosexual men.[2,45] Subsequent research that is focused on sexual and gender minorities is needed to understand how sexual choking may be related to condom and/or other contraceptive use. Such research might also investigate the use of pre-exposure prophylaxis (PrEP) in relation to sexual choking, especially as cisgender men who use PrEP are often less likely to use external condoms.[42]

Implications for policy and programs

As recognition that sexual choking/strangulation is a common sexual behavior among young people has only recently emerged, educational programs are lacking. Findings from our exploratory study could be used in discussion-based sexuality education programming, with the goal of encouraging young people to discuss what choking/strangulation and other forms of rough sex mean in terms of gender, power, and sexual and reproductive health agency. A recent literature review related to youth in New Zealand notes that, in classroom discussions, young people have resisted the idea of choking/strangulation being related to sexual violence[10] and both consensual and nonconsensual choking/strangulation have been the subject of proposed and enacted legislation.[46,47] Thus it is critical that more research explore the dynamics surrounding consensual choking/strangulation build an evidence base to inform such educational efforts and policy decisions.

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AUTHOR BIOGRAPHIES

Debby Herbenick, PhD, MPH is a Provost Professor at the Indiana University School of Public Health-Bloomington. Her research interests relate to women's sexual health, population-representative sexual behavior trends, and measurement issues in the field of sexuality.

Tsung-Chieh Fu earned a PhD in Epidemiology from the University of Washington and a masters in Epidemiology from Johns Hopkins University. Her research interests include sexual behaviors, condom/contraceptive use, and measurement issues of sexual health surveys.

Callie Patterson, PhD, MA, is a sexuality researcher at the Center for Sexual Health Promotion at the Indiana University School of Public Health. She earned a PhD in Health Behavior from Indiana University, Bloomington and a MA in Psychological Sciences from Northern Arizona University. Her research interests include sexual health and behavior, sex work, and the intersections between these topics and mental health and wellbeing.

Lucia Guerra-Reyes holds a doctoral degree in Medical Anthropology, an MPH in Behavioral and Community Health Sciences from the University of Pittsburgh, and an MA in Gender, Sexuality

and Reproductive Health from the Universidad Peruana Cayetano Heredia. Her research explores the complexities of access to sexual and reproductive health services for women from marginalized communities.

Heather Eastman-Mueller earned her PhD in Health Promotion and Wellness from the University of Missouri, a Master of Science in Advanced Athletic Training and Kinesiology from Indiana University. She is a Certified Sexuality Educator and Supervisor. She is a Clinical Associate Faculty member in the Department of Applied Health Science at Indiana University. Her research interests include college sexual health behaviors, gender identity, and accessibility to sexual health resources, and sex education curricula.

Dubravka Svetina Valdivia, PhD, is an associate professor of quantitative methodology in the School of Education at Indiana University, Bloomington. Her research interests involve methodological investigations of the performance of current psychometric models and procedures, in particular those related to latent variable modeling, cognitive diagnostic models, and cross-cultural/measurement invariance investigations.

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