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Brief research report

Eating disorder attitudes and disordered eating behaviors as measured by the Eating Disorder Examination Questionnaire (EDE-Q) among cisgender lesbian women

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ABSTRACT

The Eating Disorder Examination Questionnaire (EDE-Q) is a measure of eating disorder attitudes and disordered eating behaviors. Prior descriptive studies of the EDE-Q for women either did not assess or omitted reporting sexual orientation. This study's objective was to assess eating disorder attitudes and disordered eating behaviors as measured by the EDE-Q among cisgender lesbian women. We present mean scores and standard deviations for the EDE-Q among 563 self-identified cisgender lesbian women ages 18–77 who were recruited from The PRIDE Study in 2018. Among cisgender lesbian women, 3.4 % scored in the clinically significant range on the Restraint, 1.6 % on the Eating Concern, 9.1 % on the Weight Concern, 13.9 % on the Shape Concern, and 3.9 % on the Global Score scales of the EDE-Q. We found that 13.5 % of participants reported any occurrence (≥1/28 days) of dietary restriction, 8.7 % for objective binge episodes, 5.3 % for excessive exercise, .4% for self-induced vomiting, and .4% for laxative misuse. Participants reported a current (1.8 %) or lifetime (7.1 %) diagnosis of an eating disorder by a clinician. These EDE-Q descriptive data capture eating disorder attitudes and disordered eating behaviors among cisgender lesbian women and may aid clinicians and researchers in interpreting the EDE-Q in this specific population.

1. Introduction

The majority of empirical eating disorders (ED) research did not assess or omitted reporting sexual orientation. Of the existing studies that included sexual minority women, distinct subgroups by sexual orientation (*e.g.,* lesbian, bisexual, asexual) have not been delineated (Matthews-Ewald, Zullig, & Ward, 2014). We aimed to elucidate descriptive statistics of eating disorder attitudes and the prevalence of disordered eating behaviors among cisgender lesbian women.

Historically, literature postulated that lesbian women were less vulnerable to internalized thin body ideals and body image dissatisfaction than their heterosexual counterparts, perhaps due to heightened masculinity (Cella, Iannaccone, & Cotrufo, 2013; Oldham, Farnill, & Ball, 1982) or lower levels of self-objectification compared to heterosexual women (Engeln-Maddox, Miller, & Doyle, 2011). Other studies linked sexual orientation in lesbian

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women to additional eating disorder risk through the sexual minority stress theory (Mason, Lewis, & Heron, 2018). This theory postulates that discrimination based on sexual orientation leads to less social support from family, more general negative affect, and more social anxiety, all of which contribute to disordered eating behaviors (Mason, Lewis, & Heron, 2017). Furthermore, lesbian women may experience weight discrimination leading to disordered eating (Mason et al., 2017). A systematic review examining eating disorder symptoms in sexual minority women demonstrated a range of findings (Meneguzzo et al., 2018). The prevalence of a lifetime eating disorder diagnosis among lesbian women 18–30 years old was estimated at 9.0 % and nearly one quarter of the participants (23.7 %) reported binge eating in the past week (Mason et al., 2017).

Eating disorder researchers have studied the intersections between sexual orientation, body dissatisfaction, and disordered eating behaviors (Calzo, Blashill, Brown, & Argenal, 2017) and found distinct appearance attitudes across groups of non-heterosexual cisgender women (Huxley, Clarke, & Halliwell, 2014). While revised descriptive data for commonly used measures of ED symptomatology – such as the Eating Disorder Examination Questionnaire (EDE-Q) (Fairburn & Beglin, 2008) – have been put forth for women drawn from community (*i.e.*, non-clinical) samples (Darcy, Hardy, Lock, Hill, & Peebles, 2013; Luce, Crowther, & Pole, 2008; Mond, Hay, Rodgers, & Owen, 2006; Quick & Byrd-Bredbenner, 2013; Rø, Reas, & Lask, 2010), these studies have not reported participants' sexual orientations and have not explored sexual orientation as an ED symptom covariate.

Because ED symptomatology may differ by sexual orientation and prior research on the EDE-Q has not explored these differences, we conducted the present study to address this literature gap. The purpose of this study was to explore descriptive statistics of eating disorder attitudes and prevalence of disordered eating behaviors as measured by the EDE-Q among cisgender lesbian women.

2. Method

2.1. Study population

Launched in 2017, The Population Research in Identities and Disparities for Equality (PRIDE) Study is a national longitudinal cohort study of sexual and gender minority (SGM) adults (*i.e.*, people who identify as lesbian, gay, bisexual, transgender, queer, or another sexual or gender minority) in the U.S. (Lunn, Lubensky et al., 2019; Lunn, Capriotti et al., 2019). Data were collected through a web-based research platform accessible from any web-enabled device. The PRIDE Study recruited participants through blog posts and newsletters, PRIDEnet community partners, online advertising, promotional items, conferences, community events, and word-of-mouth.

All PRIDE Study participants were invited to complete the Eating and Body Image questionnaire from April 2018 to August 2018. For this analysis, we included participants who exclusively indicated "woman" as their gender identity, reported female sex assignment at birth, and exclusively indicated "lesbian," "gay," or "same-gender loving" as their sexual orientation. Participants who reported multiple gender identities or sexual orientations other than those above were excluded. Of the 10,665 participants in The PRIDE Study, 4672 completed the questionnaire (response rate was 43.8 %). Of these, participants reporting male sex assignment at birth ($n = 1696/4672$), not identifying as a "woman" ($n = 2732/4672$), or not identifying as exclusively "lesbian," "gay," or "same-gender loving" ($n = 4109/4672$) were excluded for this specific study (participants could meet multiple exclusion criteria). Five-hundred and sixty-three (12.1 % of participants who completed the questionnaire) identified as cisgender lesbian women. Contemporary best practice guidance for missing data were followed (Parent, 2013; Swami & Barron, 2019). Missing values were observed for 0.05 % of EDE-Q and sociodemographic data on age, weight, and height; the nonparametric test of homoscedasticity suggested that the mechanism was consistent with missing completely at random ($p = .31$). Consequently, data imputation was performed using multiple imputation by chained equations procedure. No compensation was received. This study was approved by the University of California, San Francisco and Stanford University Institutional Review Boards as well as The PRIDE Study's Research Advisory and Participant Advisory Committees. Data from The PRIDE Study may be accessed through an Ancillary Study application (details at pridestudy.org/collaborate).

2.2. Measures

The EDE-Q is one of the most widely used self-report instruments in ED clinical practice and research. The EDE-Q assesses disordered eating attitudes and behaviors over the previous 28 days (Fairburn & Beglin, 2008). The measure provides four subscale scores: Restraint (5 items), Eating Concern (EC, 5 items), Shape Concern (SC, 8 items), and Weight Concern (WC, 5 items). The Global score is obtained by averaging the four subscale scores. Responses are on a 7-point, forced-choice rating scale (0–6); higher scores reflect greater eating- or body-related concerns or behaviors. Frequencies of disordered eating behaviors (*e.g.*, binge eating and compensatory behaviors) are assessed. In this study, internal consistency was 0.78 for Restraint; .81 for EC; .91 for SC; .83 for WC; and 0.94 for the Global score. The internal consistency values were aligned with prior studies (Luce et al., 2008).

Disordered eating behavior frequency was assessed as the number of episodes occurring during the past four weeks (28 days) in accordance with previous literature (Lavender, De Young, & Anderson, 2010; Penelo, Villarroel, Portell, & Raich, 2012). Any occurrence of disordered eating behaviors was defined as $\geq$1 episode in the past 28 days (Lavender et al., 2010; Penelo et al., 2012). Regular occurrence of dietary restriction was defined as going for long periods of time ($\geq$8 h) without eating anything in order to influence shape or weight for $\geq$13 days over the past 28 days (EDE-Q item 2). Regular occurrence of excessive exercise was defined as exercising in a driven or compulsive way as a means of controlling weight, shape, amount of fat, or burning off calories for $\geq$20 days over the past 28 days (EDE-Q item 18). Regular occurrence of objective binge episodes, self-induced vomiting, and laxative misuse was defined as $\geq$4 occurrences over the past 28 days (EDE-Q items 14, 16, and 17, respectively). Consistent with previous studies (Lavender et al., 2010; Luce et al., 2008), a cut-off of $\geq$4 indicated clinical significance (range 0–6; higher scores indicate greater symptoms) on the Global Score and any of the four EDE-Q subscales.

Sociodemographic information including age, race (White, Black/African American, Asian, Native American/American Indian), ethnicity (Hispanic/Latino), and education was self-reported. Race and ethnicity were combined into the following categories: White (non-Hispanic/Latino), Hispanic/Latino, Black/African American (non-Hispanic/Latino), Asian (non-Hispanic/Latino), Native American/American Indian (non-Hispanic/Latino), and other/multiracial (if participants selected multiple groups). Body mass index (BMI) was calculated from self-reported weight and height using weight (kilograms) divided by height (meters) squared ($\text{BMI} = \text{weight}/\text{height}^2$). Participants were classified as underweight ($\text{BMI} < 18.5$), normal weight ($\text{BMI} \geq 18.5$ & $\text{BMI} < 25$), overweight ($\text{BMI} \geq 25$), or obese ($\text{BMI} \geq 30$). Participants were asked, "Has a mental health professional or physician EVER told you that you have an eating disorder such as Anorexia nervosa, Bulimia

Table 1
Distribution of means, standard deviations, and percentile ranks for the Eating Disorder Examination Questionnaire (EDE-Q) Global and subscale scores among cisgender lesbian women from The PRIDE Study (N = 563).

	Restraint	EC	WC	SC	Global
M (SD)	1.43 (1.42)	0.76 (1.00)	2.04 (1.45)	2.20 (1.55)	1.61 (1.17)
Range	0–6.00	0–6.00	0–6.00	0–6.00	0–5.59
Percentile rank					
5	0.00	0.00	0.00	0.13	0.06
10	0.00	0.00	0.20	0.25	0.25
15	0.00	0.00	0.40	0.50	0.40
20	0.00	0.00	0.60	0.75	0.50
25	0.00	0.00	0.80	0.88	0.65
30	0.20	0.00	1.00	1.13	0.82
35	0.40	0.20	1.20	1.25	0.96
40	0.60	0.20	1.60	1.50	1.08
45	0.80	0.20	1.80	1.75	1.25
50	1.00	0.40	2.00	2.00	1.39
55	1.20	0.40	2.20	2.38	1.64
60	1.60	0.60	2.40	2.62	1.80
65	1.80	0.60	2.60	2.75	1.94
70	2.20	0.80	2.80	3.00	2.18
75	2.40	1.20	3.00	3.38	2.35
80	2.80	1.40	3.40	3.63	2.59
85	3.20	1.60	3.60	3.88	2.84
90	3.60	2.20	4.00	4.35	3.21
95	4.00	3.00	4.60	5.13	3.87
99	5.60	4.60	5.80	5.75	4.71

EDE-Q. Eating Disorder Examination Questionnaire; EC. Eating Concern subscale; WC. Weight Concern subscale; SC. Shape Concern subscale; Global. Global score; M. mean; SD. standard deviation.

nervosa, or Binge Eating Disorder?" If participants responded affirmatively, they were asked, "Which eating disorder(s) did they say you have? (Check all that apply)." Response options included: "anorexia nervosa," "bulimia nervosa," "binge eating disorder," "other," and "not specified."

2.3. Data analysis

Data are presented as mean (standard deviation), median (interquartile range), and percentage. R software (version 3.4.4) were used for all analyses.

3. Results

A total of 563 cisgender lesbian women were included. The mean age was 38.0 years (*SD* = 14.3, range 18–77). Mean BMI was 28.1 kg/m^2 (*SD* = 7.9), with BMI categories underweight (2.1 %), normal weight (34.5 %), overweight (27.5 %), or obese (35.9 %). A total of 74.4 % of the participants identified as White (non-Hispanic/Latino), 5.3 % as Hispanic/Latino, 1.4 % as Black/African American (non-Hispanic/Latino), 1.1 % as Asian (non-Hispanic/Latino), 0.4 % as Native American/American Indian (non-Hispanic/Latino), 8.7 % as other/multiracial, and 8.7 % did not report their race/ethnicity. In addition, 73.7 % of participants had a college degree or higher.

Table 2
Proportion of cisgender lesbian women engaging in disordered eating behaviors in The PRIDE Study (N = 563).

Disordered eating behavior	Any occurrence (%)	Regular occurrence (%)
Dietary restriction	13.50	3.73
Objective binge episodes	8.70	4.09
Self-induced vomiting	0.36	0.36
Laxative misuse	0.36	0.18
Excessive exercise	5.33	1.24

Any occurrence was defined as ≥1 episode in the past 28 days. Regular occurrence of dietary restriction was defined as going for long periods of time (8 h) without eating anything to influence shape or weight for ≥13 days over the past 28 days. Regular occurrence of excessive exercise was defined as exercising in a driven or compulsive way as a means of controlling weight, shape or amount of fat, or burning off calories for ≥20 days over the past 28 days. For all other behaviors (objective binge episodes, self-induced vomiting, and laxative misuse), regular occurrence was defined as ≥4 occurrences over the past 28 days.

Mean scores, standard deviations, and percentile ranks for the EDE-Q subscales and Global Score are presented in Table 1. Among cisgender lesbian women, 3.4 % scored in the clinically significant range (*i.e.,* ≥4) on Restraint, 1.6 % on EC, 9.1 % on WC, 13.9 % on SC,

Table 3
Correlation table.

	Age	BMI	Global	Restraint	EC	WC	SC	Dietary restriction	Objective binge episodes	Self-induced vomiting	Laxative misuse
BMI	.16*										
Global	−.07	.29*									
Restraint	.01	.07	.73*								
EC	−.12*	.25*	.81*	.41*							
WC	−.09*	.36*	.94*	.55*	.72*						
SC	−.07	.32*	.93*	.52*	.72*	.91*					
Dietary restriction	−.09*	.02	.38*	.37*	.31*	.30*	.31*				
Objective binge episodes	−.04	.17*	.33*	.11*	.47*	.30*	.30*	.12*			
Self-induced vomiting	−.08	−.07	.16*	.15*	.23*	.11*	.11*	.06	−.02		
Laxative misuse	−.03	.03	.06	.11*	−.02	.05	.05	.06	−.02	.01	
Excessive exercise	−.11*	−.10*	.32*	.30*	.30*	.25*	.26*	.25*	.24*	.12*	.12*

BMI. Body mass index; Global. Global score; EC. Eating Concern subscale; WC. Weight Concern subscale; SC. Shape Concern subscale.
* $p < .05$.

Table 4
Mean and median scores on the EDE-Q subscales for cisgender lesbian women by body mass index (BMI) classification (N = 563).

BMI	Underweight (a) BMI<18.5 (n = 12) M (SD)/Md (IQR)	Normal weight (b) 18.5≤BMI<25 (n = 194) M (SD)/Md (IQR)	Overweight (c) 25≤BMI<30 (n = 155) M (SD)/Md (IQR)	Obese (d) BMI>30 (n = 202) M (SD)/Md (IQR)	Kruskal-Wallis test	Post-hoc Mann-Whitney
GS	1.01 (1.32)/0.45 (3.72)	1.20 (1.18)/0.82 (5.90)	1.69 (1.06)/1.46 (4.47)	1.94 (1.09)/1.84 (5.10)	63.68*	b < c, d; c < d
R	1.00 (1.85)/0.00 (5.60)	1.19 (1.43)/0.60 (6.00)	1.63 (1.38)/1.40 (5.00)	1.41 (1.30)/1.20 (6.00)	16.89*	b < c
EC	0.53 (0.95)/0.10 (3.20)	0.56 (0.90)/0.20 (6.00)	0.66 (0.89)/0.40 (4.60)	1.04 (1.14)/0.60 (5.40)	29.46*	b, c < d
WC	1.15 (1.51)/0.50 (4.40)	1.39 (1.41)/0.90 (6.00)	2.17 (1.33)/2.00 (5.80)	2.61 (1.32)/2.60 (5.80)	85.87*	a, b < c, d; c < d
SC	1.34 (1.59)/0.62 (3.72)	1.64 (1.46)/1.31 (6.00)	2.30 (1.48)/2.12 (5.88)	2.70 (1.51)/2.62 (6.00)	56.52*	a, b < c, d; c < d

Note. EDE-Q. Eating Disorder Examination Questionnaire; EC. Eating Concern subscale; WC. Weight Concern subscale; SC. Shape Concern subscale; Global. Global score; M. mean; SD. Standard deviation; Md. Median; IQR, interquartile range.
* $p < .005$ (after Bonferroni's correction).

Table 5
Proportion (%) of cisgender lesbian women engaging in disordered eating behaviors, by body mass index (BMI) classification.

Disordered eating behavior		Underweight (a) BMI < 18.5 (n = 12) %	Normal weight (b) 18.5 ≤ BMI<25 (n = 194) %	Overweight (c) 25 ≤ BMI<30 (n = 155) %	Obese (d) BMI>30 (n = 202) %	Fisher-Freeman-Halton test p-values	Post-hoc Fisher's exact test
Dietary restriction	Any	8.34	14.99	12.25	13.37	.884	–
	Regular	8.34	4.12	3.87	2.97	.579	–
Objective binge episodes	Any	8.34	3.55	6.45	15.35	< .001*	a, b, c < d
	Regular	0.00	1.55	2.58	7.92	.012	–
Self-induced vomiting	Any	8.34	0.52	0.00	0.00	.027	–
	Regular	8.34	0.52	0.00	0.00	.027	–
Laxative misuse	Any	0.00	0.00	0.00	1.14	.364	–
	Regular	0.00	0.00	0.00	0.49	.999	–
Excessive exercise	Any	8.34	7.22	5.81	2.97	.174	–
	Regular	0.00	1.02	1.94	1.00	.753	–

Any occurrence was defined as ≥1 episode in the past 28 days. Regular occurrence of dietary restriction was defined as going for long periods of time (8 h) without eating anything to influence shape or weight for ≥13 days over the past 28 days. Regular occurrence of excessive exercise was defined as exercising in a driven or compulsive way as a means of controlling weight, shape or amount of fat, or burning off calories for ≥20 days over the past 28 days. For all other behaviors (objective binge episodes, self-induced vomiting, and laxative misuse), regular occurrence was defined as ≥4 occurrences over the past 28 days.
* $p < .005$ (after Bonferroni's correction).

and 3.9 % on the Global Score scales. Overall, 7.1 % of participants reported ever being told by a mental health provider or physician that they had an eating disorder, including anorexia nervosa (4.3 %), bulimia nervosa (2.5 %), binge eating disorder (2.1 %), or other/not specified (3.6 %). As shown in Table 3, BMI showed a moderate positive correlation with the EC, WC, SC, and Global Score scales. No significant correlation between BMI and the Restraint subscale was observed. EDE-Q descriptive statistics by BMI category are shown in Tables 4 and 5.

Any occurrence and regular occurrences of key ED behavioral features and compensatory behaviors are presented in Table 2. Approximately 9% of participants reported at least one episode of objective binge eating each week during the previous 28 days; almost 14 % reported at least one weekly episode of dietary restriction in the past 4 weeks. Purging methods (*i.e.*, self-induced vomiting and laxative misuse) were rarely reported. Five percent of the participants reported excessive exercise at least once a week in the previous 28 days.

4. Discussion

We report descriptive statistics of eating disorder attitudes and prevalence of disordered eating behaviors as measured by the EDE-Q among cisgender lesbian women. To our knowledge, this is the first study to report these descriptive data, as prior studies did not address sexual orientation and enrolled samples presumed to be predominantly cisgender heterosexual women (Darcy et al., 2013; Luce et al., 2008; Mond et al., 2006; Quick & Byrd-Bredbenner, 2013; Rø et al., 2010).

We found that the highest subscale scores were for WC and SC, similar to findings in other populations including adult (presumably cisgender predominantly heterosexual) women 18–42 years (Mond et al., 2006), undergraduate (presumably cisgender predominantly heterosexual) women (Luce et al., 2008), and cisgender gay men (Nagata et al., 2020). Given that 63.4 % of our sample had a BMI classified as overweight or obese as well as the presence of weight stigma in society (Wu & Berry, 2018), WC and SC may be normalized in this population. Although we found that BMI was associated with WC and SC, it was not associated with Restraint. This contrasts with findings in other populations, in which BMI was found to be associated with higher EDE-Q Restraint subscale scores (and all subscale scores) among (presumably cisgender predominantly heterosexual) women in Norway (Rø, Ø, Reas, & Rosenvinge, 2012), undergraduate (presumably cisgender predominantly heterosexual) men (Lavender et al., 2010), cisgender gay men (Nagata et al., 2020a), and transgender men and women (Nagata et al., 2020b).

Prior studies have shown significant weight misperception, or mismatch, between an individual's measured and self-reported weight status in sexual minority women (Hadland, Austin, Goodenow, & Calzo, 2014; Yean et al., 2013). Body dissatisfaction studies in lesbian compared to heterosexual women had mixed findings; some have found lower (Hadland et al., 2014), higher (Mor et al., 2015), and no difference (VanKim et al., 2016; Yean et al., 2013) in body satisfaction. SC among cisgender lesbian women may be driven by a greater desire for muscularity compared to their heterosexual counterparts (Meneguzzo et al., 2018). Minority stress (Meyer, 2003) may also contribute to high levels of attitudinal ED symptomatology among lesbian women.

We also reported disordered eating behaviors among cisgender lesbian women. We found that approximately 14 % of cisgender lesbian women reported any occurrence of dietary restriction. One Australian study reported that 19 % of (presumably cisgender)

lesbian women reported dietary restriction by cutting out meals (Polimeni, Austin, & Kavanagh, 2009). Cisgender lesbian women reported any (10 %) and regular (4%) occurrence of objective binge episodes, and low rates of purging.

This study had several limitations. A convenience sample recruited online may limit generalizability. For the purposes of this study, we combined cisgender women who identified as lesbian, gay, or same-gender loving, which may have obfuscated possible differences in ED symptomology across these groups. Our sample was highly educated and mostly White; descriptive data may not be representative of all cisgender lesbian women in the US. Prior qualitative research showed that body image among lesbian women is not a unidimensional construct or universally experienced; it is based on the complex intersection of multiple identities, including, but not limited to, race/ethnicity, socioeconomic status, age, and other factors (Pitman, 2000). Individuals with more health problems may be more likely to participate in health studies (Ullemar et al., 2015), which could lead to selection bias. The EDE-Q is based on self-report, which may be subject to reporting bias. In the absence of an empirical clinical cut-off value in this population, a cut-off score of ≥4 was based on previously reported methodology (Lavender et al., 2010; Luce et al., 2008). Future research could incorporate clinical interviews to develop appropriate clinical cut-offs in cisgender lesbian women and examine the EDE-Q factor structure in this population.

To our knowledge, the EDE-Q has not been validated specifically in cisgender lesbian women. Prior studies in sexual minority women (including lesbian and bisexual women) have shown adequate internal consistency of the EDE-Q, but not full validation (Convertino, Gonzales, Malcarne, & Blashill, 2019). Given that the original four-factor EDE-Q structure of the EDE-Q has not consistently been replicated in subsequent studies across populations, the four-factor structure may not replicate among cisgender lesbian women, potentially decreasing its utility. Nonetheless, this legacy instrument is widely used by clinicians and researchers, and this descriptive study will aid interpretation of this measure among cisgender lesbian women.

Given that sexual orientation health disparities are increasingly recognized, establishing descriptive data about eating disorders and behaviors for cisgender lesbian women may enable clinicians and researchers to interpret EDE-Q scores among this understudied population. In addition, understanding the prevalence of disordered eating behaviors may be of benefit to the lesbian community. Future research could correlate the EDE-Q to eating disorder pathology among clinical samples of cisgender lesbian women with diagnosed eating disorders and examine the EDE-Q in bisexual women or other sexual minority groups.

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CRediT authorship contribution statement

Jason M. Nagata: Conceptualization, Formal analysis, Methodology, Writing - original draft, Writing - review & editing. **Stuart B. Murray:** Conceptualization, Writing - original draft, Writing - review & editing. **Annesa Flentje:** Conceptualization, Methodology, Writing - review & editing. **Emilio J. Compte:** Formal analysis, Methodology, Writing - original draft, Writing - review & editing. **Rebecca Schauer:** Writing - original draft, Writing - review & editing. **Erica Pak:** Writing - original draft, Writing - review & editing. **Matthew R. Capriotti:** Conceptualization, Methodology, Writing - review & editing. **Micah E. Lubensky:** Conceptualization, Methodology, Writing - review & editing. **Mitchell R. Lunn:** Conceptualization, Methodology, Writing - review & editing. **Juno Obedin-Maliver:** Conceptualization, Methodology, Writing - review & editing.

Declaration of Competing Interest

Dr. Juno Obedin-Maliver has consulted for Sage Therapeutics (5/2017) in a one-day advisory board, Ibis Reproductive Health (a non-for-profit research group 3/2017-5/2018), and Hims Inc. (2019 - present). None of these roles present a conflict of interest with this work as described here. The other authors have no competing interests to declare.

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