



ORIGINAL

Self-reported Sexual Response in Transgender Women to Audiovisual Stimulation Protocol¹

Autoinforme de Respuesta Sexual en Mujeres Transgénero ante un Protocolo de Estimulación Audiovisual

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Abstract

Sexuality changes associated with the medical transition in transgender women are not well known; the few studies present discrepancies in labeling their sexual orientation and controlling surgery conditions. This study aimed to evaluate the self-reported sexual response to audiovisual sexual stimulation protocol in androsexual transgender women on hormone replacement therapy. This study also evaluated their sexual functioning to support the empirical protocol. Participated androsexual transgender women with (n = 16) and without hormone therapy (n = 15) in a non-sex reassignment surgery condition. Androsexual cisgender men (n = 25) and women (n = 24) also were included as contrast groups. All participants were assessed with the Short Form of the Changes in Sexual Functioning Questionnaire; then watched video clips with neutral and sexual content and informed their sexual responses through two self-report scales adapted from the Film Scale. The results showed trans women with hormone therapy, compared to trans women without treatment, experienced a less selective sexual response to sexual stimuli. Also, they registered the lowest scores for every sexual functioning except for pleasure. In conclusion, transgender women on hormone therapy without sex reassignment surgery showed fluidity in their self-reported sexual response and reduced sexual functioning.

Keywords: Transgender; Hormonal replacement; Sexual arousal; Androsexual; Sexology

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Resumen

Poco se conoce de los cambios en la sexualidad de las mujeres transgénero que se encuentran bajo un proceso de transición médica. El objetivo de este estudio fue evaluar el autoinforme de la respuesta sexual de las mujeres transgénero bajo terapia hormonal y sin cirugía de reasignación de sexo ante un protocolo de estimulación sexual audiovisual, así como el funcionamiento sexual general para robustecer los resultados del protocolo. Participaron mujeres transgénero sin cirugía de reasignación de sexo con ($n = 16$) y sin terapia hormonal ($n = 15$), así como hombres ($n = 25$) y mujeres ($n = 24$) cisgénero como grupos de contraste. Todas las personas que participaron reportaron una atracción androsexual. Se evaluaron con la Versión Abreviada del Cuestionario de Cambios en el Funcionamiento Sexual, posteriormente observaron videos con contenido neutro y actividad sexual entre dos mujeres, dos hombres y entre mujer y hombre, y reportaron su respuesta sexual a través de dos escalas de autoinforme adaptadas de la *Film Scale*. Los resultados mostraron que las mujeres trans bajo terapia hormonal, a comparación de las mujeres trans sin tratamiento, tuvieron una respuesta sexual menos selectiva, aunque esta fue similar a la de las mujeres cisgénero, además puntuaron más bajo para todos los rubros del cuestionario de funcionamiento sexual, excepto para el placer. En conclusión, las mujeres transgénero en terapia hormonal muestran fluidez en su respuesta sexual autoinformada, así como una disminución en el funcionamiento sexual. Estos datos pueden ofrecer un entendimiento más amplio del tratamiento médico y psicológico, con la finalidad de mejorar la atención a la población trans.

Palabras Clave: Transgénero; Reemplazo hormonal; Excitación; Androsexualidad; Sexología

Gender identity refers to the subjective sense of one's gender (Price & Skolnik, 2017). We recognize "cisgender" or "cis" people as those who internally identify with the externally determined cultural expectations of behavior and roles considered appropriate for one's sex (American Psychological Association [APA], n.d.). On the other hand, a "transgender" or "trans" person is uncomfortable with the assigned gender and moves from one gender category to another (Kessler & McKenna, 2000). The term "transsexual" is largely outdated and should be used only for individuals who specifically claim it (APA, 2020).

Some trans women (person who was assigned male at birth but whose gender identity is female) make changes to their bodies by means of hormone replacement therapy to feminize secondary sexual characteristics (APA, 2011; Dahl et al., 2015) through two physiological mechanisms: 1) Progressively reducing the levels of endogenous hormones (i.e. testosterone) through cyproterone acetate or spironolactone, which inhibits androgen secretion and the binding of androgen with its receptor; 2) Replacing endogenous hormone levels with those of the reassigned sex by oral, parenteral, or transdermal estrogen administration (Hembree et al., 2017).

In addition to bodily changes, hormone therapy has consequences for emotions (Chen et al., 2023), cognition (Orozco-Calderón et al., 2011; Schöning et al., 2010), and sleep (Barrón-Velázquez et al., 2015). However, it should be noted that studies on the sexuality of transgender women on hormone therapy are scarce.

The few studies on the sexuality of trans women frequently present discrepancies in categorizing their sexual orientation (physical, romantic, and emotional attraction to another person) (APA, 2011). Some authors have taken chromosomes and genitalia as a reference to label sexual orientation (Blanchard, 1989), which could be discriminatory because the trans population should be recognized by their gender identity (APA, 2011).

Behavioral sciences have developed two alternative categories for describing sexual attractions: 1) androsexual or androphilic to designate the predominant sexual attraction and arousal to adult males; 2) gynesexual or gynephilia to denote the sexual attraction and arousal to adult females (Vasey & VanderLaan, 2014). These terms do not define a person's gender as the words "lesbian" or "gay" do. Therefore, it is

irrelevant whether you are male or female, trans or cis; what matters is the person you are attracted to.

The previous discussion may be related to the lack of research concerning the sexuality of trans women under medical transition with hormone replacement therapy. The limited research available has employed interviews and questionnaires to obtain relevant information about how exogenous hormones affect sexual orientation (Auer et al., 2014; Daskalos, 1998), and negatively impact sexual functioning stages such as sexual contact, orgasm (Kerckhof et al., 2019), and sexual desire (Wierckx, van Caenegem, et al., 2014); however, these techniques do not provide input about the response to an actual stimulus.

As an alternative to psychometric evaluations, there are protocols in which initial phases of the human sexual response, such as sexual arousal and genital response, can be triggered by exposure to sexual stimuli of different sensory modalities (Dawson & Chivers, 2018; Handy et al., 2018). Video clips with erotic content are the stimuli that generate the highest sexual arousal under laboratory conditions (Julien & Over, 1988) using an experimental protocol known as Audiovisual Sexual Stimulation (AVSS). The advantage of this protocol is to systematize and control the external variables during sexual arousal to a real stimulus. The sexual response can be measured through self-reported sexual arousal and perceived genital response by scales (Chivers, 2005).

The few studies implementing AVSS protocols with trans women (Brotto et al., 2005; Chivers et al., 2004; Lawrence et al., 2005) have evaluated the sexual response after the sex reassignment surgery (SRS), and therefore it is not possible to distinguish between the possible effect of hormone therapy and that of surgery on the sexual response.

As a result of scarce research in which an AVSS protocol was conducted in trans women with hormone therapy and without SRS, we only found two classic papers over the last 40 years. In Barr's study (1973), the sexual attraction of trans women was not controlled, which means that the results of the contrasts are unclear. Besides, there was no group of trans women without estrogens to control the effect of hormone replacement therapy. In the second

AVSS study (Kwan et al., 1985), seven trans women alternately administered estrogens or placebos participated; however, the results are unclear because of the reduced number of participants, the unreported participants' sexual attraction, and the undescribed content of the videos.

A more recent study found that trans women assessed with the International Affective Picture System, after one month of hormone therapy, decreased their emotional valence response to sexual pictures and decreased the use of different emotional valence gradients (pleasant-unpleasant) to qualify non-sexual stimuli, similarly to cisgender women pattern of emotional response (Orozco-Calderón et al., 2009). Although this study didn't use an AVSS protocol and did not determine the sexual orientation of the participants, it is a precedent that may indicate that hormonal treatment may be a factor that assimilates the response of transgender women with the response of cisgender women to visual stimuli.

Based on all previously stated, this study aims to evaluate the self-report of sexual response to AVSS protocol in transgender women on hormone replacement therapy. Likewise, this study seeks to evaluate different areas of the sexual functioning of transgender women to support the empirical phase. We have hypothesized that: 1) The sexual response of transgender women taking hormone therapy is decreased in the presence of audiovisual sexual stimuli. 2) The sexual response to AVSS protocol is similar between transgender women on hormone therapy and cisgender women because they share the same gender identity. 3) Sexual functioning is negatively affected in transgender women using hormone therapy. The study on the influence of gender identity and the content of the sexual stimuli on sexual response is exploratory, so we did not hypothesize specific outcomes.

Method

Participants

Two non-probability sampling methods were used: convenience and snowball sampling. Transgender

and cisgender participants were recruited via social media, online support groups for LGBTQIA+ and activist groups. The inclusion criteria were as follows: (a) present exclusively or mostly sexual attraction towards men (androsexual attraction); (b) with normal or corrected vision and (c) between the ages of 18 to 55 years, an interval in which sexual frequency is keeping high (Aggarwal, 2013). The exclusion criteria were as follows: (a) having a history of neurological damage; (b) trans women with previous hormonal treatments; (c) using antidepressant medication, oral contraceptives, and history of drug abuse and (d) a diagnosis of major depression and severe generalized anxiety, since both disorders may be associated with sexual dysfunction (Rajkumar & Kumaran, 2015).

A power analysis was used to determine a sample size of at least 15 participants per group for a split plot design. It was estimated an average effect size $f = 0.21$; alpha was set at .05 and power ($1 - \beta$) at 0.90. The initial sample consisted of 104 participants; everyone who failed to meet the inclusion criteria and all those who requested it ($n = 24$) were excluded from the analysis. The final sample consisted of 80 people distributed in four groups. Two transgender groups with no SRS: 15 trans women (age $M = 31.4$, $SD = 6.4$) without hormonal therapy (-HT) and 16 trans women (age $M = 35.7$, $SD = 9.2$) with hormonal therapy (+HT). Two cisgender groups: 25 cis men (age $M = 26.4$, $SD = 5.0$) and 24 cis women (age $M = 25.5$, $SD = 3.5$).

Trans women on hormone therapy who decided to participate voluntarily were patients from transgender health clinics in Mexico City. The 16 trans women +HT were on estrogen prescription with estradiol. Two routes of administration were reported: 75 % of the trans women +HT ($n = 12$) were on oral estradiol valerate (2 mg/day), and the other 25 % ($n = 4$) were on transdermal Ethinylestradiol treatment (20-50 $\mu\text{g}/\text{day}$). The different routes of administration employed were due to the requirements and medical history of the participants. Also, most of them ($n = 12$; 75%) were under progestogens with antiandrogen activity of androgen blockers (spironolactone 100 mg/day). All participants had been on hormone therapy for more than three months. None of the trans women

without hormone therapy had previously been under any treatment with estrogens or antiandrogens.

All participants signed an informed consent form prior to participating, and their well-being, dignity, integrity, right to self-determination, privacy, and confidentiality of personal information were safeguarded in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki. Also, this study was approved by the Ethics Committee of the Master and Doctoral Program of Psychology at National Autonomous University of México (UNAM).

Audiovisual stimuli

There is no standardized base of audiovisual erotic stimuli; therefore, we conducted a careful and systematic selection of video clips from commercial adult films. The videos' length and content were based on the meta-analysis by Chivers et al. (2010). The videos were rated in a pilot study by cisgender men, cisgender women, and transgender women to demonstrate their capability to elicit sexual arousal and positive emotions following the study description by Janssen et al. (2003).

The chosen videos were classified into four types of content: 1) Female-Female, sexual activity between two cisgender women; 2) Female-Male, sexual activity between a cis woman and a cis man; 3) Male-Male, sexual activity between two cisgender men and 4) Neutral, stimuli where cisgender men appeared performing activities without sexual content such as sports, giving an interview or explaining a topic. Even though all participants reported androsexual attraction, video clips with the exclusive presence of women were included to identify a probable sexual fluidity.

We obtained a total of twelve stimuli, three for each category, and they were edited by iMovie version 10.1.8 to shorten their length to 5 minutes. Likewise, the loudness was normalized with the iZotope RX 5 software. The video clips were displayed on the computer in which they were acquired, respecting the copyright by not marketing, redistributing, and projecting the complete material to third parties.

Measures

Demographics and gender identity. A questionnaire designed by the author was administered to obtain demographic characteristics regarding age, gender, education, occupation, and employment. We confirmed sexual orientation and gender identity and discarded neurological damage, the use of antidepressant medication, oral contraceptives, and a history of drug abuse by clinical interview. The results were only used to determine exclusion criteria.

Depression and anxiety. We used to rule out severe symptoms the standardized Beck Depression Inventory, IA (BDI-IA) for the Mexican population. This instrument has a reliability of Cronbach's alpha = 0.87; it has been validated by expert judges, and it also has concurrent validity with the Zung Depression Scale $r = 0.70$ (Jurado et al., 1998). For anxiety, the standardized Beck Anxiety Inventory (BAI) for the Mexican population was used. It has a reliability of Cronbach's alpha = 0.83 and a high test-retest reliability coefficient $r = .75$ (Robles et al., 2001). The results were only used to determine exclusion criteria.

Self-report of sexual response. The participants answered on a scale of 1 (*no response*) to 9 (*high response*) with no pictographic orientation to the questions "How sexually aroused did you feel?" and "How intense was your genital response?" for every sexual stimulus. These scales were adapted from the Film Scale, used in more than 200 sexuality studies since its introduction in 1983, and frequently adapted to meet the needs of a given study (Handy et al., 2018). The continuous lever was not employed to measure self-report because its use may decrease the experience of sexual arousal (Wincze et al., 1980).

Short Form of the Change in Sexual Function Questionnaire (CSFQ-14). Its five scales include: a) Desire/Frequency, a 2-item scale that assesses the frequency of sexual acts and the frequency of desire to participate in sexual activity; b) Desire/Interest, a 3-item scale that assesses interest and desire for sexual experiences expressed as thoughts or fantasies and feelings of enjoyment elicited by erotica; c) Arousal/Excitement, a 3-item scale that assesses the

frequency of arousal, ease of arousal, and adequate vaginal lubrication/penis erection during sexual activity; d) Orgasm/Completion, a 3-item scale that assesses the frequency of orgasms, ability to achieve orgasms when desired, and the degree of pleasure derived from orgasm; and e) Pleasure, a single item that assesses current enjoyment of sex life. The overall scores are between 14-70, and the normal scores from 47-70 for men and 41-70 for women (Keller et al., 2006). The Spanish language version of CSFQ has a reliability of Cronbach's Alpha = 0.80 and a test-retest reliability coefficient $r = .90$. Regarding the construct validity, factor analysis explains 82.6 % of the variance in the case of males and 77.6 % for women (Bobes et al., 2000). This questionnaire has been administered to the Mexican population in a previous study (Cabada-Ramos et al., 2011).

Procedure

After reading the informed consent form, they received a signed copy. Then, a clinical interview and the application of demographics and CSFQ-14 instruments were employed. People who fulfilled the inclusion criteria participated in the AVSS protocol. The participants sat in front of a 33 x 22 cm rectangular monitor at a 50 centimeters distance, and they were fitted with headphones. The stimuli were shown randomly and counterbalanced by Psychopy version 3.0.3 (Peirce, 2007) to avoid bias because of the order of presentation; the participants had 30 seconds to answer the evaluation scales between each video using the computer keyboard. The watching and listening of the stimuli were conducted in a closed and silent room with absolute privacy. Participation in the study concluded at the end of the experimental phase, and trans women received financial support to cover their transportation costs.

Analytic plan

We obtained the average score per participant for each stimulus category from the self-report of sexual

arousal and the self-report of the genital response. A 4 (fixed factor gender: cis men, cis women, trans women -HT, and trans women +TH) x 4 (repeated factor audiovisual sexual stimulation: neutral, female-female, male-female, and male-male) two-way mixed ANOVA was performed to compare the groups, the stimuli, and interactions for self-report of sexual arousal. A second two-way mixed ANOVA was conducted on the self-report of genital response analysis. The one-way ANOVA tests were employed to follow up the interaction between factors. The CSFQ-14 results were analyzed with the Kruskal-Wallis test to identify differences between groups in each questionnaire scale, whereas a simple ANOVA test was used for the total score. The Bonferroni correction test was used for the multiple comparisons, with a statistically significant level set as $p < 0.05$. The normal distribution was controlled by the Shapiro-Wilk test.

Results

Self-report of sexual arousal and genital response

Data from self-reported sexual arousal was analyzed by a two-way mixed ANOVA. Mauchly's test for repeated measures variable indicates the sphericity assumption, $W = 0.966$, $\chi^2(5) = 2.550$, $p = 0.769$. The results showed that there was no significant main effect for Gender, $F(3,76) = 1.711$, $p > 0.05$, $\eta^2 = 0.063$. Nonetheless, the analysis revealed a main effect for the Audiovisual Sexual Stimulation repeated factor, $F(3,228) = 104.589$, $p < 0.001$, $\eta^2 = 0.579$. Post-hoc multiple comparisons using the Bonferroni correction test indicated no differences between Female-Male ($M = 5.0$, $SE = 0.23$) and Male-Male ($M = 5.66$, $SE = 0.25$) stimulus but both were scored higher than the Female-Female ($M = 3.53$, $SE = 0.23$) and Neutral stimulus ($M = 1.26$, $SE = 0.07$).

Also, the analysis revealed an interaction between gender and audiovisual sexual stimulation, $F(9,228) = 10.348$, $p < 0.001$, $\eta^2 = 0.290$. There were statistically significant differences in the Fe-

male-Female stimulus, $F(3,76) = 6.625$, $p < 0.001$, $\eta^2 = 0.207$. Bonferroni adjustment test revealed trans women -HT scored significantly lower than cis women, but between trans women +HT and cis women there were no differences for the same stimulus. For the Female-Male video clips $F(3,76) = 5.284$, $p = 0.002$, $\eta^2 = 0.173$, trans women +HT self-reported lower sexual arousal than cis women, meanwhile arousal ratings of trans women -HT did not show differences with the ratings of the cis women group. For the Male-Male stimulus, $F(3,76) = 7.963$, $p < 0.001$, $\eta^2 = 0.239$, all three groups of women (trans +HT, trans -HT, and cis) reported similar arousal compared to each other but lower than the cisgender men group. There were no statistically significant in the Neutral stimulus, $F(3,76) = 1.091$, $p = 0.358$, $\eta^2 = 0.041$ (see Figure 1).

The differences between stimuli within each gender group revealed that trans women -HT reported greater arousal for the Female-Male and Male-Male stimulus than Neutral. The trans women +HT and cisgender women reported a higher sexual arousal for all three sexual stimuli than Neutral; however, trans women +HT scored similarly in the three video clips with sexual content, whereas cis women scored higher in the Female-Male than the other sexual stimuli. For cisgender men, the Male-Male video clips generated the highest level of arousal. All the differences were with a statistical significance of $p < 0.001$ (see Table 1).

For the data analysis from self-report of genital response, a two-way mixed ANOVA was used too. For repeated measures variable, the sphericity was assumed by Mauchly's test, $W = 0.959$, $\chi^2(5) = 3.089$, $p = 0.686$. There was a significant main effect of Gender, $F(3,76) = 4.226$, $p = 0.008$, $\eta^2 = 0.143$. The post-hoc comparison using the Bonferroni correction test showed that regardless of the type of stimulus, cis women ($M = 4.07$, $SE = 0.24$) self-reported a higher genital response than trans women + TH ($M = 2.81$, $SE = 0.30$). No differences between cis men ($M = 3.43$, $SE = 0.24$), trans women -HT ($M = 3.0$, $SE = 0.31$), and the other groups were found. Additionally, there was a significant main effect for Audiovisual

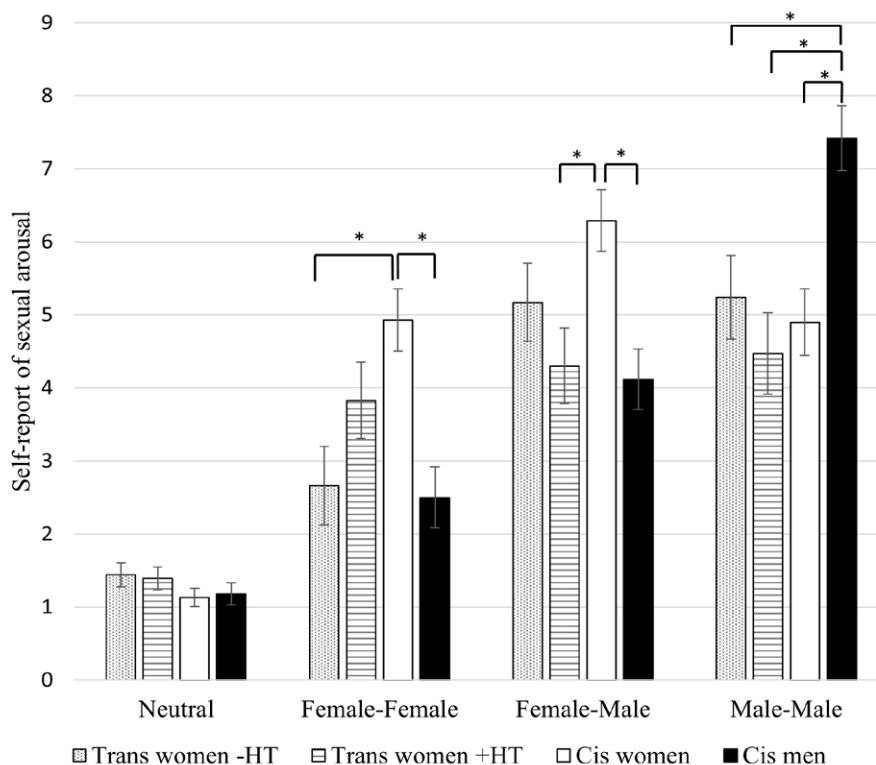


Figure 1. Interaction between gender and audiovisual sexual stimulation in the self-report of sexual arousal. Error bars represent standard errors of the mean. The asterisks indicate significant differences between conditions. * $p < 0.05$

Sexual Stimulation, $F(3,228) = 93.302, p < 0.001, \eta^2 = 0.551$. Female-Male ($M = 4.30$ SE = 0.23) and Male-Male ($M = 4.90$ SE = 0.24) stimuli elicited a higher score in the self-report of genital response than the Female-Female ($M = 2.98$ SE = 0.22) and Neutral ($M = 1.12$ SE = 0.43) stimuli.

There was also an interaction between gender factor and audiovisual sexual stimulation for self-report of genital response, $F(9,228) = 14.007, p < 0.001, \eta^2 = 0.356$. There were significant differences for Female-Female $F(3,76) = 8.343, p < 0.001, \eta^2 = 0.248$, Female-Male $F(3,76) = 8.407, p < 0.001, \eta^2 = 0.249$, and Male-Male stimuli $F(3,76) = 11.618, p < 0.001, \eta^2 = 0.314$; however, one-way ANOVA did not show statistical significance for neutral stimulus $F(3,76) = 2.491, p = 0.067, \eta^2 = 0.090$. The differences between stimuli within each gender group were the same as those found in the self-report of sexual arousal (see Table 1).

Short Form of Change in Sexual Function Questionnaire (CSFQ-14)

Cronbach's Alpha test was run to measure the internal consistency of the CSFQ-14 in the study. The questionnaire consisted of five scales and was found to be highly reliable (14-items; $\alpha = 0.88$). This result allows us to use data to analyze differences between the groups.

The Kruskal-Wallis test was used to analyze the differences between the groups in each scale of the questionnaire. The results indicate that trans women +HT reported the lowest score compared to both cisgender groups and trans women -HT group in the Desire/Interest scale. Likewise, trans women +HT again scored lower than cis men and cis women, but not against trans women -HT in Orgasm/Completion and Arousal/Excitement scales. Trans women +HT also had the lowest score on the De-

Table 1

Analyses for the interaction of gender groups and audiovisual sexual stimuli. Pairwise multiple comparisons among stimuli within each group

Groups	Audiovisual sexual stimuli				F(3, 42)	η^2
	Neutral	Female-Female	Female-Male	Male-Male		
Self-report of Sexual arousal						
Trans women -HT	1.4 (0.1) ^a	2.6 (0.5) ^a	5.1 (0.5) ^b	5.2 (0.5) ^b	18.330***	0.567
Trans women +HT	1.3 (0.1) ^a	3.8 (0.5) ^b	4.3 (0.5) ^b	4.4 (0.5) ^b	9.253***	0.382
Cis women	1.1 (0.1) ^a	4.9 (0.4) ^b	6.2 (0.4) ^c	4.9 (0.4) ^b	54.671***	0.704
Cis men	1.1 (0.1) ^a	2.5 (0.4) ^b	4.1 (0.4) ^c	7.4 (0.4) ^d	81.916***	0.773
Self-report of Genital response						
Trans women -HT	1.3 (0.1) ^a	2.1 (0.5) ^a	4.3 (0.5) ^b	4.1 (0.5) ^b	13.676***	0.494
Trans women +HT	1.1 (0.1) ^a	3.0 (0.4) ^b	3.4 (0.5) ^b	3.6 (0.5) ^b	9.580***	0.390
Cis women	1.0 (0.1) ^a	4.6 (0.4) ^b	6.0 (0.4) ^c	4.6 (0.4) ^b	44.507***	0.659
Cis men	1.0 (0.1) ^a	2.0 (0.3) ^b	3.3 (0.4) ^c	7.1 (0.4) ^d	90.796***	0.791

Note: The means (and standard errors) with different superscripts letters are significantly different at the $p < 0.05$ by Bonferroni correction test. *** $p < 0.001$

Table 2

Results from Kruskal-Wallis test for each scale of the Shortened Version of Change in Sexual Function Questionnaire

Scales	Cis men	Cis women	Trans women -HT	Trans women +HT	$\chi^2(3)$	
Pleasure	3.1 (0.8)	3.6 (0.9)	3.2 (1.0)	3.0 (1.3)	3.964	0.05
Desire/Frequency	8.0 (1.2) ^b	7.6 (1.0) ^{ab}	7.6 (1.9) ^{ab}	6.2 (1.6) ^a	11.746*	0.15
Orgasm	12.1 (1.5) ^{bc}	11.3 (2.2) ^{bc}	10.7 (2.3) ^{abc}	8.6 (2.7) ^a	17.062***	0.22
Desire/Interest	11.4 (2.0) ^b	10.8 (1.7) ^b	11.0 (2.5) ^b	7.8 (3.3) ^a	13.851*	0.18
Arousal	13.8 (1.3) ^{bc}	12.1 (1.6) ^{bc}	10.8 (3.4) ^{abc}	7.8 (3.4) ^a	32.310***	0.41

Note: The means (and standard errors) with different superscripts letters are significantly different at the $p < 0.05$ by Bonferroni correction test. * $p < 0.05$. *** $p < 0.001$

sire/Frequency scale but only statistically significant compared with cisgender men. Trans women -HT and cis women only had lower scores than cis men on Arousal/Excitement scale. There were no differences between the groups for the Pleasure scale (see Table 2).

A simple ANOVA was used to analyze the Total Score, and the results showed significant differences, $F(3,76) = 16.777$, $p < 0.001$, $\eta^2 = 0.398$. Post-hoc multiple comparisons using the Bonferroni correction test indicated that Trans women +HT ($M = 35.6$, $SE = 6.0$) reported significantly low score compared with cis men ($M = 51.2$, $SE = 5.6$), cis women ($M = 49.0$, $SE = 5.0$), and trans women -HT ($M = 46.2$, $SE = 9.0$).

Discussion

The present study revealed that regardless of the given type of stimulus, trans women +HT scored lower self-reported genital response than the other groups. In a previous study, half of the trans women under hormone therapy also showed a decreased sexual response to erotic films, but counterintuitively, the other 50 % had an increased response (Kwan et al., 1985). Our research supports the idea that trans women on hormone therapy may experience their genital responses decreased while they are exposed to sexual stimuli.

The previous results indicate that hormone therapy may be a reason for reduced general genital response because it has been shown in cis men that androgen

deprivation can cause atrophy in penile tissue which impedes the anatomical and physiological capacity of erection (Gooren & Saad, 2006). However, sexual arousal was unaffected, these findings provide mixed support for the first hypothesis.

Additionally, we found that audiovisual sexual stimuli that generated the highest scores in both kinds of self-reported responses were those with the male presence, either maintaining sexual contact with a woman or another man. The previous outcome was expected because all groups reported androsexual attraction. Related to the above, the cis men group rated male-male videos higher than other sexual stimuli; meanwhile, the three groups of women (trans +HT, trans -HT, and cis) scored similarly to these stimuli but significantly lower compared to cis men. This result contrasts with those of Barr's study (1973), in which the genital response to erotic stimuli with male sequences for the androsexual transgender women and androsexual cisgender men was similar. Nevertheless, the sexual attraction of trans women was not controlled by Barr, making the results from the contrasts unclear.

Besides, some groups responded to stimuli with the exclusive presence of women. Trans women +HT scored higher on both scales for Female-Female stimuli against a Neutral stimulus, even though they were androsexual. Since the previous results were not found in trans women -TH, hormone therapy probably favors self-reported sexual response to stimuli in which exclusively women appear. Our findings support the idea that self-reporting sexual orientation using questionnaires or interviews is not always a predictor of how individuals respond to an actual sexual stimulus. Similar results were found in a previous study implementing AVSS protocol, in which one transgender woman with SRS, reported sexual attraction mainly to men but displayed greater physiological and subjective response to female stimuli than to male stimuli (Lawrence et al., 2005).

The sexual fluidity found in trans women +TH has similarities to cis women who also scored on both self-report scales with a high response to Female-Female stimuli compared to Neutral stimuli supporting our second hypothesis. This sexual fluid-

ity was previously found by Chivers et al. (2004) in an AVSS protocol through physiological measures. Furthermore, there is an extensive study of how cis women experience sexual desire for men and women under some circumstances, regardless of their sexual orientation (Diamond, 2008).

With respect to the above, it has been reported that exogenous administration of estrogens and antiandrogens decreased the brain volume of trans women toward cis women proportions (Pol et al., 2006), which helps explain the similarities between the sexual response of trans +HT and cisgender women. Nonetheless, another explanation could be that bodily transition by itself also affects how trans people experience their sexuality. For example, in a qualitative study, some trans people mentioned that shifting into a more authentic gender identity allowed them to extend their sexual practices and feel more comfortable during sexual intimacy, which, in turn, allowed them to feel attracted to different people regardless of their sexual orientation (Levitt & Ippolito, 2014). As can be seen, we used a multidisciplinary approach to discuss the sexual response of trans women since there are not enough studies in the field of psychology to resort to a unique theoretical model which explains sexual behavior.

Additionally, sexual functioning was assessed by the CSFQ-14 to supplement the AVSS protocol results. The questionnaire showed that trans women +TH scored low on the following functioning scales: Desire/Frequency, Arousal/Excitement, Orgasm/Completion, and Total Score. The outcomes of this study support our third hypothesis. These findings also complement the results of previous research in which trans women on hormone therapy reported diminished sexual desire (Wierckx, van Caenegem, et al., 2014), difficulty with initiating and seeking sexual contact, and difficulty achieving orgasm (Kerckhof et al., 2019).

Even though trans women +HT score a low sexual functioning on CSFQ-14, they responded with a higher level of sexual arousal to the three sexual stimuli than to the neutral stimulus in the AVSS protocol. Once again, we can see evaluation of sexual

functioning through questionnaires and interviews do not always indicate how trans women with hormone therapy will respond to a real stimulus.

Sexual pleasure was the only undiminished sexual function in trans women +HT compared to other groups. If sexual pleasure is not affected, we can infer that this function is not directly related to other sexual functions. These results are consistent with a qualitative study in which trans women on hormone therapy did not report a decline in their sexual desire as discomfort (Wierckx, Elaut et al., 2014). Along with bodily satisfaction, as an outcome of hormone therapy, gender transition is positively correlated with sexual behavior and functioning (Nikkelen & Kreukels, 2018; Weyers et al., 2009). The above indicates more factors involved in sexual satisfaction than just the ones evaluated by CSFQ-14.

This study also revealed that gender identity could be related to sexual activity. Trans women without hormone treatment reported a lower overall score on sexual functioning than cisgender men, maybe due to the lack of any form of body transition when they participated in this study. The above situation can be associated with a degree of body insecurity and gender dysphoria that can difficult physical contact during sexual activity (Doorduyn & van Berlo, 2014; Lindroth et al., 2017). Nonetheless, the total score of trans women -HT was similar to cisgender women; therefore, the total score on CSFQ is in the gender identity range (female) rather than their biological sex range (male). Thus, the sexual functioning of trans women, without hormone therapy, could be understood as normal instead of sexual dysfunction.

Limitations and future directions

In this study, it was not possible to examine the causal relationship between hormone therapy and the sexual response of trans women in the presence of sexual stimuli because we did not implement a clinical trial. However, we found differences in the sexual response between trans women with hormone therapy and the group of trans women without treatment. These outcomes allow us to suggest that estrogens adminis-

tration and testosterone blockers may be playing an important role.

Another limitation of the present work is the absence of a physiological measure of genital response. Vaginal and penile plethysmography would have allowed us to control self-report biases and determine the difference compared to subjective responses; however, this technique is not yet feasible in México, partly because it requires specialized medical staff. We also realized that body satisfaction in trans women is a variable that could influence sexual functioning, so it is important to measure it in future studies. A hormone therapy longitudinal evaluation is also needed to discern between the physiological effects of hormones, social factors, and self-perception.

The development of specific psychological instruments like questionnaires and scales that can evaluate the trans population is necessary too for the following reasons: the existing ones are based on the cisgender population and do not consider the hormone therapy of trans women, are heteronormative, or require that the respondents have a partner (Holmberg et al., 2019).

It is necessary to carry out more sex research because it provides knowledge to develop comprehensive health care, supports training for psychologists and medical staff, and provides aid to anyone who has questions about their sexuality. A systematic review found that only 3.5% of 2.405 studies with trans people focused on their sexuality (Wanta & Unger, 2017), thus, it is important to conduct more research to enhance transgender health care.

Conclusion

The present research shows that transgender women with hormonal therapy self-report a decreased genital response but unaffected sexual arousal to audiovisual sexual stimuli; also, they presented fluidity in their sexual response that could be related to the medical transition. The sexual response to sexual stimuli in transgender women on treatment resembles that of cisgender women who also present fluidity in their sexual attraction. Additionally, out of the stimulation protocol context, transgender women reported an un-

altered experience of sexual pleasure but a decreased overall sexual functioning, including intensity of desire, orgasm, and sexual arousal.

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