

THE IMPACT OF INTEROCEPTIVE AWARENESS ON SEXUAL FUNCTIONING AMONG PORTUGUESE WOMEN

O IMPACTO DA CONSCIÊNCIA INTEROCEPTIVA NO FUNCIONAMENTO SEXUAL ENTRE MULHERES PORTUGUESAS

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ABSTRACT: Research on sexual functioning among women suggests a relation between sexual functioning and interoceptive awareness, or the conscious perception of internal bodily signs. The aim of this study was to assess the impact of interoceptive awareness on sexual functioning among Portuguese women. Hence, 459 Portuguese women, with an average age of 34.57 years ($SD=10.27$), ranging from 18 to 65 years, completed the Multidimensional Assessment of Interoceptive Awareness (MAIA), the Female Sexual Distress Scale–Revised (FSDS-R), and the Female Sexual Function Index (FSFI). The results showed that higher levels of interoceptive awareness were associated with better sexual functioning, less sexual distress, and greater desire for sex with and without intercourse. Higher levels of distress, meanwhile, were related to worse sexual functioning. Using a linear regression model, we found a significant correlation between interoceptive awareness and sexual distress in sexual functioning; the two variables, together, explain 44.8% of sexual functioning of the women who participated in the study. However, only sexual distress was shown to be a significant predictor of the model. Interoceptive awareness can have an influence on sexual functioning in women with or without sexual dysfunction, although it is not an essential predictor.

Keywords: Sexual functioning; Sexual distress; Interoceptive awareness

RESUMO: Investigações sobre funcionamento sexual na mulher sugerem uma relação entre funcionamento sexual e percepção interoceptiva, ou seja, a percepção consciente de sinais corporais internos. O objetivo deste estudo foi avaliar o impacto da consciência interoceptiva no funcionamento sexual de mulheres portuguesas. Assim, 459 mulheres portuguesas, com idade média de 34,57 anos ($DP = 10,27$), variando de 18 a 65 anos, completaram as escalas: *Multidimensional Assessment of Interoceptive Awareness* (MAIA), *the Female Sexual Distress Scale–Revised* (FSDS-R), e a *Female Sexual Function Index* (FSFI). Os resultados mostraram que níveis mais elevados de consciência interoceptiva foram associados a melhor funcionamento sexual, menos *distress* sexual e maior desejo sexual com e sem coito. Níveis mais elevados de *distress* sexual, entretanto, foram relacionados a um pior funcionamento sexual. Usando um modelo de regressão linear, verificou-se uma correlação significativa entre consciência interoceptiva e *distress* sexual no funcionamento sexual; as duas variáveis, juntas, explicam 44,8% do funcionamento sexual das mulheres que participaram do estudo. No entanto, apenas o *distress* sexual se mostrou um preditor significativo do modelo. A consciência interoceptiva pode ter uma influência sobre o funcionamento sexual em mulheres com ou sem disfunção sexual, embora não seja um preditor essencial.

Palavras-chave: Funcionamento sexual; Sofrimento sexual; Consciência interoceptiva

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Several investigations have shown a positive association between interoceptive awareness and sexual functioning (for example, Carvalheira et al., 2017; Costa et al., 2019). Interoception can be defined as the perception of what happens inside one's body (Craig, 2002) including the perception of physical sensations related to the function of internal organs that may remain unconscious. What becomes conscious is interoceptive awareness, and this involves the processing of internal sensations so that they become available for conscious perception (Cameron, 2001). Therefore, interoception is the representation of afferent internal body signals. When people refer to their emotions, they are also resorting to and perceiving internal body sensations, which is necessary to describe their emotions (Nummenmaa et al., 2014).

In addition to the concept of interoceptive awareness, it is essential to refer to the concept of mindfulness, which can be defined as a form of meditation where the objective is to consciously maintain or focus attention on the present moment (Brotto & Goldmeier, 2015), focus on a purpose or goal, and cultivate non-judgmental thinking (Kabat-Zinn, 2003). Mindfulness refers to focus and is usually defined as having complete attention on the experiences occurring in the present moment (Brown & Ryan, 2003). The conceptualization of mindfulness is a multifaceted construct, including describing, acting with awareness, nonjudging, and nonreacting. Thus, interoceptive awareness is a key component of mindfulness (Baer et al., 2006) and there is evidence that the ability to identify signals in the body itself is essential for mindfulness (Gibson, 2019). Mindfulness has been associated with reduction of psychological distress (Kiken & Shook, 2012) and mindfulness-based cognitive-behavioral therapy (MBCT) has had effective results in reducing symptoms of major depressive disorder and anxiety disorders (Brotto, 2011). Mindfulness seems to be able to improve women's sexual functioning by focusing attention on sexual stimuli and increasing sexual response (Brotto et al., 2016)

A review of the literature reveals significant evidence of the importance that awareness of bodily signals can have in sexual functioning. According to Barlow's (1986) model of sexual dysfunction, attention focused on sexual stimuli can increase subjective arousal and positive affect. On the other hand, a shift in attention to internal stimuli or critical sexual thoughts can lead to decreased sexual arousal. In this sense, subjective perception/assessment provides emotional meaning to a given stimulus, with consequences for physiological and sexual responses. Individuals with sexual dysfunction will have a decreased focus on erotic and genital cues and a greater attention to non-erotic cues, which include negative or inappropriate thoughts about sexual activity (Cacioppo et al., 2000). According to Basson (2000), the female sexual response is motivated both biologically and through mental and non-sexual factors, which include emotional needs, acceptance, and affection. The author argues that these psychological and non-sexual factors tend to be greater drivers for arousal and orgasm, in relation to biological drives. For Basson, subjective arousal and genital arousal are related in a complex way, the former may or may not be accompanied by genital or non-genital arousal perceptions. In addition to genital awareness, it may or may not be perceived as an erotic stimulus. In women's sexual arousal, subjective arousal and genital arousal may not be simultaneous (Basson, 2000). The incentive motivation model presented by Toates (2009), argues that sexual arousal arises in response to a set of incentives or cues, influenced by biological and psychological factors. According to the model, sexual behavior elicits positive feedback by increasing motivation and negative feedback through orgasm and ejaculation, which induces satiety and strengthens the power of future incentives. This process can be implicit and explicit: the implicit pathway (unconscious sexual stimulus) can trigger genital changes, while the explicit pathway assumes a conscious application of a sexual meaning to a stimulus, with subjective arousal occurring. Information about the consequences of genital reactions and changes (presence or absence of subjective arousal, among others) affect future sexual motivation (Toates, 2009).

Sexual arousal, and sexual desire, in women may appear to be lower than in men, as women may be less aware of their genital responses; that is, less aware of their sexual response. Furthermore, the willingness to express sexual desire in women is inhibited by social/cultural restrictions, along with

negative attitudes towards their sexuality. However, low sexual desire or low awareness of genital responsiveness will not be an accurate indication that a woman is unable to respond to sexual stimuli with effective genital sexual arousal (Leiblum & Chivers, 2007). Men and women are different in terms of motivations or factors relevant to sexual response (Bossio et al., 2014). Therefore, this study focuses only on the female gender.

Several studies show positive effects of mindfulness among sexually dysfunctional women: namely, improvements in overall sexuality and, consequently, in overall quality of life (Brotto & Heiman 2006); improvements in sexual satisfaction, mood and quality of life (in women with a history of sexual abuse) (Brotto et al., 2008); improvement in sexual distress, with a significant decrease in sexual suffering (Brotto et al., 2012a); improvements in all dimensions of the sexual response cycle (Brotto et al., 2012b); benefits with respect to genital pain (with vestibulodynia), with increased quality of life (Brotto et al., 2013; Brotto et al., 2015); and improvements in depressed mood, in addition to sexual functioning (Paterson et al., 2016). Among sexually functional women (in non-clinical samples), mindfulness has also proved to be beneficial. Women who have entered mindfulness training have improved their ability to perceive physiological responses to sexual stimuli (improved interoceptive awareness), as well as attention to clinical symptoms (psychological barriers to healthy sexual functioning) (Silverstein et al., 2011). Also, higher levels of mindfulness were associated with higher levels of sexual satisfaction (both in terms of personal sexual experiences and sensations, as well as in sexual partner reactions and both frequency and variety of sexual experiences) and less cognitive distraction during sexual activity (due to concerns about appearance, performance issues and day-to-day distractions). Women who reported lower levels of cognitive distraction during sexual interaction reported higher levels of sexual satisfaction, since cognitive distraction mediated the association between mindfulness and sexual satisfaction (Newcombe & Weaver, 2016). Having disturbing thoughts about one's own body or performance during sexual activity is related to reduced sexual functioning and satisfaction (Purdon & Holdaway, 2006). Furthermore, mindfulness can affect genital and subjective sexual arousal differently (Velten et al., 2020). Carvalheira et al. (2017) showed that women who had no sexual difficulties had significantly greater body awareness compared to women with sexual difficulties, regardless of whether or not they lacked sexual interest or arousal, and had significantly lower body awareness and significantly higher body dissociation. Additionally, a Portuguese study concluded that women who had less interoceptive awareness presented less sexual arousal, less lubrication, more difficulties with orgasm, more dissatisfaction, more pain and more sexual anguish; hence, sexual desire was correlated with greater interoceptive awareness (Berenguer et al., 2019).

Paying attention to one's own body can contribute to healthy sexual results, since being more aware of the present allows for better regulation of emotion and more intentional behavior (Karremans et al., 2017). It is important to realize that interoceptive responses may be similar, but be emotionally categorized in different ways, because emotions are constructions of the world, and these constructions are individual (Barrett, 2017).

Thus, we aimed to examine the relationship between interoceptive awareness, female sexual distress, and sexual functioning among Portuguese women. Portuguese contributions on this topic would significantly impact the understanding of many aspects of female sexuality and psychosexual health. To do so, the following objectives were established: 1) to compare levels of female sexual distress, sexual functioning, and interoceptive awareness by sociodemographic characteristics; and 2) to assess the relationship between female sexual distress, sexual functioning, and interoceptive awareness.

METHODS

Participants

The sample consisted of 459 women (non-clinical sample) collected online from community settings. Inclusion criteria included being 18 years of age or older, being of Portuguese nationality and self-identification as heterosexual.

The average age was 34.57 years ($SD=10.27$), ranging from 18 to 65 years. 15.7% of the participants were on antidepressant medication; 29% had other health problems. 33.8% of participants took other medications (including nutritional supplements). Most participants had a regular partner (73.6%); 52.5% cohabited with their partner. Average relationship length was 111.55 months, or about 9.3 years ($SD=92.36$ months). Sociodemographic characteristics can be seen in further detail in Table 1.

Table 1. Sociodemographic characteristics.

		<i>N</i>	%
Marital status	Single	250	54.5
	De facto union	53	11.5
	Married	131	28.5
	Divorced	20	4.4
	Regular partner	338	73.6
	In cohabitation	241	52.5
Educational attainment	Up to 9 years of school	11	2.4
	Up to 12 years of school	70	15.2
	Undergraduate	158	34.4
	Master's	173	37.7
	Ph.D.	22	4.8
Professional status	Unemployed	34	7.4
	Student	47	10.2
	Employed	375	81.7
Health	Antidepressants	72	15.7

Measurement instruments

Sociodemographic Variables

In order to collect the sociodemographic data of the participants, a questionnaire was developed that included information such as: age, professional status (unemployed, student, employed), marital status (single, de facto union, married, divorced), educational attainment (up to 9 years of school, up to 12 years of school, undergraduate, master's, Ph.D.). Questions were asked regarding the participants' characterization of their mental and physical health, including whether they took antidepressants; whether they had other health problems (and which ones); and whether they

consumed other drugs (and which ones). Other questions were asked to characterize participants' sexual activity, including predominant sexual orientation; if they had a regular partner; if they cohabitated with their partner (and for how long). Regarding sexual health, participants were evaluated, based on the definition and diagnostic criteria of the DSM-IV, if they had Hypoactive Sexual Desire Disorder (HSDD) or Female Sexual Arousal Disorder (FSAD). HSDD questions: “*Do you feel persistent and recurrent lack of motivation for sexual activity? That is, reduction or absence of spontaneous desire or in response to sexual / erotic stimuli or inability to maintain desire or interest during sexual activity, or loss of desire to take the initiative or to engage in sexual activities, including avoidance of situations that lead to sexual activity*” and “*If YES, does it cause severe discomfort or interpersonal difficulties?*” for answers: “Yes” or “No”. FSAD questions: “*You currently experience a persistent or recurrent inability to maintain adequate vaginal lubrication or swelling until the completion of sexual activity.*” and “*If YES, does it cause severe discomfort or interpersonal difficulties?*”, for answers: “Yes” or “No”.

The last month was specifically characterized in relation to sexual activity performed and desired. Participants were asked about frequency of sexual intercourse (i.e., “*How many days (not times) did you have sex that involved sexual intercourse (penis in the vagina), in days?*”); the frequency of sex without sexual intercourse, not including cybersex; and the frequency of masturbation alone. About sexual desire, participants were asked about the frequency of desired sex, with and without sexual intercourse; and the frequency of desired masturbation alone.

Multidimensional Assessment of Interoceptive Awareness (MAIA): Interoceptive awareness was measured by using the Portuguese version of the Multidimensional Assessment of Interoceptive Awareness, developed by Salvador and collaborators (2019), which encompasses four dimensions: Attention Regulation; Emotional Awareness, Body Listening, and Trusting. These correspond to the dimensions of the original measure (Salvador et al., 2019). The original MAIA instrument consists of 32 items that include 8 different subscales (Noticing, Not-distracting, Not-worrying, Attention Regulation, Emotional Awareness, Self-regulation and Body Listening) with the response options on a 6-point Likert scale (from 0 = “Never” to 5 = “Always”). The final score corresponds to the sum of the average scores of each sub-dimension, where the highest values correspond to the highest levels of interoceptive awareness. Items 5, 6 and 7, 8 and 9 must be inverted (Mehling et al., 2012). This scale showed very good internal consistency when applied to the research sample. The internal consistency of this instrument was excellent (Cronbach's alpha = .93).

Female Sexual Function Index (FSFI): Female sexual function was assessed by using the Portuguese version of the FSFI (Pechorro, Diniz, Almeida, & Vieira, 2013). This is a multidimensional instrument that evaluates the various phases associated with the sexual response cycle in women. The index utilizes a 5-point Likert-type response format to score participants' sexual functioning, with higher scores indicating better sexual functioning. When scoring the FSFI, items 8, 10, 12, 17, 18 and 19 must be reversed. The FSFI consists of 19 questions that assess aspects of female sexual function across six domains: sexual desire, arousal, lubrication, orgasm, satisfaction (including overall sexual satisfaction and satisfaction with the relationship), and pain. The score of each domain gives a total value to the questionnaire. If this value is equal to or less than 26.55, it is considered female sexual dysfunction (Rosen, Brown et al., 2000). In this study, the internal consistency of this instrument was excellent (Cronbach's alpha = .93). Only participants who had sex in the previous 30 days answered this questionnaire.

The Female Sexual Distress Scale-Revised (FSDS-R): This instrument is a scale of 13 items and was developed to provide a standardized quantitative measure about the suffering or personal anguish related to sexual life in women. The responses are based on a Likert scale from 0 (Never) to 4

(Always), referring to the last 30 days (DeRogatis et al., 2008). The total score of this instrument is calculated through the sum of all items; higher values are indicators of a higher level of sexual maladjustment. The total score of the scale varies between 0 (minimum) and 52 (maximum). A score greater than 11 reveals clinically significant sexual distress. The scale revealed a discriminatory capacity to distinguish between sexually dysfunctional and functional women (DeRogatis et al., 2008). In this study, the internal consistency of this instrument was excellent (Cronbach's alpha = 0.94).

Procedures

The sample was collected for convenience, since the questionnaires used were disseminated online through social networks such as LinkedIn and Facebook, as well as sent by email; others were delivered in paper format by hand. All participants were informed of the objectives of the study, in writing; confidentiality and anonymity were guaranteed to all participants. Participants were informed that they may not answer questions they were not comfortable answering. The inclusion criteria included: being 18 years of age or older, understanding the Portuguese language fluently, and self-identifying as a straight woman. The study guaranteed the anonymity and confidentiality of the data collected and obtained participants' informed consent in accordance with the Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects. The study was approved by the Ethics Committee of ISPA – Instituto Universitário.

In the DSM-V, HSDD has been eliminated as a distinct psychological entity and has been replaced by a fusion of diagnoses from the DSM-IV. HSDD and FSAD have been merged into a single diagnosis called Female Sexual Interest/Arousal Disorder. However, in the present investigation, the DSM-IV diagnoses were considered because the distinct nature of these diagnoses is considered of greater scientific usefulness.

Data Analysis

Descriptive statistics were performed to describe the sample (mean, standard deviation, frequencies, and percentages). The analysis of the correlation between interoceptive awareness and frequency of sex and desired sex in the last month, and the correlation between interoceptive awareness and sexual distress and sexual functioning, was performed using Pearson correlations. The significance of the effect of HSDD and FSAD (diagnostic, normal/no diagnosis, symptoms but no distress) on interoceptive awareness was assessed using one-way ANOVA. One-way ANOVA was also used to assess results for interoceptive awareness, sexual distress and sexual functioning by age, marital status, education, and professional status.

Hierarchical multiple regression analyses were performed to assess the effects of interoceptive awareness (Model 1) and sexual distress (Model 2) on sexual functioning. Finally, a mediation regression model was used to test the hypothesized causal chain in which interoceptive awareness was a mediator that explained the underlying mechanism of the relationships between sexual distress and sexual functioning. All statistical procedures were conducted using the Statistical Package for Social Sciences (SPSS version 27) and PROCESS Procedure for SPSS (Version 3.5.3).

RESULTS

Results regarding sexual functioning were as follows. For HSDD status, 57.7% reported no HSDD symptoms, and 26.4% (more than a quarter) reported HSDD with distress (i.e., presented diagnostic

criteria for the disorder, according to the DSM-IV-TR). For FSAD status, 74.1% reported no FSAD symptoms, but 18.1% reported FSAD with distress (diagnosis); we consider this to be a clinical sample, since it meets the criteria for the DSM-IV-TR. Other information about the diagnosis of sexual dysfunction can be observed in Table 2.

Table 2. Distribution of sexual disorders in the sample (by DSM-IV-TR).

	<i>N</i>	(%)
HSDD	121	26.4
Low desire without distress	72	15.7
No symptoms	265	57.7
FSAD	83	18.1
Low arousal without distress	35	7.6
No symptoms	340	74.1

Regarding interoceptive awareness levels, there was no statistically significant effect of the presence of HSDD on interoceptive awareness, but there was a statistically significant effect of the presence of FSAD on interoceptive awareness levels ($F(2, 428) = 4.174; p = .016$). Women diagnosed with FSAD had significantly lower levels of interoceptive awareness ($M = 51.60; SD = 17.55$) than women with symptoms, but without distress ($M = 61.91; SD = 13.04$). This and other information can be seen in Table 3.

Table 3. Differences in mean interoceptive awareness according to symptoms or diagnosis of HSDD and FSAD

		<i>M</i>	<i>SD</i>	<i>F</i>	<i>P</i>
HSDD	Normal	57.15	18.19	1.747	.175
	No desire/no distress	53.90	19.13		
	HSSD	53.85	17.09		
FSAD	Normal	56.17	18.51	4.174	.016*
	No arousal/no distress	61.91*	13.04		
	FSAD	51.60*	17.55		

Note: * $p < .05$

Through the correlation of interoceptive awareness and the frequency of sexual relationship and sexual desire about one’s relationship (in last month), we found that interoceptive awareness had a significant and positive association with sexual intercourse desired ($r = .133; p < .01; n = 413$) and sex without intercourse desired ($r = .133; p < .01; n = 416$). This can be seen in Table 4.

It was intended to evaluate the contribution of two variables (sexual distress and interoceptive awareness) on the dependent variable (sexual functioning).

We compared results for interoceptive awareness (see Table 5) by sociodemographic characteristics, finding statistically significant differences for educational attainment ($F = 2.659; p = .032$), which indicated that women with a university education possessed higher interoceptive awareness scores than women with secondary school education or basic school education.

Regarding sexual distress, the researchers compared results for sexual distress (see Table 6) by sociodemographic characteristics, finding statistically significant differences for educational

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attainment ($F = 3.552$; $p = .007$), which indicated that women with basic school education possessed higher sexual distress scores than women with a university education (master's).

Table 4. Pearson correlation about interoceptive awareness and frequency of sex and desired sex in last month

	Interoceptive Awareness
1 – Interoceptive Awareness	1
2 – Sexual intercourse	-.081
3 – Sex without intercourse	.047
4 – Masturbation	.005
5 - Sexual intercourse desired	.133**
6 - Sex without intercourse desired	.133**
7 – Masturbation desired	.087

Note: ** $p < .01$

Table 5. Results for interoceptive awareness by age, marital status, education, and professional status

Variable	Category	<i>M</i>	<i>SD</i>	<i>F</i>	<i>P</i>
Age	18-27	56.26	17.75	.435	.648
	28-37	56.70	16.69		
	38-65	54.82	19.40		
Marital Status	Single	56.51	17.36	2.227	.084
	De Facto Union	56.31	18.21		
	Married	55.26	18.76		
	Divorced	44.56	22.86		
Educational attainment	Up to 9 years of school	43.00	22.43	2.659	.032*
	Up to 12 years of school	52.86	18.67		
	Undergraduate	54.52	19.03		
	Master's	58.40	16.50		
	Ph.D.	53.29	19.18		
Professional status	Unemployed	50.47	17.30	1.494	.226
	Employed	56.01	18.16		
	Student	57.37	18.23		

Note: * $p < .05$

The researchers compared results for sexual functioning (see Table 7) by sociodemographic characteristics, finding statistically significant differences for educational attainment ($F = 3.064$; $p = .017$), which indicated that women with a university education (master's) possessed higher sexual functioning scores than women with secondary school education or basic school education.

Regarding the correlations (see Table 8), female sexual functioning and the presence of interoceptive awareness have a significant and positive association ($r = .124$, $p < .05$; $n = 304$). Regarding sexual functioning and sexual distress, it was verified that there is a significant, strong, and negative association ($r = -.663$, $p < .001$; $n = 316$). There was also a significant and negative association between interoceptive awareness and sexual distress ($r = -.154$, $p = .002$; $n = 420$).

A hierarchical multiple regression analysis was performed to assess the effects of interoceptive awareness (Model 1) and sexual distress (Model 2), on sexual functioning. The first block of the analysis explained 2% of the overall variance, but when including sexual distress, it explained 44.8% ($R^2_a = 0.448$). Therefore, as shown in Table 9, higher levels of sexual distress were significant predictors of poorer sexual functioning.

The multiple linear regression model of women's sexual functioning, due to sexual distress and interoceptive awareness, proved to be statistically significant ($F(2, 295) = 119.66$; $R^2_a = .444$; $p < .001$). However, the analysis of the regression coefficients and their statistical significance revealed that

only sexual distress ($\beta=-.663$, $t(295) = -15.185$; $p<.001$) is a significant predictor of women's sexual functioning.

Table 6. Results for sexual distress by age, marital status, education, and professional status

Variable	Category	<i>M</i>	<i>SD</i>	<i>F</i>	<i>P</i>
Age	18-27	14.80	12.96	1.005	.367
	28-37	14.76	13.77		
	38-65	12.89	12.88		
Marital Status	Single	14.65	13.55	1.120	.341
	De Facto Union	14.26	13.14		
	Married	14.18	12.85		
	Divorced	8.84	13.43		
Educational attainment	Up to 9 years of school	24.10	12.05	3.552	.007*
	Up to 12 years of school	14.56	12.85		
	Undergraduate	14.16	13.17		
	Master's	12.19	12.75		
	Ph.D.	20.09	14.87		
Professional status	Unemployed	13.12	12.12	1.507	.223
	Employed	13.90	13.41		
	Student	17.40	13.03		

Note: * $p<.05$

Table 7. Results for sexual functioning by age, marital status, education, and professional status

Variable	Category	<i>M</i>	<i>SD</i>	<i>F</i>	<i>P</i>
Age	18-27	27.97	5.15	.673	.511
	28-37	28.09	5.37		
	38-65	28.74	5.06		
Marital Status	Single	28.52	5.20	1.389	.246
	De Facto Union	27.65	6.02		
	Married	27.88	4.89		
	Divorced	30.34	3.94		
Educational attainment	Up to 9 years of school	26.02	4.77	3.064	.017*
	Up to 12 years of school	27.00	5.45		
	Undergraduate	28.45	5.15		
	Master's	29.14	4.83		
	Ph.D.	25.60	6.55		
Professional status	Unemployed	27.72	4.28	.304	.738
	Employed	28.37	5.32		
	Student	27.76	4.49		

Note: * $p<.05$

Table 8. Correlation matrix

	1	2	3
1 – Interoceptive Awareness	1		
2 – Sexual Distress	-.154**	1	
3 – Sexual Functioning	.124*	-.663**	1

Note: * $p<.05$; ** $p<.01$

Table 9. Hierarchical multiple regression analysis predicting sexual functioning

	Model 1			Model 2		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Interoceptive Awareness	.038	.017	.128*	.012	.013	.041
Sexual Distress				-.288	.019	-.663**
R ²	.016			.448		
F for change in R ²	4.920*			119.656**		

Note: * $p < .05$; ** $p < .001$

DISCUSSION

The objective of the study was to verify the impact of interoceptive awareness, as well as sexual distress, on the sexual functioning of women.

In the present study, we found a relatively high percentage of women with criteria compatible with HSDD (26.4%) and FSAD (18.1%). A Portuguese study found that 15% of women reported low sexual desire (most occasions or always), with moderate to severe symptoms (Nobre 2003, *cited in* Nobre, 2006). Vendeira et al. (2005) found low sexual desire in 35% of women, with low to severe symptoms (Nobre, 2006). Mitchell et al. (2013) found that about 50% of women had some sexual problem, but cases of clinical sexual distress decreased to 7-10% of women (Mitchell et al., 2013). In the study, only 57.7% of the participants revealed that they do not have symptoms of HSDD.

Sexual distress happens when negative emotions are perceived, such as shame, guilt, frustration, anxiety, fear, and anger, and are associated with sexual life or sexual experience (DeRogatis et al., 2008). In addition, anguish is present as a diagnostic criterion in sexual disorders, so an association between sexual distress and worse sexual functioning was expected, although poor sexual functioning is not necessarily indicative of the presence of a sexual dysfunction. There was a negative correlation between sexual distress and interoceptive awareness, as greater sexual distress is related to a weaker perception of internal signs. Interoceptive awareness includes trust, perception of one's own body as being a safe place (Mehling et al., 2012). This self-acceptance, or self-compassion, can help people deal effectively with negative emotions, minimizing the negative distress effects on sexual problems and sexual functioning. Self-compassion helps one to perceive personal difficulties with greater self-acceptance, mindfulness, and an understanding that failures and deficiencies are part of being human (Neff, 2003). Linear regression showed distress as a predictor of women's sexual functioning. Paterson et al. (2016) also suggested an association between weak interoception and greater female sexual distress; women with sexual problems who were subjected to mindfulness interventions had increased interoception and, consequently, increased sexual desire and decreased sexual suffering, revealing the importance of perceiving internal signs for a good experience of sexuality in women. In the women's case, when they have low interoceptive awareness, they are more likely to have clinical symptoms such as depression, low self-esteem, anxiety, and negative self-judgment, all of which prevent sexual desire (Brotto 2018). Sexual distress can interfere with sexual performance, even if the symptoms are not compatible with a diagnosable sexual dysfunction, as well as interfere with sexual satisfaction (Ferenidou et al., 2008). Rosen et al. (2009) have verified a negative association between global sexual distress and sexual satisfaction. According to the results of the study, interoceptive awareness had a significant effect on mean differences in the FSAD group; namely, between participants that had the diagnostic criteria for the disorder (showing less interoceptive awareness) and participants who had low arousal but no distress, therefore not meeting the diagnostic criteria, despite having symptoms. Here, it was verified that the fact of the existence, or not, of sexual distress influences the levels of interoceptive awareness, showing the importance of the presence of sexual distress.

Greater interoceptive awareness was associated with greater desire to have sex, with and without intercourse, better overall sexual functioning, and less sexual distress. Though these associations are weak, they make a significant contribution. These data are partially corroborated by several investigations that show that, even in sexually functional women (or those without a diagnosis of sexual dysfunction), attention directed to internal signs helps in sexual response (e. g., Berenguer et al., 2019; Carvalheira et al., 2017). Interoceptive awareness can be enhanced through mindfulness, which increases body awareness (Paterson et al., 2017; Silverstein et al., 2011). Several investigations show the impact of mindfulness on sexual functioning (Brotto & Heiman 2006; Brotto et al., 2008; Brotto et al., 2012a; Brotto et al., 2012b; Brotto et al., 2015; Paterson et al., 2016). Thus, the results reinforce the importance of recognizing that the awareness of interoceptive sensations have an impact on sexual function. They also reinforce the idea that sexual intervention programs or protocols based on interoceptive awareness can bring significant improvements to women's sexual functioning, regardless of whether they have sexual dysfunctions or not, and can protect them from future sexual disorders.

Although a significant linear regression model has been established between interoceptive awareness and sexual distress in sexual functioning (the two variables, together, explaining about 44.8% of women's sexual functioning), interoceptive awareness was not shown to be a significant predictor of the model. The results show that interoceptive awareness presents a weak correlation with sexual functioning, even though it presents a significant relationship and is not predictive of sexual functioning of women. Therefore, even though the correlation is weak, there is an association between interoceptive awareness and sexual functioning that must be considered. Interoceptive awareness is a subjective and psychologically complex construct to access and define; therefore, interference with other variables can increase or decrease its influence on women's sexual functioning. It is important for future investigations to clarify the impact of this variable on sexual functioning, which can, nevertheless, translate into an added value for the development of intervention techniques and procedures in the area of sexuality.

As for the limitations, they should be noted when interpreting and replicating our result. All methods used were self-reported, which may have interferences or influence responses. The analysis is based on a convenience sample. Through the descriptive analysis of the sample, we realized that, although the sample is a normative, non-clinical sample, there is a very high percentage of women who meet diagnostic criteria (according to the DSM-IV-TR, because it distinguishes between a desire disorder and a sexual arousal disorder) for HSDD (26.4%) and for FSAD (18.1%), which may also have influenced the results. These "subsamples" were not analyzed in a discriminatory way.

In conclusion, our research contributes to a better understanding of the role of introspective awareness in women's sexual functioning among Portuguese women. The results show that introspective awareness can have an influence on sexual functioning in women with or without sexual dysfunction, even though it is not an essential predictor. Even so, it is important to develop further investigations, also with non-clinical samples, in order to better understand the contribution that interoceptive awareness can bring to the understanding of the sexual functioning of women, and the consequent effectiveness of its implementation in the development of sexual intervention techniques. This study has important implications for the relevance of continuing to study the impact of interoceptive awareness in the study of women's sexual functioning. Although its implication is not yet understood objectively, it seems clear that there is an important interference related to the benefits of the attention paid to the body's own signals in the sexual response. Identifying and describing internal bodily sensations, and relating these signals to one's own body, facilitates the perception of sensations and emotions. On the other hand, failing to perceive or trust the body's own signals facilitates the experience of distressing thoughts or emotions, which include distress. This whole process is reflected in the perception and experience of the sexual response and, consequently, in well-being, as good sexual functioning will be essential to general well-being. In this sense, developing interventions in sexual functioning, which include enhancing attention, listening, and

building confidence in one's bodily signals, can improve this functioning, prevent future sexual pathologies and contribute to a better psychological and emotional functioning in general terms.

We suggest the development of future investigations that study the impact of interoceptive awareness in women and also in men, discriminating between clinical and non-clinical samples, as well as the various dimensions of sexual functioning and response, in order to understand more objectively the impact of attention on body signals in sexual functioning.

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