

Differences between Pre- and Postmenopausal Women in Cues for Sexual Desire

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ABSTRACT

Introduction. Recently, McCall and Meston presented an assessment tool for empirically categorizing stimuli associated with sexual desire in women. Significant differences in cues resulting in sexual desire were found between women with and without hypoactive sexual desire disorder (HSDD).

Aim. The present study examined differences in cues resulting in sexual desire between pre- and postmenopausal women with and without sexual desire concerns using the Cues for Sexual Desire Scale (CSDS) which assesses four distinct aspects of desire motivators: (i) Love/Emotional Bonding Cues; (ii) Erotic/Explicit Cues; (iii) Visual/Proximity Cues; and (iv) Implicit/Romantic Cues.

Main Outcome Measures. The Female Sexual Function Index and the CSDS.

Methods. Women included premenopausal women with no sexual concerns (N = 35), premenopausal women with low sexual desire (N = 30), postmenopausal women with no sexual concerns (N = 21), and postmenopausal women with low sexual desire (N = 39).

Results. Consistent with prior findings, women with low sexual desire reported significantly less Love/Emotional Bonding Cues, Erotic/Explicit Cues, Implicit/Romantic Cues, and had significantly lower CSDS total scores as compared with women with no sexual difficulties. Postmenopausal women were more likely to report cues associated with Love/Emotional Bonding as compared with premenopausal women.

Conclusions. There were significant differences between women with and without sexual desire concerns in Love/Emotional Bonding Cues, Erotic/Explicit Cues, Implicit/Romantic Cues, and CSDS total scores. There were no significant differences between pre- and postmenopausal women in Erotic/Explicit Cues, Visual/Proximity Cues, or Implicit/Romantic Cues. Interestingly, postmenopausal women with and without HSDD endorsed more Love/Emotional Bonding Cues resulting in feelings of sexual desire as compared with premenopausal women. **McCall K, and Meston C. Differences between pre- and postmenopausal women in cues for sexual desire. J Sex Med 2007;4:364–371.**

Key Words. Sexual Desire; Female Sexual Dysfunction; Menopause

Introduction

Recently, McCall and Meston [1] presented the results of a study which culminated in a multidimensional assessment tool for empirically categorizing stimuli associated with sexual desire in women. The instrument, entitled the Cues for Sexual Desire Scale (CSDS), comprises four factor-analytic derived subscales: (i) Love/Emotional

Bonding Cues; (ii) Erotic/Explicit Cues; (iii) Visual/Proximity Cues; and (iv) Implicit/Romantic Cues. All four factors and the total score of the CSDS differentiated between women with no sexual dysfunction and women with hypoactive sexual desire disorder (HSDD) such that women with HSDD reported fewer cues associated with sexual desire as compared with women with no sexual concerns.

There has been an extensive amount of research investigating the menopausal transition and its impact on women's lives. The literature reports myriad changes associated with menopause including, but not limited to, changes in mood [2–5], changes in cognitive functioning [4,5], physical and/or physiological changes [4–9], changes in reported levels of sexual activity [6,10], changes in a woman's sense of self [11] or her feminine identity [12], changes in intimate relationships [11], psychological changes [5,7–10,13], changes in sleep patterns [3,4,14], and changes in quality of life [3]. Women who have undergone menopause often experience changes in their level of sexual functioning [3,6,7,10,12,15,16] with low sexual desire being the most commonly reported sexual problem among postmenopausal women [17].

Reports from both clinical data and large-scale population surveys [18,19] provide evidence that women who have undergone menopause, both natural and surgical, often experience a significant decrease in sexual desire [15]. Research indicates that a woman's menopausal status can influence levels of sexual desire both directly and indirectly. That is, the number and degree of a woman's menopausal symptoms can affect both her subjective and physical well-being, which in turn, can affect her sexual desire and responsiveness [20]. Although recently validated instruments have been created to specifically assess sexual desire in postmenopausal women (e.g., [15,21]), to our knowledge, currently there are no validated measures intended for the assessment of cues or triggers resulting in sexual desire in postmenopausal women. Given the various number of factors which can contribute to sexual desire in postmenopausal women, a multidimensional understanding of sexual desire in this population of women is crucial. To this end, the goal of the present study was to further our understanding of how sexual desire is impacted in women undergoing menopause by investigating differences in the CSDS in four discrete groups of women: (i) premenopausal women with no sexual concerns; (ii) premenopausal women with low sexual desire; (iii) postmenopausal women with no sexual concerns; and (iv) postmenopausal women with low sexual desire. Delineating the various cues that trigger desire in pre- and postmenopausal women will add to the current conceptualization of sexual desire which emphasizes the importance of women's receptivity to sexual stimuli (e.g., [22–26]). That is, the majority of women do not report frequent "spontaneous desire" [27–30]; therefore, hypoac-

tive sexual desire is often seen as an inability to trigger or access desire when sexual stimuli are present.

Methods

Participants

Participants were women recruited via local community and university advertisements. In total, 169 women who responded to the advertisements were given a detailed description of the experiment and screened for inclusion/exclusion criteria. Inclusion criteria included: between the ages of 18–75 years, and current involvement in a stable, sexually active relationship. Participants meeting these criteria were evaluated for current sexual functioning status using the Female Sexual Function Index (FSFI) [31] and for menopausal status established through clinical interviews conducted by a female researcher. Based on the information obtained during interviews and through the FSFI desire domain scores, participants were divided into four groups. These groups were identified as: (i) premenopausal women with no sexual concerns, $N = 35$; (ii) premenopausal women with low sexual desire, $N = 30$; (iii) postmenopausal women with no sexual concerns, $N = 21$; and (iv) postmenopausal women with low sexual desire, $N = 39$.

Level of sexual desire was established based on FSFI desire domain scores. Women assigned to the "low sexual desire" groups scored within the range of women with HSDD on the desire subscale of the FSFI (i.e., less than 3.0) as established by Rosen et al. [31], whereas women assigned to the "no sexual concerns" groups scored within the range of healthy controls on all subscales and total score of the FSFI as established by Rosen et al. [31]. The final data set presented in the current study included 125 women. Of the 169 women who responded to advertisements, 44 women were excluded from subsequent analyses for the following reasons: perimenopausal status identified during clinical interviews ($N = 19$), no current involvement in a stable, sexually active relationship ($N = 10$), FSFI desire domain scores between 3.0 and 4.0 ($N = 12$), or incomplete/missing data ($N = 3$) For FSFI means (\pm SD) by group, see Table 2.

In total, 81% of the participants identified themselves as Caucasian, 3% as African American, 9% as Hispanic, 4% as Asian, 2% as Native American, and 1% as other. Participants ranged in age from 19 to 75 years (mean age = 41.66 years,

Table 1 Participant characteristics

	Premenopausal, no sexual concerns (N = 35)	Premenopausal, low sexual desire (N = 30)	Postmenopausal, no sexual concerns (N = 21)	Postmenopausal, low sexual desire (N = 39)
Age (years)				
Mean (\pm SEM)	29.14 (1.64) ^{†‡§}	34.83 (1.81) ^{*†§}	50.67 (2.12) ^{*†}	53.13 (1.56) ^{*†}
Range	20–49	19–47	32–75	38–69
Ethnicity, N (%)				
Caucasian	25 (71.4)	23 (82.1)	15 (71.4)	36 (94.7)
African American	1 (2.9)	1 (3.6)	2 (9.5)	0 (0.0)
Hispanic	4 (11.4)	1 (3.6)	4 (19.0)	1 (2.6)
Native American	1 (2.9)	0 (0.0)	0 (0.0)	0 (0.0)
Asian	3 (8.6)	2 (7.1)	0 (0.0)	0 (0.0)
Other	1 (2.9)	1 (3.6)	0 (0.0)	1 (2.6)
Education, N (%)				
High school/GED	17 (48.6)	10 (34.5)	11 (52.4)	16 (41.0)
College degree	14 (40.0)	11 (37.9)	7 (33.3)	14 (35.9)
Advanced degree	4 (11.4)	8 (27.6)	3 (14.3)	9 (23.1)
Annual income, N (%)				
<50,000	15 (68.2)	10 (41.7)	9 (42.9)	9 (24.3)
50,000–100,000	7 (31.8)	11 (45.8)	10 (47.6)	15 (40.5)
>100,000	0 (0.0)	3 (12.5)	2 (9.5)	13 (35.1)

*Significant difference from group 1.

†Significant difference from group 2.

‡Significant difference from group 3.

§Significant difference from group 4.

GED = General Education Development.

SD = 14.26). To see demographic variables by group, see Table 1.

Measures

The FSFI was used to assess current levels of sexual function. The FSFI is composed of 19 items divided into factor-analytic derived subscales: desire (two items), arousal (four items), lubrication (four items), orgasm (three items), satisfaction (three items), and pain (three items). In a recent article, Wiegel et al. [32] reported internal consistency within each subscale to reflect values in an acceptable range (Cronbach's alpha = 0.82–0.98). Meston [33] reported inter-item reliability values within the acceptable range for sexually healthy women (Cronbach's alpha = 0.83–0.90), as well as for women with diagnosed HSDD (Cronbach's alpha = 0.58–0.94). Weigel et al. [32] provided strong evidence of discriminant validity between women with and without sexual dysfunction for FSFI total score and each subscale score, although a high degree of overlap was present across various diagnostic groups.

The CSDS [1] was used to assess cues associated with sexual desire. The CSDS is composed of 40 items divided into four factor-analytic derived subscales: Love/Emotional Bonding Cues (10 items), Erotic/Explicit Cues (10 items), Visual/Proximity Cues (10 items), and Romantic/Implicit Cues (10 items) (see Appendix 1). The 40 items

are listed using a conventional questionnaire format with each item presented as a brief descriptive statement to which respondents rated the likelihood that a given item would make them desire sexual activity. The response choices are on a 5-point Likert scale, with scale interval anchors being: Not at all likely (1), Somewhat likely (2), Moderately likely (3), Very likely (4), and Extremely likely (5). The CSDS demonstrated good reliability (Cronbach's alpha = 0.78–0.93) and validity and was able to detect significant differences between women with and without HSDD.

Procedure

Upon arrival, participants were given a review of the general experimental procedures required for participation and were asked to provide informed consent. Participants then completed the clinical interview, the CSDS, the FSFI, a participant information questionnaire, and other standardized questionnaires (not presented here). The interview and questionnaires were administered individually in a private participant room. The clinical interviews were conducted by a female research assistant with previous training and work experience in clinical interviewing and diagnostic assessments. Interviews involved a thorough semi-structured assessment of menopausal status including, but not limited to, the following

questions: self-reported menopausal status, menopausal symptoms (e.g., changes in mood, hot flashes, amenorrhea), date of last menstrual period, current use of hormone replacement therapy (HRT), and previous gynecologic surgeries (e.g., including hysterectomy). Women who reported previous bilateral oophorectomy were considered surgically postmenopausal. None of the participants in the present study were currently receiving HRT. A female researcher was available to answer any potential questions that participants had while completing questionnaires. Participants were compensated monetarily upon completion of the measures for their participation in the study.

Results

Participants

A univariate ANOVA revealed significant differences in age between groups, $F(3,124) = 48.19$, $P < 0.001$. Follow-up independent samples t -tests revealed significant age differences between each group except for between postmenopausal women with and without sexual desire concerns. Premenopausal women were younger than postmenopausal women (to see age by group and between group comparisons, see Table 1). Likelihood ratios indicated that the two groups did not significantly differ in race/ethnicity, $LR(3) = 21.46$, $P = 0.12$, or educational background, $LR(3) = 4.12$, $P = 0.65$. Significant differences in reported annual income were found, $LR(3) = 21.16$, $P = 0.002$, such that postmenopausal women with low sexual desire were more likely to report earning greater than \$100,000 a year as compared with the other groups of women.

Multivariate ANOVAs revealed significant differences between groups for the FSFI desire domain, $F(3,124) = 201.92$, $P < 0.001$; arousal

domain, $F(3,124) = 62.95$, $P < 0.001$; lubrication domain, $F(3,124) = 28.41$, $P < 0.001$; orgasm domain, $F(3,124) = 23.38$, $P < 0.001$; satisfaction domain, $F(3,124) = 44.08$, $P < 0.001$; sexual pain domain, $F(3,124) = 3.99$, $P = 0.009$; and overall FSFI total scores, $F(3,124) = 60.88$, $P < 0.001$ (see Table 2). Follow-up tests indicated that these differences were a result of women in the no sexual concerns groups having significantly higher scores for the FSFI desire, arousal, lubrication, orgasm, satisfaction, pain, and total score as compared with pre- and postmenopausal women with low sexual desire.

Multivariate analyses were conducted for one between-group factor: group assignment, five dependent variables: CSDS Factors 1, 2, 3, 4, and total scores, and one covariate: age. Results indicated significant differences between the four groups of women on CSDS Love/Emotional Bonding Cues, $F(3,124) = 3.96$, $P = 0.01$; Explicit/Erotic Cues, $F(3,124) = 5.55$, $P < 0.001$; Romantic/Implicit Cues, $F(3,124) = 5.48$, $P = 0.002$; and CSDS total scores, $F(3,124) = 5.19$, $P = 0.002$. There were no significant group differences for Visual/Proximity Cues, $F(3,124) = 1.09$, $P = 0.36$.

Subsequent multivariate analyses to further understand these group differences were conducted with the following between-group variables: sexual desire status (no sexual dysfunction vs. low sexual desire) and menopausal status (premenopausal vs. postmenopausal) with age covaried. Outcome variables included CSDS Factors 1, 2, 3, 4, and total scores. A significant main effect of sexual desire status was found for CSDS Factor 1, $F(1,124) = 4.99$, $P = 0.03$; CSDS Factor 2, $F(1,124) = 19.89$, $P < 0.001$; CSDS Factor 4, $F(1,124) = 14.77$, $P < 0.001$; and CSDS total scores, $F(1,124) = 14.90$, $P < 0.001$. That is, women with low sexual desire reported fewer Love/Emotional Bonding Cues, Explicit/Erotic

Table 2 Female Sexual Function Index (FSFI) scores by group

	Premenopausal, no sexual concerns (N = 35)	Premenopausal, low sexual desire (N = 30)	Postmenopausal, no sexual concerns (N = 21)	Postmenopausal, low sexual desire (N = 39)
FSFI scores [1], mean (\pm SD)				
Desire	4.85 (0.62)	2.40 (0.50)	5.20 (0.61)	2.11 (0.71)
Arousal	5.33 (0.59)	3.05 (1.23)	5.30 (0.66)	2.52 (1.35)
Lubrication	5.59 (1.05)	3.81 (1.59)	5.34 (0.89)	2.60 (2.03)
Orgasm	4.99 (1.22)	2.59 (1.38)	4.88 (1.55)	2.54 (2.00)
Pain	5.59 (1.10)	4.48 (1.96)	4.72 (2.17)	4.05 (2.40)
Satisfaction	5.27 (0.88)	3.11 (1.16)	5.12 (1.43)	2.74 (1.14)
Total	31.62 (3.68)	19.41 (4.81)	30.57 (4.44)	16.55 (7.64)

Higher scores represent higher levels of function for all domains.

Table 3 CSDS discriminant validity

	Premenopausal, no sexual concerns mean (\pm SD)	Premenopausal, low sexual desire mean (\pm SD)	Postmenopausal, no sexual concerns mean (\pm SD)	Postmenopausal, low sexual desire mean (\pm SD)
CSDS Factor 1: Love/Emotional Bonding Cues	3.05 (0.79)	2.76 (1.13)	3.66 (1.28)	3.28 (0.92)
CSDS Factor 2: Explicit/Erotic Cues	3.77 (0.90)	2.97 (0.92)	3.56 (0.62)	2.92 (0.85)
CSDS Factor 3: Visual/Proximity Cues	2.17 (0.76)	2.10 (0.80)	2.16 (1.00)	1.88 (0.60)
CSDS Factor 4: Romantic/Implicit Cues	3.00 (0.75)	2.49 (0.80)	3.28 (0.82)	2.71 (0.65)
CSDS total score	11.99 (2.32)	10.11 (2.90)	12.73 (3.16)	10.80 (2.12)

CSDS = Cues for Sexual Desire Scale.

Cues, Romantic/Implicit Cues, and had overall lower total scores on the CSDS as compared with women with no sexual desire concerns. There was no significant main effect of sexual desire status on CSDS Factor 3 (Visual/Proximity Cues), $F(1,124) = 1.74$, $P = 0.19$. A significant main effect of menopausal status was found for CSDS Factor 1 (Love/Emotional Bonding Cues), $F(1,124) = 9.43$, $P = 0.003$, such that postmenopausal women reported more cues of Love/Emotional Bonding associated with sexual desire as compared with premenopausal women. There were no significant main effects of menopausal status on CSDS Factors 2, 3, 4 or total scores. To see CSDS Factors and total scores by group, see Table 3.

Discussion

Consistent with our previous findings [1], significant differences on CSDS Factors 1, 2, 4, and total score emerged between women with and without sexual desire concerns. That is, women with low sexual desire reported fewer Love/Emotional Bonding Cues, Erotic/Explicit Cues, Romantic/Implicit Cues as compared with women with no sexual concerns. These findings seem intuitive as the relative lack of cues for sexual desire are most likely responsible and/or related to women's low sexual desire.

Although women with low sexual desire reported fewer Factor 3 Visual/Proximity Cues as compared with women with no sexual concerns (mean for women with low desire = 1.97, mean for women with no sexual concerns = 2.17), the difference was not statistically significant. This is inconsistent with McCall and Meston's [1] finding of lower Factor 3 scores among women with HSDD vs. controls. To the extent that Visual/Proximity Cues may be more apparent among younger vs. older women, the discrepancy between studies may be due to age differences in the two samples. Participants in McCall and Meston's [1] study had

a mean age of 26.1 years ($SD = 7.6$ years, age range 18–53 years), whereas participants in the current study had a mean age of 41.66 years ($SD = 14.26$ years, age range 19–75 years). To test this hypothesis, exploratory analyses were conducted to examine whether age and Factor 3 scores were related. Pearson product moment correlations did not indicate a significant relationship between age and CSDS Factor 3 scores in the sample of women presented in the current study.

Pre- and postmenopausal women showed significant differences only on Factor 1, such that postmenopausal women endorsed more Love/Emotional Bonding Cues which resulted in sexual desire as compared with premenopausal women. The majority of studies investigating midlife women focus on negative symptoms associated with the menopausal transition (for exceptions, see [34–37]), and there is less understanding about the positive sexual changes experienced by postmenopausal women. In light of this, the fact that postmenopausal women did not differ significantly from premenopausal women on three of the four subscales, and scored higher than premenopausal women on one of the four subscales is noteworthy.

One explanation for the finding that postmenopausal women endorsed more cues associated with Love/Emotional Bonding as compared with premenopausal women is related to the fact that, overall, postmenopausal women may encounter fewer daily demands (e.g., attaining financial stability, meeting career goals, children living at home, etc.) as compared with premenopausal women, and this may allow for more of a focus on her relationship. Consistent with this explanation are results from Foerster's [38] qualitative investigation of the relationship between body image and sexuality for women in their sixties. In this study, women completed individual qualitative biographical interviews which emphasized sexuality and body image. Foerster [38] found that all of the women in her study reported that the quality of

their sexuality had *actually* improved with age. In particular, aspects of improved quality included a deepening of intimacy within romantic relationships, an increased focus on sensuality (including a broader appreciation of activities beyond sexual intercourse), and increased time to enjoy sex because of fewer work and familial demands.

Another possible explanation for differences in pre- and postmenopausal women in Love/Emotional Bonding Cues could be related to differences in androgen activity between these two groups. Postmenopausal women have lower androgen levels than premenopausal women, and, to the extent that androgen levels are implicated in feelings of "spontaneous desire," it is possible that spontaneous desire may be more rare in postmenopausal women. If so, Love/Emotional Bonding Cues resulting in feelings of sexual desire may be more salient and play a more substantial role in triggering desire. Although all women in our sample reported current involvement in a stable, sexually active relationship, we did not assess for length of relationship. This limitation warrants mention as it is possible that length of relationship could be related to group differences given previous findings which have shown that marital length predicts less sexual activity and that married couples have less sex over time [39,40]. It should also be noted that menopausal status was determined solely on the basis of clinical interviews. Hormonal assay of follicle stimulating hormone and estradiol would have provided a more stringent categorization of women in the pre- and postmenopausal groups.

In conclusion, the finding that postmenopausal women endorsed more Love/Emotional Bonding Cues resulting in feelings of sexual desire could have important treatment implications. That is, for postmenopausal women seeking therapy for concerns related to low sexual desire, it is feasible that raising awareness and attention to situations which promote feelings of love and emotional bonding could, in fact, be a crucial component for increasing her overall levels of sexual desire.

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Appendix 1**Cues for Sexual Desire Scale (CSDS)**

Instructions:

Different factors cause different people to desire sexual activity (e.g., intercourse, kissing, oral sex, petting, masturbation). Use the scale below to indicate what the likelihood is that each of the following factors or cues would lead you to *desire* sexual activity.

	1 Not at all likely	2 Somewhat likely	3 Moderately likely	4 Very likely	5 Extremely likely
1				1	2
2				2	3
3				3	4
4				4	5
5				5	
6				1	2
7				2	3
8				3	4
9				4	5
10				5	
11				1	2
12				2	3
13				3	4
14				4	5
15				5	
16				1	2
17				2	3
18				3	4
19				4	5
20				5	
21				1	2
22				2	3
23				3	4
24				4	5
25				5	
26				1	2
27				2	3
28				3	4
29				4	5
30				5	
31				1	2
32				2	3
33				3	4
34				4	5
35				5	
36				1	2
37				2	3
38				3	4
39				4	5
40				5	