

1 **RUNNING HEAD: IMPACT OF PSYCHOSOCIAL AND INTERPERSONAL FACTORS**  
2 **ON SEXUAL FUNCTION IN SS**

3 **TITLE: Coping strategies, illness perceptions and relationship dynamics contribute to**  
4 **female sexual function and sexual distress in Sjögren's syndrome**

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39 **ABSTRACT**

40 **Background**

41 Sexual dysfunction and sexual distress are common complaints for women with the  
42 autoimmune rheumatic disease, Sjögren's syndrome (SS); however, the role of psychosocial  
43 and interpersonal factors have not previously been explored in SS.

44 **Aim**

45 This study investigated whether psychosocial variables, such as coping strategies, illness  
46 perceptions and relationship dynamics contributed to sexual function and sexual distress for  
47 women with SS.

48 **Methods**

49 Participants with SS completed an online cross-sectional survey that included pre-validated  
50 questionnaires assessing sexual function, sexual distress, disease-related symptom  
51 experiences, cognitive coping strategies, illness perceptions, relationship satisfaction and  
52 partners behavioural responses. Multiple linear regression was used to identify factors  
53 significantly associated with sexual function (total FSFI score) and sexual distress (total  
54 FSDS score) for women with SS.

55 **Outcomes**

56 Study outcome measures included the Female Sexual Function Index (FSFI), Female Sexual  
57 Distress Scale (FSDS), EULAR Sjögren's Syndrome Patient Reported Index (ESSPRI),  
58 numeric rating scale for vaginal dryness (0-10), Profile of Fatigue and Discomfort (ProFaD),  
59 Cognitive Emotion Regulation Questionnaire (CERQ), Brief Illness Perceptions  
60 Questionnaire (B-IPQ), West-Haven Yale Multidimensional Pain Inventory (WHYMPI) and  
61 Maudsley Marital Questionnaire (MMQ).

62 **Results**

63 A total of 98 cisgender women with SS (M=48.13, SD=13.26) participated in the study.  
64 Vaginal dryness was reported by 92.9% of participants, and clinical levels of sexual  
65 dysfunction were observed in 85.2% (n=69/81) of cases (total FSFI score <26.55). More  
66 vaginal dryness, lower CERQ positive reappraisal and higher CERQ catastrophising were  
67 significantly associated with poorer self-rated sexual function ( $R^2=.420$ ,  $F(3,72)=17.394$ ,  
68  $p<.001$ ). Higher CERQ rumination, lower CERQ perspective, lower WHYMPI distracting  
69 responses and higher B-IPQ identity were significantly associated with higher sexual distress  
70 ( $R^2=.631$ ,  $F(5,83)=28.376$ ,  $p<.001$ ).

### 71 **Clinical Implications**

72 This study would suggest that interpersonal and psychosocial factors are important  
73 contributors to sexual function and distress in women with SS and that the development of  
74 psychosocial interventions for this population is warranted.

### 75 **Strengths and Limitations**

76 This study is one of the first to explore the impacts of coping strategies, illness perceptions,  
77 and relationship dynamics on sexual function and sexual distress for women with SS.  
78 Limitations of our study include its cross-sectional nature and limited sample demographic  
79 which limit the generalisability of our results to other population groups.

### 80 **Conclusion**

81 Women with SS who utilised adaptive coping strategies had better sexual function and lower  
82 levels of sexual distress than women who utilised maladaptive coping strategies.

### 83 **Key Words**

84 Sexual Function, Chronic Diseases, Coping Strategies, Illness Representations, Relationship  
85 Dynamics

86

## 87 INTRODUCTION

88 Sjögren's syndrome (SS) is a rheumatic autoimmune disease that attacks the moisture-  
89 producing glands throughout the body (1). The disease causes inflammation and dysfunction  
90 in glands such as the lacrimal and salivary glands, leading to symptoms of oral and ocular  
91 dryness (2). Additionally, the systemic nature of the disease means that individuals may  
92 experience extraglandular manifestations, such as vaginal dryness, fatigue, myalgias and  
93 arthralgias (3). SS is the second most common autoimmune rheumatic disease (4), with  
94 current estimates suggesting that around 3.1 million adults in the United States have SS (5).  
95 As with most autoimmune diseases, SS predominately affects females (9:1), with onset  
96 occurring around 40 years of age (6).

97 One aspect of life that SS can negatively impact is sexual function. A recent meta-analysis  
98 found that women with SS had significantly poorer sexual function than healthy controls,  
99 with disruptions observed in levels of desire, arousal, lubrication, orgasm, sexual satisfaction  
100 and pain experienced during vaginal penetration (dyspareunia) (7). Gynaecological  
101 investigations exploring possible causes of sexual dysfunction in women with SS have found  
102 preliminary evidence to suggest that pelvic floor dysfunction (8), vaginal or cervical atrophy  
103 (9), severity of vaginal dryness (10) and lower levels of hormones, such as oestrogen and  
104 testosterone (11) may all be correlated with poorer sexual function in SS. However, there is a  
105 sparsity of research, with these factors only being explored in one or two studies, as well as  
106 an inconsistency of the significance of such factors across studies. Moreover, a recent study  
107 conducted a regression analysis to assess the weight of some of these gynaecological  
108 manifestations (vaginal dryness, presence of atrophy in the vagina, cervix and labia, parity  
109 and gravidity) in predicting sexual dysfunction (as measured by the FSFI) in women with SS  
110 (9). The study found that although these gynaecological variables (except vaginal dryness)  
111 correlated with sexual functioning, only parity (number of pregnancies that resulted in the

112 delivery of either a live or stillbirth at  $\geq 24$  weeks gestation) was a significant predictor of  
113 sexual function along with depression (9). This finding would suggest that psychological  
114 variables may play an important role in sexual dysfunction than some of the gynaecological  
115 manifestations seen in women with SS.

116 The relationship between depression and sexual dysfunction in SS has been explored  
117 previously (12,13,14), with studies typically finding significant associations between the two  
118 variables (12,14). Furthermore, a path analysis found that depression mediated the  
119 relationship between SS and sexual dysfunction; however, the effects of the disease itself had  
120 a greater impact on sexual dysfunction than depression (14). Although the exploration of the  
121 role that other psychological or interpersonal factors have on sexual dysfunction have not  
122 previously been explored in SS, they have been researched in healthy women, as well as  
123 other chronic health conditions.

124 For example, a study by Crisp and colleagues (15) explored the coping strategies of healthy  
125 women and found evidence to suggest that an individual's coping styles (i.e. the cognitive  
126 and behavioural strategies used to manage stressors), particularly maladaptive strategies such  
127 as denial and self-blame, were associated with poorer sexual function. On the other hand, the  
128 authors found that adaptive coping strategies, such as acceptance and emotional and  
129 instrumental support, were significantly associated with better sexual function (15). As  
130 individuals with SS are more likely to display a dispositional coping profile reliant on  
131 maladaptive strategies (16), it could be hypothesised that these individuals may be more at  
132 risk of experiencing sexual dysfunction. Insights into adaptive coping strategies may be  
133 useful to inform subsequent interventions in managing female sexual dysfunction in SS.

134 Another important aspect is the way in which an individual perceives their illness and the  
135 beliefs they hold about the causes, consequences and controllability of the illness. These

136 illness perceptions have been found to differ between individuals with the same condition and  
137 are an important determinant of behaviour, influencing the way an individual manages their  
138 illness, adheres to treatments, and makes progress in functional recovery (17). Previous  
139 research with women with systemic lupus erythematosus (SLE) found that individuals with  
140 negative illness perceptions (i.e. perceived a greater impact of disease or a lack of  
141 understanding and an uncontrollability of the illness) had a poorer overall sexual function  
142 than those with more positive illness perceptions. Additionally, those with SLE who were  
143 more emotionally affected by their illness also experienced lower sexual and body esteem  
144 and perceived themselves as less attractive (18). The authors found that an individual's illness  
145 perceptions were a greater predictor of sexual functioning than other previously identified  
146 factors, such as sociodemographic characteristics or disease activity (18). Identifying whether  
147 illness perceptions play a role in the sexual function of women with SS would be worthwhile  
148 as previous research has shown that brief cognitive behavioural interventions have  
149 successfully managed to modify negative illness perceptions, leading to improvements in  
150 adjustment and functioning (19), which may be a potential avenue of sexual dysfunction  
151 management in SS.

152 In addition to the role of psychosocial factors, certain interpersonal factors have also been  
153 shown to be implicated in female sexual dysfunction. One example is the impact that a  
154 partners response behaviours (i.e. the behaviours a partner displays in response to the other  
155 partners pain behaviours) can have on sexual function and sexual satisfaction (20). An 8-  
156 week diary study conducted by Rosen and colleagues (21) found that the sexual function of  
157 women with vulvodynia was significantly impaired when their partners displayed more  
158 negative (expressions of hostility or frustration) or solicitous behaviours (expressions of  
159 attention and sympathy). In contrast, their sexual functioning was found to be improved when  
160 their partners displayed facilitative behaviours, such as affection and encouragement (21).

161 Such evidence provides support for the exploration of the role of a partners response  
162 behaviours in SS.

163 The research outlined above suggests that psychosocial and interpersonal factors may play an  
164 important role in developing and maintaining female sexual dysfunction. Therefore, there is a  
165 need to understand the role of psychosocial and interpersonal variables in predisposing,  
166 perpetuating and precipitating sexual dysfunction in SS. Identifying influencing factors in this  
167 patient group may help develop non-pharmaceutical interventions that facilitate the  
168 successful management of sexual dysfunction for women with SS. This explorative study  
169 aimed to address the gap in the literature by investigating whether coping strategies, illness  
170 perceptions and relationship dynamics (i.e. relationship satisfaction and partners response  
171 behaviours) were associated with sexual function and sexual distress for women with SS.

## 172 **MATERIALS AND METHODS**

173 An online cross-sectional survey was conducted between July - December 2021. Ethical  
174 approval was obtained from the Ethical Committee at Northumbria University (26288). All  
175 participants provided written informed consent in compliance with the Declaration of  
176 Helsinki. No compensation was provided for participating in the study. Recruitment  
177 advertisements were displayed on Twitter, SS-specific groups on Facebook, and in member  
178 newsletters or websites of SS associations in the UK, USA, Canada and Europe. Cisgender  
179 females aged 18+ and diagnosed with SS were invited to participate. The study did not  
180 exclude participants based on country of residence; however, participants needed to be  
181 proficient in reading and writing in English. Potential participants were pre-informed about  
182 the sexual nature of the questions in the study to ensure that no unnecessary distress was  
183 caused to participants and that they could make an informed choice regarding their  
184 comfortability with answering questions about their sexual function and sexual lives.

185 Informed consent was given by 139 respondents. However, 41 respondents dropped out  
186 (without providing a reason), yielding a total of 98 participants (response rate=71%).  
187 Retained participants and dropouts did not significantly differ in age, disease duration,  
188 relationship duration, menopausal status, ESSPRI subscales or vaginal dryness (all  $p>.05$ ).

### 189 *Assessment measures*

190 The European League Against Rheumatism (EULAR) Sjögren's Syndrome Patient Reported  
191 Index (ESSPRI) was used to assess the severity of symptoms of dryness, fatigue and pain  
192 (joint or muscular pain) over the previous two-week period (22). An 11-point numeric rating  
193 scale (NRS) labelled from 0, '*no symptom at all*' to 10, '*worst symptom imaginable*' was  
194 used to capture the severity of symptoms from the patient's perspective. A total ESSPRI  
195 score was derived by calculating the mean score of the three domains. A higher score  
196 represents severer symptom impact. While Cronbach's alpha is just 0.68 for this study,  
197 ESSPRI has been shown to have good psychometric properties when used in clinical research  
198 with SS patients (23).

199 An additional NRS, compiled for this study, was included to assess the severity of  
200 vaginal dryness. Participants were asked to rate the severity of their vaginal dryness over the  
201 last two weeks on a scale of 0 ('*no symptom at all*') to 10 ('*worst symptom imaginable*').  
202 Higher scores indicate greater symptom severity.

203 The 19-item Profile of Fatigue and Discomfort (ProFaD) was utilised to assess disease-  
204 specific fatigue and discomfort (24). The ProFaD assesses three domains of fatigue: somatic  
205 fatigue, mental fatigue and general discomfort and participants are asked to rate the severity  
206 of each symptom over the last two weeks. It is rated on an 8-item response scale ranging from  
207 '*no problem at all*' (0) to '*as bad as imaginable*' (7). The facet items within each domain  
208 were averaged to obtain a total domain score. Higher scores are indicative of greater levels of



209 fatigue and discomfort. The ProFaD was found to have excellent internal consistency in this  
210 sample (Cronbach's  $\alpha=0.97$ ).

211 Sexual functioning was measured with the Female Sexual Functioning Index (FSFI) (25).  
212 The FSFI contains 19 items that assess six domains of sexual function: arousal, desire,  
213 lubrication, orgasm, satisfaction, and pain (during penetration) over the previous 3-month  
214 period. Response options were either on a 5 or 6-item Likert scale, with the response anchors  
215 differing depending upon the context of the questions (e.g. frequency, difficulty, satisfaction).  
216 The additional response option on the 6-item scale reflected either '*no sexual activity*' or '*did*  
217 *not attempt intercourse*'. Items within each domain were summed and multiplied by the  
218 domain factor value (25). A total FSFI score was computed by summing domain scores, with  
219 a higher score indicating better self-rated sexual functioning. A total FSFI score  $<26.55$  was  
220 used as a cut-off value to identify clinical cases of sexual dysfunction (26). The FSFI has  
221 been extensively used in research employing various clinical and non-clinical groups and has  
222 been shown to have excellent internal consistency (25, 27-29), which was also found in this  
223 sample (Cronbach's  $\alpha=0.96$ ).

224 The Female Sexual Distress Scale (FSDS) (30) was used to assess levels of distress  
225 associated with impaired sexual function. Respondents were asked to indicate on a scale of 0  
226 ('*never*') to 4 ('*always*') how often they experience a variety of emotional and affective states  
227 regarding their sexual function. Responses to the 12 items were summed to compute a total  
228 score (ranging from 0-48). Higher scores indicate more self-rated sexual distress, with a cut-  
229 off score of  $>11$  identifying high levels of sexual distress (31). In this sample, the FSDS was  
230 shown to have excellent internal consistency (Cronbach's  $\alpha=0.96$ ), which is similar to  
231 previous studies that have utilised the measure with women with sexual disorders (i.e.  
232 hypoactive sexual desire disorder and female sexual dysfunction) (31,32).

233 The 36-item Cognitive Emotion Regulation Questionnaire (CERQ) was used to assess the  
234 cognitive coping strategies that an individual uses to respond to a stressful life event (33). In  
235 this study, the CERQ was framed within a specific context and participants were asked about  
236 their cognitive coping strategies when thinking about any difficulties they may have  
237 experienced in their sexual life (33). Nine cognitive coping strategies are assessed: five  
238 adaptive strategies (acceptance, positive refocusing, positive reappraisal, putting into  
239 perspective and refocusing on planning) and four maladaptive strategies (self-blame,  
240 rumination, catastrophising and blaming others). A 5-point Likert scale was used to capture  
241 the frequency of the thought on a scale ranging from 1, '*almost never*', to 5, '*almost always*'.  
242 Items corresponding to each coping strategy were summed to compute a total score. Higher  
243 scores on a domain represent a greater frequency of use for that particular coping strategy.  
244 The internal consistency of eight of the subscales was either acceptable or good (Cronbach's  
245  $\alpha \geq 0.71$  and  $\leq 0.87$ ), while one subscale (positive refocusing) was found to have questionable  
246 reliability (Cronbach's  $\alpha = 0.63$ ). However, the range of Cronbach's  $\alpha$  values for this sample  
247 are comparable to other studies utilising the CERQ with healthy populations (Cronbach's  $\alpha \geq$   
248  $0.68 \leq 0.83$ ) (33) and a sample of primary SS patients (Cronbach's  $\alpha \geq 0.67$  and  $\leq 0.81$ ) (34).

249 The Brief Illness Perceptions Questionnaire (B-IPQ) was used to assess the cognitive and  
250 emotional representations respondents hold toward their illness (35). The B-IPQ contains  
251 nine items, five of which assess cognitive representations (consequences, timeline, personal  
252 control, treatment control, identity), two assess emotional representations (concern,  
253 emotions), and one item assesses illness comprehensibility (coherence). The remaining item,  
254 which assesses causal representations of the illness, was not included as it was irrelevant to  
255 the study's aim. Responses were captured on an 11-point scale, with anchor points  
256 representing '*not at all*' (0) and '*extremely affected*'. Scores on the eight items were summed  
257 together to form a total B-IPQ score. A higher total B-IPQ score indicates a greater perceived

258 psychological burden of illness (35). The internal consistency of the B-IPQ was found to be  
259 acceptable for this sample (Cronbach's  $\alpha=0.74$ ).

260 Relationship satisfaction was assessed with the 10-item marital subscale of the Maudsley  
261 Marital Questionnaire (MMQ) (36). A 9-point scale (0-8) was used to capture the  
262 participant's perceptions regarding the dynamics of their relationship over the previous 3-  
263 month period. The original questionnaire used the word 'marriage' within the questions;  
264 however, in this study, the word 'marriage' was changed to 'relationship' to increase the  
265 applicability of the measure. Scores on the marital subscale of the MMQ ranged from 0 to 80,  
266 with higher scores indicating greater relationship dissatisfaction. In this sample, the internal  
267 consistency of the marital subscale of the MMQ was found to be excellent (Cronbach's  
268  $\alpha=0.94$ ), which is similar to values reported by previous research (Cronbach's  $\alpha=0.90-0.93$ )  
269 (37,38).

270 Part II of the West-Haven Yale Multidimensional Pain Inventory (WHYMPI) was utilised to  
271 assess a respondent's perceptions of the degree to which their partner displays solicitous,  
272 distracting or negative behaviours in response to their communicated pain (39). Respondents  
273 were asked to indicate, on a 7-point Likert scale ('never' (0), 'very often' (6)), how often their  
274 partner displays a particular behaviour in response to their pain behaviours and complaints.  
275 Mean scores were calculated for each behavioural domain. Higher scores represent a greater  
276 frequency of that category of behaviours. Internal consistency for the negative responses  
277 (Cronbach's  $\alpha=0.62$ ) and the distracting responses (Cronbach's  $\alpha=0.69$ ) subscales were found  
278 to be lower in this study than has been previously reported (Cronbach's  $\alpha=0.84$  and  $0.74$ ,  
279 respectively) (39). For the solicitous responses subscale, internal consistency was higher than  
280 previously reported (Cronbach's  $\alpha=0.83$  vs  $\alpha=0.78$ , respectively) (39).

281 *Statistical Analyses*

282 An a-priori power calculation estimated that a sample size of 89 was adequate to achieve the  
283 specified parameters ( $\alpha=0.05$ ,  $1-\beta=0.80$ ,  $d=0.5$ , two-tailed) (40). A medium effect size was  
284 employed for the calculation due to it being the smallest effect size of interest. This ensures  
285 both an achievable sample size and the ability to detect a meaningful difference that has  
286 practical importance (41). An additional 10% was included to account for data attrition.  
287 Three cases with missing data (>10% on 3 or more questionnaires) were removed prior to  
288 analysis. Data analysis was performed using IBM SPSS Version 28.0. Descriptive statistics  
289 were calculated for all variables. Fisher's exact test and Pearson's chi-square test were used  
290 for categorical variables. Independent-samples t-tests and Mann-Whitney u tests were used  
291 (as appropriate) to assess group differences based on menopausal status. Data for the  
292 menopausal women were not included in the group comparisons due to the limited sample  
293 size. Participants who were not sexually active in the previous three-month period ( $n=17$ )  
294 were not included in any inferential analyses that involved the FSFI questionnaire. This is  
295 because sexually inactive participants will score zero or one for most questions on the FSFI,  
296 resulting in a low total FSFI score, which may be incorrectly construed as sexual dysfunction.  
297 Including sexually inactive participants in the analysis of this measure would likely lead to  
298 the overestimation of the prevalence of sexual dysfunction in the sample (42). Associations  
299 between sexual function (FSFI), sexual distress (FSDS) and the other outcome measures were  
300 assessed using Spearman's Rho correlation coefficients. Variables significantly associated  
301 with each dependent variable were entered into a backward stepwise multiple regression to  
302 identify any factors associated with sexual function (total FSFI score) and sexual distress  
303 (total FSDS score). Raw, unadjusted p-values are presented permitting the reader to make  
304 their own preferred adjustments for multiple testing. The threshold for significance was set at  
305  $p<0.05$ .

## 306 **RESULTS**

307 A total of 98 cisgender females participated in the study (Table 1). Participants were  
308 predominantly from the UK (47%), USA (23.5%), Europe (13.3%) and Canada (11.2%) and  
309 were aged between 21 and 73 years (M=48.13, SD=13.26). The majority of the sample were  
310 of white ethnicity (91.8%), identified as heterosexual (91.8%) and were in a relationship  
311 (91.8%) with male partners (100%). Approximately half of the sample were premenopausal  
312 (43.8%), and the other half were postmenopausal (48.0%). Primary SS was the most common  
313 diagnosis (70.4%). A small number of participants were diagnosed with another autoimmune  
314 rheumatic disease (e.g. RA (16%), SLE (14.6%) or osteoarthritis (8%)).

315 The majority of the sample were considered sexually active, as they had engaged in sexual  
316 activity within the previous 3-month period (n=81, 82.7%). There was a small subset of the  
317 sample (n=17, 17.3%) who had not engaged in any sexual activity within the last 12 months  
318 (n=8/17, 47.1%) or within the last five years (n=7/17, 41.2%) and were therefore classified as  
319 being currently sexually inactive. Comparisons between the sexually active and inactive  
320 groups found that the groups were broadly similar, though the sexually inactive group was  
321 significantly older, with higher self-reported ESSPRI Fatigue and ESSPRI Dryness scores (all  
322  $p < .05$ ). Vaginal dryness was self-reported by 92.9% of women with SS. The severity of  
323 vaginal dryness was described as 'mild to moderate' in 30.8% of cases and 'severe to very  
324 severe' in 69.2% of cases. A clinical level of sexual dysfunction (indicated by a total FSFI  
325 score  $< 26.55$ ) was identified in 85.2% of respondents (n=69/81) ( $Mdn=18.90$ ;  $IQR=8.45$ )

### 326 *Sexual functioning, sexual distress and menopausal status*

327 Stratifications based on menstrual status found that postmenopausal women with SS had  
328 significantly poorer sexual function (total FSFI score) than premenopausal women with SS.  
329 Analysis of FSFI subdomains found that postmenopausal women with SS had significant  
330 reductions in desire, lubrication, satisfaction, and experienced significantly more pain during

331 vaginal penetration or intercourse than premenopausal women with SS (all  $p < .05$ ). No  
332 significant differences were found between the groups on the subdomain of orgasm or arousal  
333 ( $p > .05$ ) (Table 2). Point-biserial correlations found a significant association between  
334 menopausal status and sexual function ( $r = -.351$ ,  $p = .002$ ) (Supplementary Table 1). According  
335 to the total FSDS cut-off score of 11, 87.8% ( $n = 86/98$ ) of women with SS in this sample  
336 regularly experienced high levels of emotional distress in regard to their sexual lives.  
337 Between-group analyses ( $N = 90$ ) found no significant differences to suggest that total FSDS  
338 score was influenced by menopausal status ( $p > .05$ ) (Table 2). Point-biserial correlations  
339 between menopausal status and sexual distress were not found to be significant ( $p > .05$ )  
340 (Supplementary Table 1).

341 *Parameters associated with sexual function (FSFI score)*

342 Associations between psychosocial and interpersonal parameters, disease parameters and  
343 sexual function were explored (Table 3). Poorer sexual function, as indicated by a lower total  
344 FSFI score, was significantly associated with increases in age, vaginal dryness, ProFaD  
345 mental fatigue, CERQ self-blame, CERQ rumination, CERQ catastrophising, B-IPQ  
346 consequences, B-IPQ identity, B-IPQ total score, WHYMPI negative responses, MMQ  
347 relationship dissatisfaction, and with decreases in B-IPQ personal control. Higher self-rated  
348 sexual functioning was significantly associated with increases in CERQ positive reappraisal,  
349 CERQ perspective, WHYMPI solicitous responses, WHYMPI distracting responses and total  
350 WHYMPI score (all  $p < .05$ ).

351 All variables that significantly correlated with sexual function were entered into the  
352 regression model. Analyses found that less vaginal dryness, more CERQ positive reappraisal  
353 and less CERQ catastrophising were significantly associated with higher self-rated sexual  
354 functioning, accounting for 42.0% of the variance in total FSFI scores ( $R^2 = .420$ ,

355  $F(3,72)=17.394, p<.001$ ) (Table 4).

356 *Parameters associated with sexual distress (FSDS score)*

357 Associations between psychosocial and interpersonal parameters, disease parameters and  
358 sexual distress were explored (see Table 3). Sexual distress, as indicated by a higher total  
359 FSDS score, was significantly associated with increases in vaginal dryness, ProFaD mental  
360 fatigue, CERQ self-blame, CERQ rumination, CERQ catastrophising, B-IPQ consequences,  
361 B-IPQ identity, B-IPQ illness concern, B-IPQ emotional representation, B-IPQ total score,  
362 WHYMPI negative responses, MMQ relationship dissatisfaction and with decreases in B-IPQ  
363 personal control and B-IPQ treatment control. Lower self-rated sexual distress was  
364 significantly associated with increases in CERQ positive reappraisal, CERQ perspective,  
365 WHYMPI solicitous responses, WHYMPI distracting responses and total WHYMPI score  
366 (all  $p<.05$ ).

367 The results of the regression analyses indicated that four variables explained 63.1% of the  
368 variance in total FSDS scores ( $R^2=.631, F(5,83)=28.376, p<.001$ ). The variables that were  
369 found to be significantly associated with higher sexual distress (higher total FSDS score)  
370 were: higher CERQ rumination, lower CERQ perspective, less WHYMPI distracting  
371 responses and higher B-IPQ identity (Table 5).

372 **DISCUSSION**

373 This study explored associations between various psychosocial and interpersonal variables  
374 and sexual function and sexual distress for women with SS. Previous research investigating  
375 sexual functioning for women with SS typically identifies a high prevalence of a clinical level  
376 of sexual dysfunction in their samples (10,13,43), which was also the case in this study. In  
377 our sample we also identified a higher prevalence of vaginal dryness; however, this was  
378 marginally higher in this sample than in prior investigations with women with SS (10,13). We

379 found that increases in severity of vaginal dryness were significantly associated with poorer  
380 sexual function, which has been reported previously (10,42). Results from the regression  
381 analyses found that vaginal dryness was significantly associated with reductions in sexual  
382 function for women with SS. To our knowledge, no previous research has included vaginal  
383 dryness as a predictor variable in similar analyses for this population group. However, this  
384 association has been identified for healthy women (44,45) and women with systemic sclerosis  
385 (46). We also found that increases in the severity of vaginal dryness were significantly  
386 associated with increases in sexual distress, which, to our knowledge, has not previously been  
387 investigated for women with SS. Although not assessed in this study, vaginal dryness has  
388 previously been associated with increased pain during intercourse (dyspareunia) for women  
389 with SS (13,43). It is thought that repeated experiences of dyspareunia lead to hypervigilance  
390 of pain sensations within the sexual environment; this then has a knock-on effect on  
391 physiological sexual responses such as desire, arousal and lubrication (47). Future research  
392 should explore this mechanism to identify its role in sexual function in women with SS.

393 Regarding disease parameters, our study found that patient-reported symptoms of pain,  
394 fatigue and dryness (ESSPRI) were not significantly associated with sexual function or sexual  
395 distress, which is discordant with previous research (13,42). However, we acknowledge that  
396 the internal consistency of the ESSPRI measure was lower in our sample than in other SS  
397 samples, which may account for the lack of consistency between findings. Our study also  
398 found that increases in mental fatigue were significantly associated with poorer sexual  
399 function and greater sexual distress; however, no significant associations were found for  
400 somatic fatigue and general discomfort. A previous study that utilised the Multidimensional  
401 Fatigue Inventory (MFI) to assess relationships between dimensions of fatigue and sexual  
402 function also found that greater mental fatigue was associated with reductions in sexual  
403 function and increases in sexual distress (13). However, the study also found that reduced



404 motivation was significantly associated with both sexual parameters, which was not the case  
405 in this study or a study with women with SLE (48). Despite the negative impacts of fatigue  
406 on female sexual functioning, the mechanisms of action of how it impacts the sexual response  
407 cycle have not been widely investigated. However, research involving women with chronic  
408 fatigue syndrome suggests that fatigue dampens sexual desire (49), reduces sexual pleasure,  
409 impairs ability to reach orgasm, and can lead to avoidance and reduced frequency of sexual  
410 activity (50). Future research should explore the impacts of fatigue on the domains of sexual  
411 function as well as attaining the lived experiences of women with SS to gain a greater  
412 understanding of the role of fatigue on sexual functioning parameters in SS.

413 Previous research investigating differences in sexual functioning for women with SS based  
414 on menopausal status found that postmenopausal women with SS had significantly poorer  
415 overall sexual function than premenopausal women with SS (43). This finding was also  
416 corroborated in this study. Furthermore, we identified that postmenopausal women with SS  
417 had significantly lower levels of desire, reduced levels of vaginal lubrication, higher levels of  
418 pain during vaginal intercourse and reduced levels of sexual satisfaction than premenopausal  
419 women with SS. We did not find any evidence to suggest that levels of arousal or ability to  
420 reach orgasm were impacted by menopausal status in SS, with both subgroups displaying an  
421 average score that suggests that in most sexual interactions, they are able to become aroused  
422 and reach orgasm. This is noteworthy, given that the presence of vaginal dryness and  
423 increases in dyspareunia observed in this population would typically be perceived to impact  
424 these sexual response phases (51,52). Whilst it is important to consider the possible  
425 mechanisms which could account for this, our ability to do so is hindered due to a lack of  
426 reporting of the subdomains of sexual functioning in pre-and-postmenopausal women with  
427 SS (13,43). However, in other disciplines, menopausal women, both with and without a  
428 chronic illness, tend to experience significantly poorer functioning across all subdomains of

429 the FSFI, including arousal (53,54) and orgasm (55). Further comparative research is  
430 therefore needed in SS to unpick the underlying explanations which would account for the  
431 observed differences between pre-and-postmenopausal states.

432 Previous studies that have utilised a control group comparison to explore differences  
433 in sexual functioning in pre-and menopausal women with SS have found that premenopausal  
434 women with SS have significantly poorer sexual function than premenopausal controls (43).  
435 Although menopausal women with SS experienced sexual dysfunctions, these did not  
436 significantly differ from those experienced by healthy postmenopausal women (43). This  
437 would suggest that the sexual difficulties experienced by premenopausal women with SS may  
438 not be attributed to their menstrual status, unlike menopausal women whose sexual  
439 difficulties are typically attributed to increases in age (56), reductions in hormone levels (e.g.  
440 oestrogen, testosterone, DHEAS) (11) and vaginal atrophies (9). Further exploration of  
441 reasons as to why premenopausal women with SS experience atypical sexual functioning in  
442 comparison to menstrual-matched healthy controls.

443 In this study, we also explored associations between sexual functioning and various  
444 psychosocial and interpersonal parameters. Regarding coping strategies, we found that  
445 various coping strategies were associated with sexual function and sexual distress for women  
446 with SS. Firstly, maladaptive coping strategies, such as blaming self for the sexual issues  
447 (self-blame), having repeated thoughts and negative feelings about the sexual issues  
448 (rumination) and emphasising the awfulness of the sexual situation (catastrophising), were all  
449 found to be significantly associated with poorer sexual function and higher levels of sexual  
450 distress. In regression analyses, catastrophising was significantly associated with poorer  
451 sexual function and rumination was significantly associated with higher levels of sexual  
452 distress. Adaptive coping strategies, such as attaching a positive meaning to the sexual  
453 experiences (positive reappraisal) or downplaying the seriousness of the sexual issues

454 compared to other problems (perspective), were significantly associated with better sexual  
455 function or less sexual distress. Previous research has identified a similar pattern, whereby  
456 certain adaptive and maladaptive coping strategies were associated with either improvements  
457 or declines in sexual function (15) and sexual distress (57).

458 Moreover, we identified several significant associations between various illness  
459 representations and sexual function and sexual distress. We found that women with SS who  
460 perceived their illness to affect their life more severely (consequences), who had a lack of  
461 personal control over their illness (personal control), who attributed more severe symptoms to  
462 their illness (identity) or had a more threatening view of their illness (B-IPQ total) also had  
463 significantly poorer sexual functioning and experienced significantly higher levels of sexual  
464 distress. Additionally, greater levels of sexual distress were experienced by those individuals  
465 with SS who perceived poor treatment efficacy (treatment control), were more concerned  
466 about their illness (illness concern) or experienced more emotional distress as a result of SS  
467 (emotional representation). In regression analyses, only illness identity was significantly  
468 associated with sexual distress. No such associations were identified for sexual function. Our  
469 results are discordant with previous research, which found that four illness representations  
470 (emotional representation, consequences, coherence and treatment control) significantly  
471 determined sexual functioning in women with SLE (18).

472 Furthermore, we investigated associations between a partners response behaviours and sexual  
473 function and sexual distress for women with SS. We found that negative responses were  
474 significantly associated with poorer sexual function and higher levels of sexual distress,  
475 which is consistent with previous research (58). We found that solicitous responses and  
476 distracting responses were significantly associated with better sexual function and reductions  
477 in sexual distress. However, similar research with women with provoked vestibulodynia  
478 found no evidence of an association between a partners solicitous behaviours and sexual

479 function (58-60). The subdomain distracting responses has not previously been assessed in  
480 relation to sexual function. This study also found that a partners use of distracting behaviours  
481 was significantly associated (regression analyses) with less sexual distress for women with  
482 SS. However, regression analyses found no such associations for sexual function, which is  
483 consistent with previous research (58,59). Regarding relationship satisfaction, significant  
484 associations were found between relationship dissatisfaction and sexual function and sexual  
485 distress, which is in accordance with previous research (13). However, once other factors  
486 were entered into the regression analysis, relationship dissatisfaction was not significantly  
487 associated with sexual function or sexual distress in this study or in previous research with  
488 women with SS (13).

489 The role of various psychosocial and interpersonal factors on female sexual functioning and  
490 sexual distress in SS were explored in this study. The associations between coping strategies,  
491 illness perceptions, partners response behaviours and relationship satisfaction were explored  
492 as direct contributors to the sexual outcomes; however, evidence suggests that these factors  
493 may be implicated in mediating pathways. For example, an individual's coping strategies  
494 have been found to mediate the relationship between illness perceptions and sexual  
495 functioning, as proposed by self-regulation theory (61).

496         Moreover, a more recent theoretical perspective on the mechanisms by which some of  
497 the psychosocial and interpersonal variables investigated in the study play a role in sexual  
498 function has been proposed by Rosen and Bergeron (20). The interpersonal emotion  
499 regulation model of women's sexual dysfunction is a model which views sexual function  
500 from a biopsychosocial perspective and acknowledges the important role that psychosocial  
501 and interpersonal variables play in sexual function. The model describes how distal factors  
502 (relating to overarching traits or predisposing aspects of the relationship) and proximal factors  
503 (relating to what occurs before, during, and immediately following painful sexual activities)

504 affect an individual, and the couple's emotional regulation, which then has a bearing on the  
505 sexual outcomes. For example, distal factors such as catastrophising, intimacy, attachment  
506 and sexual communication, as well as proximal factors such as partners responses to pain,  
507 anxiety, depression and sexual motivation, reciprocally influence the individual's regulation  
508 and the couple's co-regulation. Those with less adaptive emotion regulation strategies, such  
509 as avoidance, suppression, catastrophising and emotional outbursts, are more likely to display  
510 negative outcomes such as greater sexual pain, poorer sexual function, more sexual and  
511 psychological distress, and less sexual and relationship satisfaction. Whereas those with more  
512 adaptive strategies (e.g. reappraisal, acceptance, mindfulness, problem-solving) are less likely  
513 to experience negative outcomes, reporting better sexual function, better sexual and  
514 relationship satisfaction, less psychological distress and less pain during sexual activity (20).

515         In light of this model, we can see that our findings draw several parallels and  
516 differences. Regarding coping strategies, we found evidence to suggest that sexual  
517 functioning and levels of sexual distress were related to the coping strategies elicited by an  
518 individual. In particular, maladaptive coping strategies (catastrophising, rumination, self-  
519 blame) were associated with poorer sexual outcomes, and better sexual outcomes were  
520 associated with more adaptive coping strategies (positive reappraisal, perspective). In  
521 contrast, our evidence regarding a partners response behaviour was discordant with the  
522 model, which posits that solicitous and negative partner responses disrupt emotion regulation  
523 and lead to poorer sexual outcomes as both behaviours reinforce avoidance of pain in a  
524 sexual situation which creates a negative feedback loop further modulating and maintaining  
525 sexual dysfunctions. However, our study found that only negative partner responses were  
526 associated with poorer sexual outcomes. We found that solicitous behaviours were associated  
527 with better sexual function and lower sexual distress in women with SS. It may be that  
528 solicitous behaviours may be interpreted by individuals with a chronic illness such as SS to

529 be more helpful in the sexual environment than a hindrance (62). It would be beneficial for  
530 research to explore this potential explanation in qualitative research or using dyadic diary  
531 methods with women with SS. We also explored relationship satisfaction; however, this  
532 model would suggest that this factor was more appropriate as an outcome variable rather than  
533 an independent factor, which may explain why it was found to be non-significant in this  
534 study. Future research should explore the mediating pathways suggested by this recently  
535 proposed model using structural equation modelling (SEM) to determine the contribution of  
536 psychosocial and interpersonal factors to sexual dysfunction in SS. Future research would  
537 also benefit from including the partners perspectives and their contributions to sexual  
538 functioning in this chronic illness population.

539 This study shows that further exploration of the impacts that psychosocial and interpersonal  
540 factors have on sexual functioning and sexual distress in women with SS is warranted.  
541 Previous intervention research has found that cognitive-based therapies have successfully  
542 modified negative illness perceptions (63,64) and maladaptive coping strategies (65), leading  
543 to improvements in adjustment and functioning. It is not unreasonable to suggest that the  
544 modification of coping strategies and illness perceptions could lead to better sexual outcomes  
545 for women with SS. Our findings may guide interventions by providing information  
546 concerning what types of coping strategies, illness perceptions and partners response  
547 behaviours to target in future interventions.

548 Our study has some limitations. Firstly, the study was cross-sectional, therefore limiting  
549 interpretations about causality. As such, we cannot draw definitive conclusions regarding the  
550 directionality of the associations identified in this study. However, this design was useful for  
551 establishing preliminary evidence that can be used to inform future research into sexual  
552 functioning in SS. Another limitation is that we did not include or control for other  
553 psychosocial or interpersonal variables previously shown to contribute to sexual function in

554 other chronic illness populations. For example, depression (13), anxiety (43), body image  
555 concerns (66) and sexual communication (67). It would be beneficial for future research to  
556 better understand the mediating relationships and interactions between the variables explored  
557 in this study and sexual functioning in SS. The use of self-report data in this study was also a  
558 limitation. Future research may also include other sources of information, such as laboratory  
559 measurements, to provide some objectivity to the subjective reports. Additionally,  
560 participants self-reported their diagnosis of SS, and no attempts were made by the research  
561 team to externally confirm the status reported. Future research should confirm the diagnosis  
562 through medical records or by utilising a disease classification tool, such as the European  
563 Sjögren's Syndrome Disease Activity Index (ESSDAI) (68), to measure disease activity  
564 objectively. However, there was no practising clinician within the research team, so we could  
565 not include this measure in the current study. Another limitation is that some measures (i.e.  
566 ESSPRI) or specific subscales of measures (i.e. CERQ positive refocusing, WHYMPI  
567 negative responses, WHYMPI distracting responses) used in this study displayed moderate  
568 levels of internal consistency. Therefore, results pertaining to these measures should be  
569 interpreted with caution. Future research may want to consider using more reliable measures  
570 to assess coping strategies (e.g. Brief COPE) (69) or assessing sexual communication instead  
571 of partners response behaviours (e.g. using the Dyadic Sexual Communication (DSC) scale)  
572 (70) with SS samples. Our study was also limited to cisgender women in mixed-sex  
573 relationships. Future research should explore the sexual functioning of cisgender men and  
574 transgender populations with SS and those in same-sex relationships.

## 575 **CONCLUSION**

576 This study is one of the first to explore the impacts of coping strategies, illness perceptions,  
577 and relationship dynamics on sexual function and sexual distress for women with SS. Our  
578 study found that individuals using adaptive coping strategies had better sexual function and

579 lower levels of sexual distress than those using maladaptive coping strategies. We also found  
580 that certain response behaviours elicited by the partner were significantly associated with  
581 better sexual function and less sexual distress. The findings from our study would suggest  
582 that interpersonal and psychosocial factors are important contributors to sexual function and  
583 distress in women with SS and that the development of psychosocial or interpersonal  
584 interventions for this population is warranted.

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777 **Table 1.** Sociodemographic and disease characteristics of the sample

Demographics	n (%)
Location of Residence	
United Kingdom & Ireland	46 (47.0%)
United States	23 (23.5%)
Europe	13 (13.3%)
Canada	11 (11.2%)
Asia	2 (2%)
South America	1 (1%)
Australia	1 (1%)
New Zealand	1 (1%)
Age (years) (Mean (Range))	48.13 (21 - 73)
Ethnicity	
White	90 (91.8%)
Mixed or multiple ethnic groups	4 (4.1%)
Black, African, Black British, Caribbean	2 (2.0%)
Asian or Asian British	2 (2.0%)
Sexual Orientation	
Heterosexual	90 (91.8%)
Bisexual	8 (8.2%)
Sex of partner	
Male	98 (100%)
Relationship Status (Mean (Range))	
In a relationship	90 (91.8%)
Not in a relationship	8 (8.2%)
Relationship Duration (months) (Mean (Range))	215 (0.5-612)
Disease Classification	
Primary Sjögren's Syndrome	69 (70.4%)
Secondary Sjögren's Syndrome	9 (9.2%)
Not classified as either primary or secondary	20 (20.4%)
Disease Duration (months) (Mean (Range))	80.39 (3 – 348)
Comorbid disease	
Yes	75 (76.5%)
Fibromyalgia	15 (20.0%)
RA	12 (16.0%)
IBS	11 (14.6%)
SLE	11 (14.6%)
No	23 (23.5%)
Medication	
Yes	80 (81.6%)
HCQ	43 (53.8%)
Analgesics	33 (41.3%)
Pilocarpine	12 (15.0%)
Corticosteroids	12 (15.0%)
No	18 (18.4%)
Menopausal Status	
Premenopausal	43 (43.8%)
Menopausal	8 (8.2%)
Postmenopausal	47 (48.0%)
Age at Menopause (years) (Mean (Range))	45.42 (29 – 55)
HRT Treatment	
Yes	24 (43.6%)
No	31 (56.4%)
Contraception usage	
Yes	34 (66.7%)
No	14 (27.5%)
Currently pregnant	3 (5.9%)

778 *Note.* N = 98. RA = Rheumatoid Arthritis; IBS = Irritable Bowel Syndrome; SLE = Systemic Lupus



779 Erythematosus; HCQ = Hydroxychloroquine; HRT = Hormone Replacement Therapy.

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782 **Table 2.** Differences in sexual parameters for pre-and-postmenopausal women with SS

	Premenopausal	Postmenopausal	<i>U</i>	<i>Z</i> score	<i>p</i>	ES ( <i>r</i> )
	women with SS	women with SS				
	Median (IQR)	Median (IQR)				
FSFI Total <sup>a</sup>	20.60 (10.80)	17.30 (11.05)	417.50	-3.017	<b>.002</b>	-.35
Desire	3.60 (2.40)	2.40 (1.80)	453.50	-2.665	<b>.007</b>	-.31
Arousal	3.90 (2.40)	3.30 (3.15)	520.50	-1.929	.054	-.22
Lubrication	3.00 (2.40)	1.80 (2.25)	477.00	-2.400	<b>.016</b>	-.28
Orgasm	4.40 (2.80)	4.00 (3.50)	572.50	-1.381	.169	-.16
Satisfaction	4.40 (2.40)	2.40 (3.00)	496.50	-2.188	<b>.028</b>	-.25
Pain	3.20 (2.00)	1.60 (3.10)	384.00	-3.386	<b>.001</b>	-.39
FSDS score <sup>b</sup>	23.00 (26.00)	25.00 (16.00)	923.00	-.707	.482	-.07

783 *Note.* Significant *p*-values are presented in bold. FSFI = Female Sexual Function Index;

784 FSDS = Female Sexual Distress Scale.

785 <sup>a</sup>N = 75/98 (analysis did not include sexually inactive cases (n = 17) and menopausal women

786 (n = 6)).<sup>b</sup>N = 90/98 (analysis did not include menopausal women (n = 6)).

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799 **Table 3.** Spearman’s correlations for sexual function (FSFI) and sexual distress (FSDS) for  
 800 women with SS

	FSFI total <sup>a</sup>			FSDS total <sup>b</sup>		
	ρ	p	95% CI (LB, UB)	ρ	p	95% CI (LB, UB)
Age (years)	-.270	<b>.015</b>	-.467, -.049	.055	.592	-.151, .256
Disease duration (months)	-.030	.793	-.253, .196	-.090	.379	-.289, .116
Relationship duration (months)	-.180	.119	-.396, .054	-.060	.577	-.269, .155
VAS Vaginal dryness	-.350	<b>.001</b>	-.533, -.136	.236	<b>.019</b>	.034, .420
VAS Vulva dryness	-.414	<b>.000</b>	-.584, -.209	.379	<b>.000</b>	.190, .541
ESSPRI total	-.165	.141	-.376, .062	.107	.295	-.099, .304
Pain	-.106	.344	-.323, .121	.011	.911	-.193, .215
Fatigue	-.117	.298	-.333, .110	.118	.247	-.088, .315
Dryness	-.168	.134	-.378, .059	.173	.089	-.032, .364
ProFaD						
Somatic Fatigue	-.149	.185	-.361, .079	.106	.299	-.100, .303
Mental Fatigue	-.294	<b>.008</b>	-.486, -.074	.296	<b>.003</b>	.098, .472
General Discomfort	-.141	.208	-.355, .086	.136	.182	-.070, .331
CERQ						
Self-Blame	-.264	<b>.017</b>	-.461, -.042	.548	<b>.000</b>	.385, .677
Acceptance	-.203	.070	-.409, .023	.089	.388	-.119, .290
Rumination	-.296	<b>.007</b>	-.488, -.077	.619	<b>.000</b>	.473, .732
Positive Refocusing	.139	.216	-.088, .353	-.062	.548	-.265, .146
Refocus on Planning	.158	.158	-.069, .370	-.093	.369	-.293, .116
Positive Reappraisal	.469	<b>.000</b>	.273, .628	-.433	<b>.000</b>	-.587, -.249
Perspective	.341	<b>.002</b>	.126, .525	-.378	<b>.000</b>	-.542, -.186
Catastrophising	-.499	<b>.000</b>	-.651, -.310	.554	<b>.000</b>	.393, .682
Other blame	-.147	.192	-.359, .081	.181	.078	-.027, .373
B-IPQ total	-.305	<b>.006</b>	-.496, -.086	.515	<b>.000</b>	.346, .652
Consequences	-.237	<b>.033</b>	-.438, -.013	.302	<b>.003</b>	.102, .479
Timeline	.096	.391	-.131, .314	-.033	.748	-.238, .174
Personal Control <sup>c</sup>	-.288	<b>.009</b>	-.481, -.068	.376	<b>.000</b>	.184, .541
Treatment Control <sup>c</sup>	-.201	.072	-.407, .025	.240	<b>.018</b>	.036, .425
Identity	-.294	<b>.008</b>	-.487, -.075	.297	<b>.003</b>	.097, .475
Illness Concern	-.167	.137	-.377, .060	.317	<b>.001</b>	.118, .491
Coherence <sup>c</sup>	-.061	.591	-.281, .166	.193	.059	-.014, .384
Emotional Representation	-.216	.053	-.420, .009	.395	<b>.000</b>	.205, .556
MMQ <sup>d</sup>	-.282	<b>.013</b>	-.483, -.054	.361	<b>.000</b>	.160, .533
WHYMPI total <sup>d</sup>	.253	<b>.027</b>	.022, .458	-.238	<b>.024</b>	-.429, -.026
Negative Responses <sup>d</sup>	-.252	<b>.028</b>	-.457, -.021	.219	<b>.038</b>	.006, .413
Solicitous Responses <sup>d</sup>	.267	<b>.020</b>	.037, .470	-.259	<b>.014</b>	-.447, -.048
Distracting Responses <sup>d</sup>	.311	<b>.006</b>	.085, .506	-.311	<b>.003</b>	-.492, -.105

801 *Note.* Significant p-values are presented in bold. FSFI = Female Sexual Function Index;  
 802 FSDS = Female Sexual Distress Scale; ESSPRI = EULAR Sjögren’s Syndrome Patient  
 803 Reported Index; ProFaD = Profile of Fatigue and Discomfort; CERQ = Cognitive Emotion  
 804 Regulation Questionnaire; B-IPQ = Brief Illness Perceptions Questionnaire; MMQ =  
 805 Maudsley Marital Questionnaire; WHYMPI = West-Haven Yale Multidimensional Pain  
 806 Inventory.

807 <sup>a</sup>Participants who did not have sexual intercourse in the last 3 months were excluded (n = 17;  
 808 N = 81). <sup>b</sup>N = 98. <sup>c</sup>Items are reverse scored. <sup>d</sup>Participants not currently in a relationship did  
 809 not complete the measures assessing relationship satisfaction or partners behaviours (n = 8; N  
 810 = 90).

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813 **Table 4.** Regression analysis between FSFI scores and psychosocial, interpersonal and  
 814 disease parameters for women with SS

	Sexual Functioning (FSFI)					
	Model 1			Model 14		
	B	SE	$\beta$	B	SE	$\beta$
Age (years)	-.071	.052	-.151			
VAS Vaginal dryness	-.594	.306	-.240	-.689	.231	-.278**
ProFaD Mental Fatigue	.057	.493	.015			
CERQ Self-Blame	.032	.242	.021			
CERQ Rumination	-.351	.279	-.164			
CERQ Positive Reappraisal	.539	.227	.327*	.530	.170	.322**
CERQ Perspective	-.140	.255	-.079			
CERQ Catastrophising	-.563	.274	-.292*	-.534	.198	-.277**
B-IPQ Consequences	-.166	.637	-.043			
B-IPQ Personal Control	-.443	.386	-.158			
B-IPQ Identity	-.350	.599	-.098			
B-IPQ Total score	.189	.129	.293			
MMQ Total score	.042	.066	.103			
WHYMPI Negative responses	-.506	.945	-.083			
WHYMPI Solicitous Responses	-	-	-			
WHYMPI Distracting Responses	.587	1.151	.116			
WHYMPI Total score	.252	1.916	.034			
R <sup>2</sup> (Adjusted R <sup>2</sup> )	.505 (.371) ***			.420 (.396) ***		
F	3.762			17.394		

815 *Note.* N = 81 (participants who did not have sexual intercourse in the last 3 months were  
 816 excluded (n = 17). FSFI = Female Sexual Function Index; ProFaD = Profile of Fatigue and  
 817 Discomfort; CERQ = Cognitive Emotion Regulation Questionnaire; B-IPQ = Brief Illness  
 818 Perceptions Questionnaire; MMQ = Maudsley Marital Questionnaire; WHYMPI = West-  
 819 Haven Yale Multidimensional Pain Inventory.

820 \* p<.05, \*\* p<.01 \*\*\* p<.001.

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829 **Table 5.** Regression analysis between FSDS scores and psychosocial, interpersonal and  
 830 disease parameters for women with SS

	Sexual Distress (FSDS)					
	Model 1			Model 14		
	B	SE	$\beta$	B	SE	$\beta$
VAS Vaginal dryness	.492	.442	.098			
ProFaD Mental Fatigue	-.741	.706	-.094			
CERQ Self-Blame	.486	.342	.158			
CERQ Rumination	2.098	.412	.513***	2.161	.335	.528***
CERQ Positive Reappraisal	-.417	.344	-.126			
CERQ Perspective	-.618	.402	-.171	-.922	.254	-.255***
CERQ Catastrophising	.109	.409	.028			
B-IPQ Consequences	-.020	1.007	-.003			
B-IPQ Personal Control	1.257	.692	.228			
B-IPQ Treatment Control	.713	.713	.144			
B-IPQ Identity	2.094	.972	.295*	1.093	.507	.154*
B-IPQ Illness Concern	.798	.804	.134			
B-IPQ Emotional Representation	1.439	.775	.239			
B-IPQ Total score	-.836	.445	-.627			
MMQ Total score	.050	.096	.061			
WHYMPI Negative responses	.488	1.076	.039			
WHYMPI Solicitous Responses	1.129	1.176	.129			
WHYMPI Distracting Responses	-2.112	1.105	-.210	-1.515	.718	-.150*
WHYMPI Total score	-	-	-			
R <sup>2</sup> (Adjusted R <sup>2</sup> )	.674 (.590) ***			.631 (.609) ***		
F	8.034			28.376		

831 *Note.* N = 98. FSDS = Female Sexual Distress Scale; ProFaD = Profile of Fatigue and  
 832 Discomfort; CERQ = Cognitive Emotion Regulation Questionnaire; B-IPQ = Brief Illness  
 833 Perceptions Questionnaire; MMQ = Maudsley Marital Questionnaire; WHYMPI = West-  
 834 Haven Yale Multidimensional Pain Inventory.  
 835 \* p<.05, \*\* p<.01 \*\*\* p<.001.  
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847 **Supplementary Table 1.** Results from Point-Biserial Correlation analyses assessing the  
 848 relationship between menopausal status (pre-and-postmenopausal) and sexual function and  
 849 sexual distress.

	<b><math>\rho</math></b>	<b>p</b>	<b>95% CI (LB, UB)</b>
Total FSFI Score <sup>a</sup>	-.351	<b>.002</b>	-.540, -.128
Total FSDS Score <sup>b</sup>	.093	.427	-.143,.320

850 *Note.* Significant p-values are presented in bold. FSFI = Female Sexual Function Index;  
 851 FSDS = Female Sexual Distress Scale. <sup>a</sup>N = 75/98 (analysis did not include sexually inactive  
 852 cases (n = 17) and menopausal women (n = 6)). <sup>b</sup>N = 90/98 (analysis did not include  
 853 menopausal women (n = 6)).  
 854