

1 **Quality of intimate relationships, dyadic coping, and psychological health in**
2 **women with endometriosis: results from an online survey**

3 **Running head:** Endometriosis and intimate relationships

4 Federica Facchin^a federica.facchin@unicatt.it

5 Laura Buggio^b buggiolaura@gmail.com

6 Paolo Vercellini^b paolo.vercellini@unimi.it

7 Annalisa Frassinetti^c presidente@apendometriosi.it

8 Sara Beltrami^c bel3@libero.it

9 Emanuela Saita^a emanuela.saita@unicatt.it

10
11 ^a Department of Psychology, Catholic University of the Sacred Heart, Milan, Italy

12 ^b Fondazione Istituto di Ricovero e Cura a Carattere Scientifico Ca' Granda - Ospedale Maggiore
13 Policlinico, Milan, Italy

14 ^c Associazione Progetto Endometriosi – Organizzazione di Volontariato (Endometriosis Project
15 Association – Volunteer Organization), Reggio Emilia, Italy

16
17 Correspondence: Federica Facchin, PsyD, PhD

18 Department of Psychology, Catholic University of the Sacred Heart, Largo A. Gemelli 1, Milan
19 20123, Italy. Email: federica.facchin@unicatt.it. Phone: +39 02 7234 5942

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25 ABSTRACT

26 OBJECTIVE: To explore the associations between intimate relationships, psychological health, and
27 endometriosis-related variables such as pelvic pain and infertility.

28 METHODS: In this cross-sectional study, data were collected with an online survey delivered
29 through Qualtrics and posted on the Facebook page and website of a patient association
30 (Associazione Progetto Endometriosi—APE) in August 2020. The survey was composed of a
31 researcher-made questionnaire and four validated questionnaires assessing relational satisfaction
32 (adapted Quality of Marriage Index), dyadic coping (Dyadic Coping Questionnaire), and
33 psychological health (Hospital Anxiety and Depression Scale and Rosenberg Self-Esteem Scale).

34 RESULTS: Participants were 316 women (age: 35.9 ± 6.7) with endometriosis, who reported being
35 in an intimate relationship from at least one year. A greater perceived negative impact of the disease
36 on past and current intimate relationships was associated with poorer psychological health, lower
37 relational satisfaction and worse dyadic coping. Women who perceived their partner as more
38 informed about endometriosis, more informed about and interested in their health conditions, and
39 more likely to accompany them to the medical appointments, showed greater relational satisfaction
40 and dyadic coping. Relational satisfaction and dyadic coping were associated with psychological
41 health. A greater perceived negative impact of endometriosis on intimate relationships was
42 associated with more severe pelvic pain (especially dyspareunia).

43 CONCLUSION: Endometriosis has a negative impact on intimate relationships, which is associated
44 with poorer psychological health. For the women with the disease, partner's support is important,
45 and our findings suggest that effort should be made to involve both members of the couple in
46 multidisciplinary treatment.

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48 KEYWORDS: Dyadic coping; Endometriosis; Intimate relationships; Online survey; Psychological
49 health; Self-esteem

50

51 1. Introduction

52 Endometriosis is a menstrual cycle-dependent, chronic, inflammatory, systemic disease that affects
53 approximately 8-10% of women of reproductive age and 30-50% of women with infertility, and is
54 characterized by lesions of endometrial-like tissue outside of the uterus [1-4]. This condition,
55 especially when painful, may have a pervasive impact on women's daily life due its emotional and
56 economic costs, leading to impaired psychological health [5-8]. Intimate relationships are also
57 affected, considering not only the association between endometriosis and infertility (which involves
58 revising the couple's expectations and future plans, including having children), but also its negative
59 consequences on social and working lives, intimacy and sexuality [9]. In this regard, there is
60 evidence that endometriosis-related dyspareunia (i.e., pain at intercourse) is an important cause of
61 sexual dysfunction [10-12], which may lead to reduced or even non-existent sexual activity, with
62 negative consequences on women's self-esteem and intimate relationships [13,14]. In a study by De
63 Graaff *et al.* [15], 468 women (50% of the total) reported that endometriosis affected their
64 relationships. Of these, 312 (67%) reported endometriosis-related problems with their partner, and
65 90 (19%) considered endometriosis associated with relationship breakup. In an online survey
66 conducted by Armour *et al.* [16] using the World Endometriosis Research Foundation EndoCost
67 tool [17] (see also De Graaff *et al.* [15]) and including 340 women with endometriosis, the disease
68 was linked to significant problems with partner by 120 participants (59%) and to relationship
69 breakdown by 31 women (15%).

70 The negative systemic (rather than merely individual) effects of the disease have been
71 recently underlined by Facchin *et al.* [18], who summarized the evidence provided by a small body
72 of literature showing that endometriosis represents a source of stress for both women and their
73 partners. In addition, partners are often scarcely informed about endometriosis by physicians, with
74 limited involvement in healthcare decisions that may affect the organization of the whole family
75 [13,19].

76 *1.1. Coping with chronic illness: the notion of dyadic coping*

77 Managing a chronic condition like endometriosis is a relational process that involves the
78 couple and requires taking multiple actions related to the illness (e.g., attending medical
79 appointments together, discussing treatment options), to everyday life (e.g., housework and
80 childcare), to revising plans for the future (for instance as a consequence of infertility) and dealing
81 with the emotional burden of the disease [20,21]. In the context of diseases other than endometriosis,
82 coping with chronic illness has been conceptualized as a transactional process (referred to as dyadic
83 coping) in which partners mutually influence each other while coping with a shared stressor [22,23].
84 Communicating one's stress to one's partner is an important component of dyadic coping, and
85 positive dyadic coping involves: supportive dyadic coping (i.e., providing listening and
86 understanding, information and practical advice, to help the other deal with the stressor); delegated
87 dyadic coping (i.e., taking over the other's daily tasks to reduce the other's stress); common dyadic
88 coping (i.e., making efforts to cope with the stressor as a couple, for instance by talking and
89 relaxing together). On the other hand, negative dyadic coping occurs when one partner is bothered
90 by the other's stress and shows lack of motivation and engagement, ambivalence, or even hostility
91 while providing support. Depression and chronic illness are associated with negative dyadic coping
92 [24,25]. Greater positive dyadic coping and lower negative dyadic coping are associated with better
93 relational and psychological outcomes in patients with cancer [26] and other types of chronic
94 disease such as chronic obstructive pulmonary disease [25], dementia [27], and diabetes [28].

95 *1.2. The current study*

96 Although the importance of intimate relationships and partner's support is well known in the
97 context of other chronic diseases, in most studies the impact of endometriosis on women's mental
98 health was examined with an exclusive focus on the association between several aspects of the
99 disease (including pelvic pain) and psychological symptoms (especially anxiety and depression).
100 Little attention has been devoted to the role played by intimate relationships in shaping women's
101 subjective experience of endometriosis. Therefore, we conducted the current study to provide

102 further insights into the association between women's experiences of intimate relationships
103 (including relational satisfaction and dyadic coping) and psychological health. We expected to find
104 better psychological conditions in women who (1) reported a lower negative impact of
105 endometriosis in their past and current love life, (2) perceived their partner as interested in and
106 informed about their condition, (3) were more satisfied with their relationship, and (4) had better
107 dyadic coping. In addition, we explored the correlation between women's subjective experiences of
108 intimate relationships and some important aspects of endometriosis, such as pelvic pain and
109 infertility.

110 **2. Methods**

111 In this cross-sectional study, data were collected from 10 to 13 August 2020 with an
112 anonymous online survey hosted on Qualtrics (Qualtrics Ltd.). Participants were recruited using a
113 snowballing sampling strategy that involved posting the invitation to participate in the study (with a
114 direct link to the survey) on the Facebook page and the website of the largest endometriosis patient
115 association in Italy (Associazione Progetto Endometriosi [Endometriosis Project Association]—
116 APE). APE is a volunteer organization founded in 2005 by a group of women with endometriosis
117 and is currently committed to supporting other women with the disease and their families, providing
118 correct information about endometriosis, and sensitizing in order to enhance early diagnosis and
119 quality of care. Inclusion criteria were: (1) age \geq 18 years, (2) surgical or clinical (gynecological
120 examination, transvaginal ultrasound, magnetic resonance imaging) diagnosis of endometriosis (as
121 regards to the importance of clinical diagnosis of endometriosis, see Agarwal *et al.* [29]), and (3)
122 being in a relationship for at least one year (as done in other studies exploring dyadic coping in
123 couples, see for instance Breitenstein *et al.* [30]). Women who completed the survey, but reported
124 being in a romantic relationship for less than one year, were excluded from the analyses. Detailed
125 information regarding the research, including aims and procedures, were reported in an online
126 consent form that women had to read and approve (anonymously) to be able to continue the survey.

127 The research was approved by the Ethics Commission of the Department of Psychology, Catholic
128 University of the Sacred Heart (protocol number: 21-20; approval date: 10 July 2020).

129 *2.1. Measures*

130 The online survey was composed of a researcher-made questionnaire, along with the Italian
131 version of 4 validated questionnaires focused on relational satisfaction, dyadic coping, and
132 psychological health (symptoms of anxiety/depression and self-esteem). The researcher-made
133 questionnaire was divided in three parts aimed at collecting (1) socio-demographic data such as age,
134 level of education, employment, and marital status, (2) endometriosis-related information, including
135 type of endometriosis, type of diagnosis, hormonal treatment, current infertility and IVF,
136 comorbidities, pelvic pain severity (rated on a 0-10 numerical rating scale, with 0 = “no pain at all”,
137 and 10 = “the worst imaginable pain”, with a separate score for chronic pelvic pain, dysmenorrhea,
138 dyspareunia, and dyschezia), and age at diagnosis, and (3) details regarding the couple relationship
139 (e.g., gender of partner, length of relationship, presence of children). The third section also included
140 a set of 5-point Likert scales to assess women’s perceptions regarding the negative impact of
141 endometriosis on intimate relationships (“To what extent do you think endometriosis had a negative
142 impact on your past love life / on your current intimate relationship” [1 = “not at all”, 5 = “very
143 much”]) and partner attitudes and behaviors towards endometriosis and women’s health status (“To
144 what extent do you think your partner is informed about endometriosis / informed about your health
145 status / interested in being informed about your health status” [1 = “not at all”, 5 = “very much”];
146 “How often does your partner accompany you to medical appointments” [1 = “never”, 5 =
147 “always”]).

148 Relational satisfaction was assessed using the Quality of Marriage Index [31,32], adapted to
149 be administered to either unmarried or married couples (in this article, the adapted version of the
150 QMI is referred to as “Quality of Relationship Index” [QRI]). The QRI is composed of 6 items
151 measuring relational satisfaction on a 7-point scale (the first 5 items, e.g., “We have a good
152 relationship”; 1 = “strongly disagree”, 7 = “strongly agree”) and on a 10-point scale (the last item,

153 which measures participants' overall level of happiness in their relationship; 1 = "extremely
154 unhappy", 10 = "extremely happy"). The scores of the six items are summed to obtain a global
155 score, with higher scores indicating greater relational satisfaction. In this study, the QRI had good
156 internal consistency (Cronbach's $\alpha = .95$).

157 Dyadic coping was assessed with the Dyadic Coping Questionnaire (DCQ) [33,34], a 41-
158 item questionnaire assessing dyadic coping, with responses scored on a 1-5 Likert scale (1 =
159 "Never", 5 = "Very often"). Thirty-nine items measure stress communication, supportive and
160 delegated dyadic coping, common dyadic coping, and negative dyadic coping. Specifically, the
161 DCQ measures: (1) the respondent's perception of their own dyadic coping strategies (e.g., "I show
162 my partner that I'm stressed and I am not feeling well" [own stress communication]; "When my
163 partner feels he/she has too much to do, I help him/her out" [own delegated dyadic coping]); (2) the
164 respondent's perception of their partner's dyadic coping (e.g., "My partner shows me that he/she is
165 stressed and is not feeling well" [partner stress communication]; "When I am too busy and I have
166 too much to do, my partner helps me out" [partner delegated dyadic coping]); (3) common dyadic
167 coping (e.g., "We try to cope with the problem together and search for practical solutions"); (4) the
168 respondent's evaluation of the quality of dyadic coping, in terms of satisfaction with dyadic coping
169 (item 40) and the perceived efficacy of dyadic coping (item 41). Besides the scores of the 8
170 subscales related to the respondent's own and partner dyadic coping, common dyadic coping,
171 satisfaction and efficacy of dyadic coping, a global score (DCQ-Total) can be calculated as a sum of
172 items 1 through 39 (i.e., excluding evaluation), with higher scores indicating better dyadic coping.
173 The negative dyadic coping items were reversed to calculate DCQ-Total, whereas associations
174 between the negative dyadic coping subscales and other variables were examined using the original
175 negative dyadic coping scores (such that higher scores indicate more negative dyadic coping).
176 Overall evaluation of dyadic coping was calculated as the sum of items 40 and 41. In this study, the
177 values of Cronbach's α ranged from .66 for women's own negative dyadic coping to .94 for
178 evaluation of dyadic coping.

179 The Hospital Anxiety and Depression Scale (HADS) and the Rosenberg Self-Esteem Scale
180 (RSES) were used to measure women’s psychological health. The HADS [35,36] assesses
181 symptoms of anxiety and depression on two 7-item subscales (HADS-Anxiety and HADS-
182 Depression). The frequency of symptoms is scored on a 0-3 scale and a total score (HADS-Total)
183 can also be calculated, with higher scores indicating poorer psychological conditions. The RSES
184 [37,38] is a 10-item questionnaire that measures self-esteem, with responses scored on 4-point
185 Likert scale (1 = “strongly disagree”, 4 = “strongly agree”). Cronbach’s α ranged from .78 for
186 HADS-Depression to .90 for the RSES.

187 *2.2. Statistical analyses*

188 All statistical analyses were performed using the software SPSS version 25 (IBM
189 Corporation). In this article, descriptive statistics were reported as means \pm standard deviations for
190 continuous variables, and numbers and percentages for categorical variables. Normality of
191 distributions was assessed considering the values of skewness and kurtosis (-1/+1 was the
192 acceptable range for normality [39,40]). Correlations between continuous variables were examined
193 using Pearson or Spearman correlation, as appropriate. Group comparisons were performed using
194 independent samples *t*-test or Mann-Whitney U test, according to the distribution of the dependent
195 variables.

196 Sample size was determined using the software G*Power [41] and considering that, in a
197 previous unpublished survey conducted by our group, Pearson correlation between DCQ-Total and
198 HADS-Total, as reported by 143 women with endometriosis (who were in a relationship from at
199 least 1 year), was -.276. Therefore, we calculated that, given $r = -.276$, $\alpha = .05$, and power = .90, a
200 sample size of 133 participants was required. Considering that the overall reach of APE on
201 Facebook was over 32 800 followers when the study was conducted, we established that the number
202 of participants had to be ≥ 133 and we planned to stop data collection two days after reaching the
203 required number of participants. Findings were considered statistically significant at $P < .01$. No

204 attempt was made to replace missing data, and in this article we reported the exact number of
205 respondents (i.e., valid observations) for each variable of interest.

206 **3. Results**

207 A total of 345 women accessed the online survey. Twenty-seven participants provided
208 remarkably incomplete responses (i.e., no data at all, or complete absence of information regarding
209 the couple relationship) and 2 reported that the length of the intimate relationship was < 1 year.
210 Three hundred and sixteen women aged 20-54 years (35.9 ± 6.7) responded to at least one question
211 related to intimate relationships and were included in the statistical analyses. Most of them were
212 Italian (308 [97.5%]), 132 (41.8%) had a high school diploma, 153 (48.4%) had a full-time job, and
213 166 (52.5%) were unmarried. In almost all cases, partners were males (304 [96.2%]). Only 6
214 women (1.9%) had a female partner and the remaining 6 participants (1.8%) did not answer the
215 question. Relationship duration ranged from 1 to 35 years (10.7 ± 7.0). The majority of the women
216 included in the study did not have children with the current partner (235 [74.4%]). Nine women
217 (2.8%) had children from previous relationships and 8 participants (2.5%) were pregnant when the
218 study was conducted.

219 Most women (223 [70.6%]) were diagnosed with endometriosis after the initiation of the
220 current relationship. Age at diagnosis ranged from 13 to 44 years (28.5 ± 6.0). Complete
221 information regarding endometriosis-related variables is reported in Table 1. Means and standard
222 deviations of all the variables related to intimate relationships and women's psychological health
223 are reported in Table 2.

224 *3.1. Intimate relationships and psychological health*

225 The majority of the respondents (192 [63.4%]) reported that endometriosis had a moderate
226 to very negative impact on their past love life, as well as on their current relationship (114 [62.9%]).
227 A higher perceived negative impact of the disease on intimate relationships (either past or present)

228 was significantly associated with poorer psychological health (see Table 3), as well as with lower
229 relational satisfaction and worse dyadic coping, including evaluation of dyadic coping (see Table 4).

230 A minority of women perceived their partner as not or a little informed about endometriosis
231 (84 [19.5%]) and about their health status (37 [11.8%]). Only 21 participants (6.7%) reported that
232 their partner was not or a little interested in being informed about their health conditions, and 72
233 women (23.1%) reported that their partner never or rarely accompanied them to the medical visits.
234 Women who perceived their partner as more informed about endometriosis (in general), informed
235 about and interested in being informed about their health status, as well as women who reported that
236 their partner used to accompany them to the medical visits, showed greater relational satisfaction
237 and better dyadic coping (see Table 4).

238 As reported in Table 3, a greater relational satisfaction (measured with the QRI) was
239 associated with lower anxiety and depression, and higher self-esteem. As regards dyadic coping
240 (see Table 3), higher negative dyadic coping (considering either women's self-perceptions or
241 perceptions of partner's negative dyadic coping) was associated with greater symptoms of anxiety
242 and depression, and lower self-esteem, whereas more positive dyadic coping (especially common
243 dyadic coping) and evaluation of dyadic coping were associated with better psychological
244 conditions.

245 3.2. *Intimate relationships and endometriosis-related variables*

246 A greater perceived negative impact of the disease on the current relationship was associated
247 with more severe pain symptoms, especially as regards to dyspareunia (chronic pelvic pain: $r = .249$,
248 $P = .001$; dysmenorrhea: $r = .238$, $P = .002$; dyspareunia: $r = .433$, $P < .001$; dyschezia: $r_s = .389$, P
249 $< .001$). The perceived negative impact of endometriosis on past love life was also associated with
250 pain, and specifically with dyspareunia ($r = .275$; $P < .001$) and dyschezia ($r_s = .188$, $P = .001$). The
251 perceived negative impact of endometriosis on intimate relationships (either in the past or in the
252 present) was not significantly correlated with any other endometriosis-related variable ($P_s > .01$).

253 However, of the 36 women who were undergoing IVF, 32 (88.9%) reported a moderate to severe
254 impact of the treatment on the couple relationship.

255 The association between relational satisfaction and dyspareunia was very close to the pre-
256 planned level of statistical significance ($r_s = -.153, P = .011$). Women who reported higher negative
257 dyadic coping of partner had more severe chronic pelvic pain ($r_s = .190, P = .002$) and dyschezia (r_s
258 $= .182, P = .003$). No other significant associations were found between relational satisfaction,
259 dyadic coping, and endometriosis-related variables ($P_s > .01$).

260 **4. Discussion**

261 At least to our knowledge, this is one of the very few studies examining the association
262 between the perceived quality of intimate relationships and the psychological health (in terms of
263 symptoms of anxiety/depression and self-esteem) of women with endometriosis. Overall, the
264 responses provided by the 316 participants included in the study confirmed that the disease has a
265 negative impact on women's love life, as suggested in previous research [6,14-16]. In our study, a
266 greater perceived negative impact of the disease on intimate relationships was associated with
267 poorer psychological health.

268 We also found that higher satisfaction with the current relationship and better dyadic coping
269 were associated with greater psychological health. Specifically, our findings highlighted the
270 correlation between positive dyadic coping – especially common dyadic coping (which occurs when
271 both partners make efforts to cope together with a shared stressor) – and the mental health of
272 women with endometriosis. The role played by common dyadic coping strategies in the context of
273 clinical samples (including couples coping with diabetes, cancer, or psychological disorders such as
274 depression) and its positive outcomes for couples, in terms of decreased distress and greater
275 relational satisfaction, have been highlighted in previous studies [26,45-47]. On the other hand, our
276 study confirmed that negative dyadic coping (which entails responding with hostility, sarcasm,
277 distancing, superficiality, or ambivalence to the partner's signals of stress) is associated with poorer

278 psychological health in people with chronic illness, as previously demonstrated by other authors
279 [25].

280 In our study, women who perceived their partner as more interested and actively involved in
281 the management of endometriosis (for instance by accompanying them to the medical visits)
282 reported greater relational satisfaction and better dyadic coping. Taken together, these findings
283 highlighted the importance of coping strategies based on mutuality and we-ness (“we are in this
284 together” [47]), which seem to be particularly helpful for women coping with different types of
285 stressors (such as breast cancer [49]), as recently underlined by Rusu *et al.* [50].

286 Our results showed that a greater perceived negative impact of endometriosis on women’s
287 love life was also associated with lower relational satisfaction and worse dyadic coping (along with
288 poorer psychological health). Most importantly, our findings highlighted the correlation between
289 the perceived negative impact of endometriosis on intimate relationships and pelvic pain, especially
290 dyspareunia. The negative effects of this form of endometriosis-related pain on women’s sexual
291 quality of life are well known [42,43]. In addition, introital dyspareunia is associated with greater
292 concerns related to infertility in women with endometriosis [44].

293 *4.1. Limitations*

294 Our study presents several limitations, especially in relation to the methodology used to
295 collect the data. Some caution should be taken with the interpretation of our findings due to the self-
296 reported nature of the data (including medical information, for instance regarding the type of
297 diagnosis) and the risk of selection bias, also considering that the invitation to participate in the
298 online survey was posted on the social media of a patient association. Specifically, this type of
299 recruitment strategy may have resulted in the selection of women with more severe physical and
300 psychological symptoms. As underlined by De Graaff *et al.* [51], quality of life outcomes (including
301 the impact of endometriosis on relationships) are influenced by settings and recruitment strategies.

302 In their study, the authors found that affected relationships were more prevalent in women recruited
303 via the Dutch patient association vs. secondary and tertiary care populations.

304 It should also be considered that important aspects, such as impact of endometriosis on
305 women's love life and partner's engagement, were assessed using researcher-made items (rather
306 than validated questionnaires). In addition, although we examined dyadic coping, we did not
307 perform an actual dyadic study, since we considered only women's perspective. Moreover, the
308 associations between intimate relationships and psychological health were conceptualized and
309 explored in terms of correlation, which does not imply causation. Therefore, no causal inferences
310 can be drawn from our findings, also considering the cross-sectional research design.

311 *4.2. Suggestions for future research and clinical practice*

312 Future studies should include partners as participants to explore the impact of endometriosis
313 on couples in a more systematic fashion. Longitudinal studies are encouraged to describe
314 adjustment trajectories and predictors of psychological health in couples dealing with endometriosis,
315 and to further clarify the effectiveness of specific coping strategies. Dyadic research (see for
316 example Van Niekerk *et al.* [52]) can be particularly helpful to examine how couples deal with
317 endometriosis as a shared stressor, as also underlined by Hudson *et al.* [53].

318 Endometriosis should be investigated and treated considering its pervasive detrimental
319 effects on women's romantic relationships. Our findings suggest that multidisciplinary clinical
320 practice with endometriosis patients may improve their psychological health (including self-esteem)
321 by helping them find effective strategies to reduce pelvic pain and enjoy sexuality, as well as by
322 enhancing partners' engagement in the management of the disease. Psychological counseling with
323 couples may encourage common dyadic coping strategies, based on the idea that any chronic
324 disease is a shared stressor. In this regard, providing partners with detailed information about
325 endometriosis and its consequences on intimate relationships, including sexuality, may increase
326 their awareness of women's sufferance and thus decrease negative dyadic coping.

327 **5. Conclusions**

328 Combined with the small body of evidence highlighting the negative impact of
329 endometriosis on women’s partners [18], our findings suggest that endometriosis significantly
330 affects couple relationships. Over the past decades, diseases other than endometriosis (such as
331 breast cancer [54]) have been investigated and treated as a “we-stress” that affects both partners. In
332 this regard, we believe that a broader conceptualization of endometriosis as a “we-disease” may
333 contribute to expand our perspectives as researchers and clinicians, and benefit women.

334

335 **References**

- 336 [1] Acién P, Velasco I. Endometriosis: a disease that remains enigmatic. *ISRN Obstet Gynecol.*
337 2013 Jul 17;2013:242149. doi: 10.1155/2013/242149.
- 338 [2] Agarwal SK, Foster WG, Groessl EJ. Rethinking endometriosis care: applying the chronic care
339 model via a multidisciplinary program for the care of women with endometriosis. *Int J Womens*
340 *Health.* 2019 Jul 23;11:405–410. doi: 10.2147/IJWH.S207373.
- 341 [3] Laganà AS, La Rosa VL, Rapisarda AMC, Valenti G, Sapia F, Chiofalo B, et al. Anxiety and
342 depression in patients with endometriosis: impact and management challenges. *Int J Womens*
343 *Health.* 2017 May 16;9:323–330. doi: 10.2147/IJWH.S119729.
- 344 [4] Johnson NP, Hummelshoj L, Adamson GD, Keckstein J, Taylor HS, Abrao MS, et al.; World
345 Endometriosis Society Sao Paulo Consortium. World Endometriosis Society consensus on the
346 classification of endometriosis. *Hum Reprod.* 2017 Feb;32(2):315-324. doi:
347 10.1093/humrep/dew293.
- 348 [5] Facchin F, Barbara G, Dridi D, Alberico D, Buggio L, Somigliana E, et al. Mental health in
349 women with endometriosis: searching for predictors of psychological distress. *Hum Reprod.* 2017
350 Sep 1;32(9):1855–1861. doi: 10.1093/humrep/dex249.
- 351 [6] Facchin F, Saita E, Barbara G, Dridi D, Vercellini P. “Free butterflies will come out of these
352 deep wounds”: A grounded theory of how endometriosis affects women's psychological health. *J*
353 *Health Psychol.* 2018 Mar;23(4):538–549. doi: 10.1177/1359105316688952.
- 354 [7] Gambadauro P, Carli V, Hadlaczky G. Depressive symptoms among women with endometriosis:
355 a systematic review and meta-analysis. *Am J Obstet Gynecol* 2019 Mar;220(3): 230–241. doi:
356 10.1016/j.ajog.2018.11.123.

- 357 [8] Soliman AM, Surrey E, Bonafede M, Nelson JK, Castelli-Haley J. Real-world evaluation of
358 direct and indirect economic burden among endometriosis patients in the United States. *Adv Ther.*
359 2018 Mar;35(3):408–423. doi: 10.1007/s12325-018-0667-3.
- 360 [9] Hudson N, Culley L, Law C, Mitchell H, Denny E, Raine-Fenning N. 'We needed to change the
361 mission statement of the marriage': biographical disruptions, appraisals and revisions among
362 couples living with endometriosis. *Sociol Health Illn.* 2016 Jun;38(5):721–35. doi: 10.1111/1467-
363 9566.12392.
- 364 [10] Barbara G, Facchin F, Buggio L, Somigliana E, Berlanda N, Kustermann A, et al. What is
365 known and unknown about the association between endometriosis and sexual functioning: a
366 systematic review of the literature. *Reprod Sci.* 2017 Dec;24(12):1566–1576. doi:
367 10.1177/1933719117707054.
- 368 [11] Pluchino N, Wenger JM, Petignat P, Tal R, Bolmont M, Taylor HS, et al. Sexual function in
369 endometriosis patients and their partners: effect of the disease and consequences of treatment. *Hum*
370 *Reprod Update.* 2016 Nov;22(6):762–774. doi: 10.1093/humupd/dmw031.
- 371 [12] Perez-Lopez FR, Ornat L, Perez-Roncero G, Lopez-Baena M, Sanchez-Prieto M, Chedraui P.
372 The effect of endometriosis on sexual function as assessed with the Female Sexual Function Index:
373 systematic review and meta-analysis. *Gynecol Endocrinol* 2020 Sep 3;1-9. doi:
374 10.1080/09513590.2020.1812570.
- 375 [13] Culley L, Law C, Hudson N, Mitchell H, Denny E, Raine-Fenning N. A qualitative study of
376 the impact of endometriosis on male partners. *Hum Reprod.* 2017 Aug 1;32(8):1667–1673. doi:
377 10.1093/humrep/dex221.
- 378 [14] Denny E, Mann CH. Endometriosis-associated dyspareunia: the impact on women's lives. *J*
379 *Fam Plann Reprod Health Care.* 2007 Jul;33(3):189–93. doi: 10.1783/147118907781004831.

- 380 [15] De Graaff AA, D'Hooghe TM, Dunselman GA, Dirksen CD, Hummelshoj L; WERF EndoCost
381 Consortium. The significant effect of endometriosis on physical, mental and social wellbeing:
382 results from an international cross-sectional survey. *Hum Reprod.* 2013 Oct;28(10):2677–85. doi:
383 10.1093/humrep/det284.
- 384 [16] Armour M, Sinclair J, Ng CHM, Hyman MS, Lawson K, Smith CA, Abbott J. Endometriosis
385 and chronic pelvic pain have similar impact on women, but time to diagnosis is decreasing: an
386 Australian survey. *Sci Rep.* 2020 Oct 1;10(1):16253. doi: 10.1038/s41598-020-73389-2.
- 387 [17] Simoens S, Hummelshoj L, Dunselman G, Brandes I, Dirksen C, D'Hooghe T, EndoCost
388 Consortium. Endometriosis cost assessment (the EndoCost study): a cost-of-illness study protocol.
389 *Gynecol Obstet Invest.* 2011;71(3):170–176. doi: 10.1159/000316055.
- 390 [18] Facchin F, Buggio L, Saita E. Partners' perspective in endometriosis research and treatment: a
391 systematic review of qualitative and quantitative evidence. *J Psychosom Res.* 2020 Aug
392 6;137:110213. doi: 10.1016/j.jpsychores.2020.110213.
- 393 [19] Ameratunga D, Flemming T, Angstetra D, Ng S, Sneddon A. Exploring the impact of
394 endometriosis on partners. *J Obstet Gynaecol Res.* 2017 Jun;43(6):1048–1053. doi:
395 10.1111/jog.13325.
- 396 [20] Hudson N, Culley L, Law C, Mitchell H, Denny E, Raine-Fenning N. 'We needed to change
397 the mission statement of the marriage': biographical disruptions, appraisals and revisions among
398 couples living with endometriosis. *Sociol Health Illn.* 2016 Jun;38(5):721–35. doi: 10.1111/1467-
399 9566.12392.
- 400 [21] Hudson N, Law C, Culley L, Mitchell H, Denny E, Raine-Fenning N. Conducting dyadic,
401 relational research about endometriosis: A reflexive account of methods, ethics and data analysis.
402 *Health (London).* 2020 Jan;24(1):79–93. doi: 10.1177/1363459318786539.

- 403 [22] Badr H, Acitelli LK. Re-thinking dyadic coping in the context of chronic illness. *Curr Opin*
404 *Psychol.* 2017 Feb;13:44–48. doi: 10.1016/j.copsyc.2016.03.001.
- 405 [23] Bodenmann G. A systematic-transational conceptualization of stress and coping in couples.
406 *Swiss Journal of Psychology / Schweizerische Zeitschrift für Psychologie / Revue Suisse de*
407 *Psychologie.* 1995; 54(1):34–49.
- 408 [24] Bodenmann G, Widmer K, Charvoz L, Bradbury TN. Differences in individual and dyadic
409 coping in depressed, non-depressed and remitted persons. *J Psychopathol Behav Assess.*
410 2004;26:75–85. doi: <https://doi.org/10.1023/B:JOBA.0000013655.45146.47>
- 411 [25] Meier C, Bodenmann G, Mörgeli H, Jenewein J. Dyadic coping, quality of life, and
412 psychological distress among chronic obstructive pulmonary disease patients and their partners. *Int*
413 *J Chron Obstruct Pulmon Dis.* 2011;6:583–96. doi: 10.2147/COPD.S24508.
- 414 [26] Traa MJ, De Vries J, Bodenmann G, Den Oudsten BL. Dyadic coping and relationship
415 functioning in couples coping with cancer: a systematic review. *Br J Health Psychol.* 2015
416 Feb;20(1):85–114. doi: 10.1111/bjhp.12094.
- 417 [27] Gellert P, Häusler A, Gholami M, Rapp M, Kuhlmeiy A, Nordheim J. Own and partners' dyadic
418 coping and depressive symptoms in individuals with early-stage dementia and their caregiving
419 partners. *Aging Ment Health.* 2018 Aug;22(8):1008–1016. doi: 10.1080/13607863.2017.1334759.
- 420 [28] Zajdel M, Helgeson VS, Seltman HJ, Korytkowski MT, Hausmann LRM. Daily communal
421 coping in couples with type 2 diabetes: links to mood and self-care. *Ann Behav Med.* 2018 Feb
422 17;52(3):228–238. doi: 10.1093/abm/kax047.
- 423 [29] Agarwal SK, Chapron C, Giudice LC, Laufer MR, Leyland N, Missmer SA, et al. Clinical
424 diagnosis of endometriosis: a call to action. *Am J Obstet Gynecol.* 2019 Apr;220(4):354.e1-354.e12.
425 doi: 10.1016/j.ajog.2018.12.039.

- 426 [30] Breitenstein CJ, Milek A, Nussbeck FW, Davila J, Bodenmann G. Stress, dyadic coping, and
427 relationship satisfaction in late adolescent couples. *J Soc Pers Relat.* 2018 June;35(5):770–790. doi:
428 <https://doi.org/10.1177/0265407517698049>
- 429 [31] Norton R. Measuring marital quality: a critical look at the dependent variable. *Journal of*
430 *Marriage and the Family* 1983;45:141–151.
- 431 [32] Zani B, Kirchler E. Come influenzare il partner. Processi decisionali nelle relazioni di coppia
432 [How to influence the partner. Decisional processes in couple relationships] (in Italian). *Giornale*
433 *Italiano di Psicologia.* 1993;2:247–280.
- 434 [33] Donato S, Iafrate R, Barni D, Bertoni A, Bodenmann G, Gagliardi S. Measuring dyadic
435 coping: the factorial structure of Bodenmann’s “Dyadic Coping Questionnaire” in an Italian sample.
436 *TPM. Testing, Psychometrics, Methodology in Applied Psychology.* 2009;16(1):25–47.
- 437 [34] Bodenmann G. Dyadic coping—a systemic-transactional view of stress and coping among
438 couples: theory and empirical findings. *Eur Rev App Psychol.* 1997;47:137–140.
- 439 [35] Costantini M, Musso M, Viterbori P, Bonci F, Del Mastro L, Garrone O, et al. Detecting
440 psychological distress in cancer patients: validity of the Italian version of the Hospital Anxiety and
441 Depression Scale. *Support Care Cancer.* 1999 May;7(3):121–7. doi: 10.1007/s005200050241.
- 442 [36] Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psychiatrica*
443 *Scandinavica* 1983;67(6):361–370. doi: <https://doi.org/10.1111/j.1600-0447.1983.tb09716.x>.
- 444 [37] Prezza M, Trombaccia FR, Armento L. La scala dell’autostima di Rosenberg: Traduzione e
445 validazione italiana [The Rosenberg Self-Esteem Scale: Italian translation and validation] (in
446 Italian). *Bollettino di Psicologia Applicata* 1997;223:35–44.
- 447 [38] Rosenberg M. *Society and the Adolescent Self-Image.* 1965. Princeton, NJ: Princeton
448 University Press.

- 449 [39] Barbaranelli C. *Analisi dei dati. Tecniche multivariate per la ricerca in psicologia sociale* [Data
450 analysis. *Multivariate techniques for research in social psychology*] (in Italian). Milano: LED, 2003.
- 451 [40] Marcoulides GA, Hershberger SL. *Multivariate statistical methods. A first course* (chapter 3).
452 Mahawa, NJ: Lawrence Erlbaum Associates, 1997.
- 453 [41] Faul F, Erdfelder E, Lang AG, Buchner A. *G*Power 3: a flexible statistical power analysis*
454 *program for the social, behavioral, and biomedical sciences. Behav Res Methods. 2007*
455 *May;39(2):175–91. doi: 10.3758/bf03193146.*
- 456 [42] Shum LK, Bedaiwy MA, Allaire C, Williams C, Noga H, Albert A, et al. *Deep Dyspareunia*
457 *and Sexual Quality of Life in Women With Endometriosis. Sex Med 2018 Sep;6(3):224–233. doi:*
458 *10.1016/j.esxm.2018.04.006.*
- 459 [43] van Poll M, van Barneveld E, Aerts L, Mass JWM, Lim AC, de Greef BTA, et al.
460 *Endometriosis and Sexual Quality of Life. Sex Med. 2020 Sep;8(3):532–544. doi:*
461 *10.1016/j.esxm.2020.06.004.*
- 462 [44] Wahl KJ, Orr NL, Lisonek M, Noga H, Bedaiwy MA, Williams C, et al. *Deep dyspareunia,*
463 *superficial dyspareunia, and infertility concerns among women with endometriosis: a cross-*
464 *sectional study. Sex Med. 2020 Jun;8(2):274–281. doi: 10.1016/j.esxm.2020.01.002.*
- 465 [45] Badr H, Carmack CL, Kashy DA, Cristofanilli M, Revenson TA. *Dyadic coping in metastatic*
466 *breast cancer. Health Psychol. 2010 Mar;29(2):169–80. doi: 10.1037/a0018165.*
- 467 [46] Johnson MD, Anderson JR, Walker A, Wilcox A, Lewis VL, Robbins DC. *Common dyadic*
468 *coping is indirectly related to dietary and exercise adherence via patient and partner diabetes*
469 *efficacy. J Fam Psychol. 2013 Oct;27(5):722–730. doi: 10.1037/a0034006.*
- 470 [47] Meier F, Cairo Notari S, Bodenmann G, Revenson TA, Favez N. *We are in this together -*
471 *Aren't we? Congruence of common dyadic coping and psychological distress of couples facing*
472 *breast cancer. Psychooncology 2019 Dec;28(12):2374–2381. doi: 10.1002/pon.5238.*

- 473 [48] Regan TW, Lambert SD, Kelly B, Falconier M, Kissane D, Levesque JV. Couples coping with
474 cancer: exploration of theoretical frameworks from dyadic studies. *Psychooncology*. 2015
475 Dec;24(12):1605–17. doi: 10.1002/pon.3854.
- 476 [49] Rottmann N, Hansen DG, Larsen PV, Nicolaisen A, Flyger H, Johansen C, et al. Dyadic
477 coping within couples dealing with breast cancer: A longitudinal, population-based study. *Health*
478 *Psychology*. 2015;34(5):486–95. doi: <https://doi.org/10.1037/hea0000218>
- 479 [50] Rusu PP, Nussbeck FW, Leuchtmann L, Bodenmann G. Stress, dyadic coping, and relationship
480 satisfaction: A longitudinal study disentangling timely stable from yearly fluctuations. *PLoS One*.
481 2020 Apr 9;15(4):e0231133. doi: 10.1371/journal.pone.0231133.
- 482 [51] De Graaff AA, Dirksen CD, Simoens S, De Bie B, Hummelshoj L, D’Hooghe TM, Funselman
483 GAJ. Quality of life outcomes in women with endometriosis are highly influenced by recruitment
484 strategies. *Hum Reprod*. 2015 Jun;30(6):1331–41. doi: 10.1093/humrep/dev084.
- 485 [52] Van Niekerk LM, Schubert E, Matthewson M. Emotional intimacy, empathic concern, and
486 relationship satisfaction in women with endometriosis and their partners. *J Psychosom Obstet*
487 *Gynaecol*. 2020 Jun 12;1–7. doi: 10.1080/0167482X.2020.1774547.
- 488 [53] Hudson N, Law C, Culley L, Mitchell H, Denny E, Raine-Fenning N. Conducting dyadic,
489 relational research about endometriosis: A reflexive account of methods, ethics and data analysis.
490 *Health (London)*. 2020;24:79–93. doi: 10.1177/1363459318786539.
- 491 [54] Kayser K, Watson LE, Andrade JT. Cancer as a “we-disease”: examining the process of coping
492 from a relational perspective. *Fam Syst Health*. 2007;25:404–418. doi: 10.1037/1091-7527.25.4.404.
- 493

494

Variables		Respondents (N)	
Type of diagnosis (N, %)	Surgical	81 (25.8%)	314
	Clinical	233 (74.2%)	
Pelvic pain (M \pm SD)	Chronic pain	5.3 \pm 2.7	302
	Dysmenorrhea	6.5 \pm 3.3	290
	Dyspareunia	5.5 \pm 2.9	298
	Dyschezia	4.1 \pm 3.2	297
Hormonal treatment (N, %)	Yes	206 (66.2%)	311
	No	105 (33.8%)	
Type of hormonal treatment (N, %)	Estroprogestins	70 (34.5%)	203
	Progestins	126 (62.1%)	
	GnRH analogues	7 (3.4%)	
Comorbidities	Yes	124 (40.9%)	303
	No	179 (59.1%)	
Current infertility	Yes	157 (52.2%)	301
	No	144 (47.8%)	
Assisted reproduction	Yes	36 (23.1%)	156
	No	120 (76.9%)	

495

496 **Table 1.** Endometriosis-related variables

497

Variables		Respondents (N)	Mean ± SD
Perceived negative impact of endometriosis	--on the current relationship	181	2.9 ± 1.1
	--on past love life	303	2.9 ± 1.2
Women's perceptions about partner attitudes and behaviors	Partner informed about endometriosis	312	3.1 ± 0.9
	Partner informed about the woman's health status	312	3.7 ± 1.0
	Partner interested in being informed about the woman's health status	312	4.1 ± 0.9
	Partner accompanies the woman to medical visits	311	3.5 ± 1.3
Relational satisfaction (QRI)		282	36.4 ± 9.3
Dyadic Coping (DCQ)	Own stress communication	270	14.6 ± 3.1
	Partner stress communication	268	12.7 ± 3.3
	Own supportive dyadic coping	266	20.1 ± 2.9
	Partner supportive dyadic coping	267	18.4 ± 4.4
	Own delegated dyadic coping	269	7.1 ± 1.4
	Partner delegated dyadic coping	270	6.8 ± 1.9
	Own negative dyadic coping	267	7.5 ± 2.5
	Partner negative dyadic coping	269	8.3 ± 3.5
	Common dyadic coping	267	24.2 ± 5.6
	Evaluation of dyadic coping	269	7.2 ± 2.1
	DCQ-Total	253	148.0 ± 19.9
Psychological health	HADS-A	272	9.3 ± 4.2
	HADS-D	272	8.4 ± 4.1
	HADS-Total	271	17.7 ± 7.6
	RSES	261	28.5 ± 6.1

Table 2. Intimate relationships and psychological health: means and standard deviations

		Psychological health			
		HADS-A	HADS-D	HADS-Total	RSES
Intimate relationships					
Perceived negative impact of endometriosis	--on the current relationship	.381**	.404**	.430**	-.337**
	--on past love life	.162*	.180*	.186*	-.201*
Women's perceptions about partner attitudes and behaviors	Partner informed about endometriosis	-.002	-.039	-.024	.123
	Partner informed about the woman's health status	-.084	-.078	-.091	.126
	Partner interested in being informed about the woman's health status	-.076	-.084	-.086	.091
	Partner accompanies the woman to medical visits	.000	.027	.014	.058
Relational satisfaction (QRI)		-.262**	-.337**	-.333**	.250**
Dyadic Coping (DCQ)	Own stress communication	-.025	-.140*	-.090	.115
	Partner stress communication	.016	-.092	-.044	.031
	Own supportive dyadic coping	-.092	-.206*	-.166*	.178*
	Partner supportive dyadic coping	-.132	-.208*	-.187*	.215*
	Own delegated dyadic coping	.009	-.070	-.039	.080
	Partner delegated dyadic coping	-.109	-.130	-.132	.160
	Own negative dyadic coping	.250**	.304**	.305**	-.289**
	Partner negative dyadic coping	.203*	.235**	.242**	-.296**
	Common dyadic coping	-.215**	-.319**	-.293**	.291**
	Evaluation of dyadic coping	-.214**	-.305**	-.286**	.299**
DCQ-Total		-.195*	-.316**	-.282**	.296**

503

504 **Table 3.** Intimate relationships and psychological health

505

506 The values reported in this table were derived from Spearman (for relational satisfaction and
507 negative dyadic coping) and Pearson correlation analyses (for all the other variables).508 * $P < .01$ 509 ** $P < .001$

	QRI			DCQ						Common DC	Evaluation of DC	DCQ-Total
	Relational satisfaction	Own stress communication	Partner stress communication	Own supportive DC	Partner supportive DC	Own delegated DC	Partner delegated DC	Own negative DC	Partner negative DC			
Perceived negative impact of endometriosis												
--on the current relationship	-.408**	-.053	-.117	-.248*	-.290**	-.042	-.199	.357**	.391**	-.375**	-.406**	-.354**
--on past love life	-.258**	-.051	.016	-.097	-.210*	.067	-.123	.129	.189*	-.248**	-.274**	-.203*
Women's perceptions about partner attitudes and behaviors												
Partner informed about endometriosis	.347**	.271**	.213**	.255**	.420**	.156	.339**	-.160*	-.319**	.387**	.384**	.441**
Partner informed about the woman's health status	.456**	.333**	.171*	.301**	.542**	.173*	.417**	-.251**	-.433**	.508**	.519**	.554**
Partner interested in being informed about the woman's health status	.302**	.275**	.046	.299**	.352**	.137	.324**	-.210**	-.352**	.348**	.296**	.406**
Partner accompanies the woman to medical visits	.309**	.200*	.146	.167*	.346**	.152	.340**	-.152	-.328**	.285**	.306**	.343**

Table 4. Women's perceptions, relational satisfaction, and dyadic coping (DC)

The values reported in this table were derived from Spearman (for relational satisfaction and negative DC) and Pearson correlation analyses (for all the other variables).

*Significant at $P < .01$

**Significant at $P < .001$