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## 5 **Title**

6 Sexual and relational satisfaction in couples where the woman has polycystic ovary syndrome:  
7 a dyadic analysis.

8

## 9 **Running title**

10 Effects of PCOS on relationship satisfaction.

11

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23 **Abstract**

24

25 **Study question**

26 How are objective characteristics of the polycystic ovary syndrome (PCOS) and PCOS-  
27 related concerns associated with the sexual and relational satisfaction of PCOS women and  
28 their partners?

29 **Summary answer**

30 Both objective PCOS characteristics (parity, women's body mass index (BMI) and current  
31 unfulfilled wish to conceive) and PCOS-related concerns (women's infertility-related and  
32 acne-related concerns) were associated with sexual and/or relational satisfaction, although  
33 some associations differed for PCOS women and their partners.

34 **What is known already**

35 There is some evidence indicating an association between objective PCOS characteristics and  
36 sexual satisfaction of PCOS women, but this evidence is conflicting, scarce, and often no  
37 validated questionnaires are used to evaluate sexual satisfaction. No evidence is available  
38 about the association of (a) PCOS with relational satisfaction; (b) PCOS-related concerns with  
39 sexual and relational satisfaction; and (c) PCOS with sexual and relational satisfaction as  
40 experienced by partners of PCOS women.

41 **Study design, size, duration**

42 We set up a cross sectional study from April 2007 till April 2009 including 31 overweight  
43 (BMI  $\geq$  25 kg/m<sup>2</sup>) women with PCOS at reproductive age as well as their partners with who  
44 they had a committed intimate relationship at the time of recruitment.

## 45 **Participants/materials, setting, methods**

46 The study was performed at the fertility center of the Ghent University Hospital. Objective  
47 PCOS characteristics were registered and PCOS-related concerns were evaluated by the  
48 PCOS Questionnaire. Sexual (<sub>SS</sub>) and relational (<sub>RS</sub>) satisfaction were measured by the  
49 Maudsley Marital Questionnaire (MMQ). Dyadic statistical analyses were performed using  
50 linear mixed models ( $\alpha < 0.05$ ).

## 51 **Main results and the role of chance**

52 A lower parity tended to be associated with higher levels of sexual and relational satisfaction,  
53 with a significantly stronger association in PCOS women than their partners ( $p_{(SS)} = .015$  and  
54  $p_{(RS)} = .009$ ). A higher BMI tended to be associated with lower and higher satisfaction levels  
55 (sexual and relational) in PCOS women and their partners, respectively, with a significantly  
56 stronger association in the partners ( $p_{(SS)} = .029$  and  $p_{(RS)} = .021$ ). The presence of a current  
57 unfulfilled wish to conceive and a higher level of infertility-related concerns was significantly  
58 stronger associated with a higher level of PCOS women's relational satisfaction than their  
59 partners' ( $p_{(RS)} = .021$  and  $p_{(RS)} = .011$ , respectively). And higher levels of acne-related  
60 concern were significantly associated with lower levels of sexual satisfaction in PCOS women  
61 ( $p_{(SS)} = .025$ ) and their partners ( $p_{(SS)} = .002$ ).

## 62 **Limitations, reasons for caution**

63 The fact that this study was performed in a sample of PCOS women who were all overweight  
64 and the small sample size are important limitations. Data were partially missing in some  
65 couples but this limitation was dealt with by using linear mixed models.

## 66 **Wider implications of the findings**

67 Our results suggest a differential association of PCOS with sexual and relational satisfaction  
68 between PCOS women and their partners. This should be kept in mind during the  
69 psychological guidance of couples dealing with PCOS.

70 **Study funding/competing interest(s):**

71 Veerle De Frène is holder of a Special PhD Fellowship of the Flemish Foundation for  
72 Scientific Research (FWO-Vlaanderen). Petra De Sutter is holder of a fundamental clinical  
73 research mandate of the Flemish Foundation for Scientific Research (FWO-Vlaanderen). This  
74 research also received financial support by Merck Serono and Artevelde University College  
75 Ghent. There are no competing interests.

76

77 **Keywords**

78 Polycystic ovary syndrome, sexuality, relationship, satisfaction, couple.

## 79 **Introduction**

80 The polycystic ovary syndrome (PCOS) is a common endocrine disorder in women of  
81 reproductive age (Broekmans et al., 2006). It is characterized by menstrual disorders,  
82 anovulatory subfertility, hirsutism, acne, biochemical signs of hyperandrogenism, obesity and  
83 insulin resistance (The Rotterdam ESHRE/ASRM-sponsored PCOS consensus workshop  
84 group, 2004; Drosdzol et al., 2007). Due to these characteristics, PCOS is found to be a  
85 trigger for psychological morbidity, with PCOS women reporting to feel different, less  
86 feminine, and more depressed as compared to non-PCOS women (Elsenbruch et al., 2003;  
87 Snyder, 2006; Jones et al., 2008). There is also preliminary evidence that PCOS  
88 characteristics negatively affect various aspects of women's sexual life. More specifically,  
89 PCOS women often report to feel less attractive and to be less sexually satisfied as compared  
90 to non-PCOS women (Elsenbruch et al., 2003; Drosdzol et al., 2007; Tan et al., 2008;  
91 Månsson et al., 2011).

92 Although these results are promising, existing research on how PCOS affects women's sexual  
93 and intimate relationships is limited in several ways. First, findings from studies on the  
94 specific objective characteristics of PCOS that affect women's level of sexual satisfaction  
95 appear to be contradictory. More specifically, indicators of hyperandrogenism were found to  
96 have a negative effect (i.e. Ferriman-Gallwey score of hirsutism) in the Drosdzol et al. study  
97 (2007) but no effect (i.e. self-reported state of hirsutism and total serum testosterone) in the  
98 Stovall et al. study (2012) on PCOS women's sexual satisfaction. Similar conflicting evidence  
99 has been found for the association of PCOS women's body mass index (BMI) with their  
100 sexual satisfaction and functioning (Elsenbruch et al., 2003; Hahn et al., 2005; Månsson et al.,  
101 2011; Stovall et al., 2012). Second, previous PCOS-studies focusing on sexuality relied on  
102 questionnaires that were often not psychometrically validated. Also, sexual satisfaction was at  
103 times measured by means of questionnaires evaluating rather women's sexual functioning,

104 and including only some items pertaining to their level of sexual satisfaction (Elsenbruch et  
105 al., 2003; Hahn et al., 2005; Drosdzol et al., 2007; Tan et al., 2008; Månsson et al., 2011).  
106 Third, studies to date did not examine how women's subjective experience of PCOS-related  
107 characteristics is related to their sexual life. This is surprising, as a stressor's (like PCOS)  
108 objective characteristics need to be conceptually and methodologically differentiated from a  
109 person's perception of and reaction to a stressor; moreover, the perception of a stressor is  
110 theoretically and empirically more directly related to individual and relational well-being than  
111 its objective characteristics (Weber, 2011). Fourth, as existing research on PCOS and sexual  
112 satisfaction/functioning exclusively focused on the perspective of PCOS women, little is  
113 known about how partners of PCOS women experience their intimate relationship. Finally,  
114 previous studies limited their scope to sexual satisfaction whereas they did not investigate  
115 how PCOS affects other non-sexual aspects of long-term intimate relationships, like a  
116 couple's level of relational satisfaction. The latter refers to how good or bad couples judge  
117 their intimate relationship to be, and reflecting partners' feelings of mutual understanding,  
118 tensions in the relationship, their commitment to the relationship, etc. (Bradbury & Karney,  
119 2010). Furthermore, couple's relational satisfaction correlates strongly with their level of  
120 sexual satisfaction (Christopher & Sprecher, 2000; Sprecher & Cate, 2004).

121 Sexual as well as relational satisfaction are essential characteristics of intimate relationships,  
122 and important predictors of both relationship stability and partner's subjective well-being  
123 (Bradbury & Karney, 2010). Given its symptomatology, PCOS is assumed to be a chronic  
124 stressor for couples to deal with, and to have the potential to undermine both partners' sexual  
125 and relational satisfaction. In order to develop evidence-based psychological interventions for  
126 PCOS women and their partners, research on the intimate life of couples facing PCOS is  
127 essential. Therefore, the present study examined how (a) both objective PCOS characteristics  
128 and PCOS-related concerns relate to (b) sexual as well as relational satisfaction, of (c) PCOS

129 women and their intimate partner. As a point of major empirical and clinical interest, we also  
130 explored potential differences between PCOS women and their partners in the association  
131 between PCOS characteristics on the one hand and sexual and relational satisfaction on the  
132 other hand, by performing dyadic statistical analyses. Psychometrically validated  
133 questionnaires were used to assess all the variables included in the current study.

## 134 **Materials and methods**

135 We set up a cross sectional study at the Department of Reproductive Medicine of the Ghent  
136 University Hospital from April 2007 till April 2009. This study was performed in the context  
137 of a lifestyle modification program for overweight women with PCOS between the age of 18  
138 and 43 years old (n = 33). The PCOS women who were involved in a committed intimate  
139 relationship at the start of that program (n = 31) were eligible for the current study. At the  
140 start of the lifestyle modification program, all 31 PCOS women as well as their partners were  
141 informed about the current study by the treating physician and all agreed to participate. PCOS  
142 was diagnosed by a gynecologist according to the Rotterdam criteria (The Rotterdam  
143 ESHRE/ASRM-sponsored PCOS consensus workshop group, 2004).

### 144 *Objective characteristics of PCOS*

145 Overweight was diagnosed as a BMI of  $\geq 25$  kg/m<sup>2</sup> (WHO, 2010). Clinical hyperandrogenism  
146 was diagnosed by evaluating the presence of visible hair growth and facial acne. The degree  
147 of visible hair growth was indicated by the modified Ferriman-Gallwey (mFG) scale and  
148 women were classified as hirsute when they had a mFG-score  $\geq 8$  (Ferriman & Gallwey, 1961;  
149 Yildiz et al., 2010). The acne parameter was evaluated by asking women whether facial acne  
150 was present or not. Hyperandrogenemia was diagnosed by the presence of a free testosterone  
151 (fT) level  $> 0.50$  ng/dL, which was determined at day 2 or 3 of a spontaneous or induced  
152 menstrual cycle. The menstrual cycle was categorized as irregular in case of no menstrual  
153 bleeding for  $> 35$  days or  $> 6$  months. Parity and gravidity, both indicators of subfertility,  
154 were registered and women were also asked if they had a current unfulfilled wish to conceive.

### 155 *PCOS-related concerns*

156 To evaluate women's subjective PCOS-related concerns, the PolyCystic Ovary Syndrome  
157 Questionnaire (PCOSQ) and an acne Visual Analogue Scale (VAS) were used (Cronin et al.,



158 1998; Guyatt et al., 2004). All PCOS women were given basic instructions to fill out the  
159 questionnaire around their first consultation in the lifestyle modification program. The 26-  
160 item PCOSQ consists of 5 domains: emotions (e.g., ‘being worried about having PCOS’ or  
161 ‘having a low self-esteem as a result of having PCOS’), body hair, weight, infertility problems  
162 and menstrual problems. Each item of the questionnaire was scored on a 7-point Likert scale  
163 (1 = *high concern*, 7 = *no concern*), with higher scores corresponding with lower levels of  
164 PCOS-related concern (Cronin et al., 1998). For each PCOS woman, the mean score of all  
165 domain-specific items and the mean score of the 5 domain scores generated the score of each  
166 PCOSQ domain and the total PCOSQ score, respectively. Whereas, in the original version of  
167 the PCOSQ, a time frame of 2 weeks is chosen for PCOS women to report their subjective  
168 experience of PCOS (Cronin et al., 1998), the current study used a time frame of six months  
169 in order to have a view on the patient’s subjective experience of PCOS over a larger period of  
170 time. In the current study, the total PCOSQ scale and the 5 separate PCOSQ domain scales  
171 showed acceptable to excellent reliability (Cronbach’s alpha’s between .61 and .95). In order  
172 to evaluate the subjective experience of the presence of facial acne, PCOS women indicated to  
173 what extent the presence of facial acne influenced their quality of life on a VAS (0 = *no*  
174 *influence*, 10 = *great influence*). Contrary to the PCOSQ scores, higher VAS scores reflect  
175 higher levels of acne-related concern.

#### 176 *Sexual and relational satisfaction*

177 Sexual and relational satisfaction of PCOS women and their partners were assessed by means  
178 of the Maudsley Marital Questionnaire (MMQ; Arrindell et al., 1983). The MMQ was filled  
179 out by the PCOS women as well as by their partners around their first consultation in the  
180 lifestyle modification program. The MMQ includes 20 items, each rated on a 9-point Likert  
181 scale that ranges from 0 = *high satisfaction* to 8 = *low satisfaction*. The sexual satisfaction  
182 subscale and the marital satisfaction subscale were used to assess each participant’s subjective

183 evaluation of their sexual life and intimate relationship, respectively. Subscale-scores were  
184 calculated separately for the PCOS women and their partners by computing the sum of their  
185 responses on all items in the respective subscales. Scores on the sexual satisfaction subscale  
186 could range from 0 to 40 and for the marital satisfaction subscale from 0 to 80, with higher  
187 scores reflecting lower levels of satisfaction. The psychometric qualities of the Dutch version  
188 of the MMQ are confirmed (Arrindell et al., 1983; Arrindell & Schaap, 1985; Joseph et al.,  
189 2007). In this study, Cronbach's alpha's were adequate to good (between .70 and .84)  
190 indicating an acceptable internal consistency for all the subscales.

#### 191 *Ethical consent*

192 This study has been authorized by the Ethics Committee of the Ghent University Hospital.  
193 Couples gave their written informed consent for participation and follow-up.

#### 194 *Statistical analysis*

195 The association between PCOS characteristics on the one hand, and sexual satisfaction ( $_{SS}$ )  
196 and relational satisfaction ( $_{RS}$ ) of PCOS women and their partners on the other hand, was  
197 analyzed by using linear mixed models (LMM). Dyadic analyses were performed to take into  
198 account the interdependence of both partners in a couple and to explore potential differences  
199 between partners in the association between PCOS characteristics and satisfaction. For each  
200 outcome variable separately, a mixed model accounting for the correlation within dyads was  
201 fitted. Models with objective predictors (i.e. objective PCOS characteristics) and subjective  
202 predictors (i.e. PCOS-related concerns) separately were built using forward-stepwise  
203 regression. For each of the predictors we allowed for a different association for the PCOS  
204 women and their partners. Couples with a missing outcome in one of the partners were  
205 included in the LMM analysis, but missingness in the predictors implied the deletion of the  
206 data from that couple. Effect sizes reflecting the effect of each predictor on the PCOS

207 woman's and their partner's outcome together were calculated using Cohen's  $f^2$  (Selya et al.,  
208 2012).  $f^2$  effect sizes of 0.02, 0.15, and 0.35 are termed *small*, *medium*, and *large*, respectively.  
209 The MMQ sexual and relational satisfaction subscale scores of both PCOS women and their  
210 partners were compared with published normative data from a sample of heterosexual,  
211 married adults (Joseph et al., 2007) by means of a one-sample t-test. The LMM analyses,  
212 including the calculation of the effect sizes, were performed using SAS version 9.3. All other  
213 statistical analyses were performed using SPSS version 22.0. The statistical significance level  
214 was set at  $\alpha < 0.05$ .

## 215 **Results**

### 216 *Descriptive statistics*

217 The PCOS women and their partners had an average age of  $30.1 \pm 5.1$  and  $34 \pm 6.3$  years  
218 respectively ( $p = .01$ ). The median length of their relationship was 63 (IQR 89.7) months and  
219 20/31 (64.5%) were married. One couple was lesbian.

220 The values for objective PCOS characteristics, PCOS-related concerns (reported by PCOS  
221 women), as well as sexual/relational satisfaction (reported by both partners) are presented in  
222 Table I. Ninety percent (28/31) of the PCOS women filled out the PCOSQ. The response rate  
223 on the MMQ was 27/31 (87.1%) and 24/31 (77.4%) for PCOS women and their partners,  
224 respectively. The MMQ sexual and relational satisfaction subscale-scores were significantly  
225 higher in PCOS women in comparison to their partners ( $p_{(SS)} = .017$  and  $p_{(RS)} = .007$ ). There  
226 was a significant positive correlation for sexual and relational satisfaction between PCOS  
227 women and their partners ( $r = .83$ ,  $p < .001$  and  $r = .88$ ,  $p < .001$ , respectively).

### 228 *Dyadic analyses*

229 When testing for the association of objective PCOS characteristics with participants' level of  
230 sexual and relational satisfaction, the following results emerged (Table II): First, a lower  
231 parity tended to be associated with higher levels of sexual and relational satisfaction in both  
232 PCOS women and their partners. However, this association was significantly stronger for  
233 PCOS women than for their partners ( $p_{(SS)} = .015$  and  $p_{(RS)} = .009$ ). Second, a higher BMI of  
234 PCOS women tended to be associated with lower levels of sexual and relational satisfaction  
235 of PCOS women, whereas – a higher BMI of PCOS women tended to be associated with  
236 higher levels of sexual and relational satisfaction of their partners. This association of BMI  
237 was significantly different between the PCOS women and their partners ( $p_{(SS)} = .029$  and  $p_{(RS)}$   
238  $= .021$ ). Third, the presence of a current unfulfilled wish to conceive tended to be associated

239 with higher levels of relational satisfaction in both PCOS women and their partners. This  
240 association was significantly stronger in PCOS women than their partners ( $p_{(RS)} = .021$ ).

241 Analyses for the PCOS-related concerns – as reported by PCOS women – (see Table II)  
242 revealed that higher levels of infertility-related concern were significantly associated with  
243 higher levels of relational satisfaction in PCOS women ( $p_{(RS)} = .028$ ). Higher levels of  
244 infertility-related concern also tended to be associated with higher levels of relational  
245 satisfaction in the partners of PCOS women. This association was significantly stronger in  
246 PCOS women than their partners ( $p_{(RS)} = .011$ ). Finally, higher levels of acne-related concern  
247 were significantly associated with lower levels of sexual satisfaction of PCOS women ( $p_{(SS)}$   
248  $= .025$ ) and their partners ( $p_{(SS)} = .002$ ). This association was not significantly different  
249 between PCOS women and their partners.

250 The effect sizes for all the associations discussed above can be considered as at least medium,  
251 except for the association of subjective acne-related concern with sexual satisfaction (see  
252 Table II).

### 253 *Comparison of participants' sexual/relational satisfaction scores with normative data*

254 Joseph et al. (2007) reported a mean ( $\pm$  standard deviation) MMQ sexual and relational  
255 satisfaction subscale score of 9.15 ( $\pm$  7.25) and 14.91 ( $\pm$  11.76), respectively for a sample of  
256 heterosexual, married women ( $n = 396$ ). For heterosexual, married men ( $n = 391$ ) the scores  
257 were 8.18 ( $\pm$  7.14) and 12.24 ( $\pm$  9.54), respectively (Joseph et al., 2007).

258 In our study, sexual satisfaction levels of the PCOS women and their partners (figures see  
259 Table I) tended to be lower ( $p = 0.7$ ) and higher ( $p = 0.7$ ), respectively, as compared to that  
260 reference sample. Relational satisfaction levels of the PCOS women and their partners were  
261 significantly higher ( $p = 0.01$  and  $p = 0.002$ , respectively) as compared to that reference  
262 sample.

## 263 **Discussion**

264 In the current study, we investigated the association of PCOS (i.e. objective PCOS  
265 characteristics and PCOS-related concerns) with the sexual and relational satisfaction of  
266 couples dealing with PCOS, as well as differences in those associations between PCOS  
267 women and their partners. Our results suggest that objective PCOS characteristics (parity,  
268 women's BMI and current unfulfilled wish to conceive) as well as subjective PCOS-related  
269 concerns (women's infertility-related and acne-related concerns) are associated with the  
270 sexual and/or relational satisfaction of couples dealing with this chronic disease. Most of  
271 these associations were significantly different for PCOS women and their partners.

272 First, we found that a lower parity tended to be associated with higher levels of sexual and  
273 relational satisfaction in both PCOS women and their partners. In contrast, the case-control  
274 study by Månsson et al. (2011) concluded that having children or not was not associated with  
275 sexual functioning of PCOS women, as measured by the McCoy female sexual rating scale.  
276 Additionally, we observed that the presence of a current unfulfilled wish to conceive and a  
277 higher level of infertility-related concerns was (significantly) associated with higher levels of  
278 relational satisfaction in both PCOS women and their partners. This pattern of results might  
279 be explained by the fact that childless couples (i.e. parity = 0) have possibly more time for  
280 each other than couples with children (Claxton & Perry-Jenkins, 2008; Lawrence et al., 2008),  
281 and that – in case of unwanted childlessness – couples with fertility problems probably have a  
282 more stable and satisfying relationship (Månsson et al., 2011). It should be noted, however,  
283 that existing evidence on the infertility-satisfaction association is inconsistent. For example,  
284 Brighenti et al. (1997) reported - on the one hand - a significantly higher level of relational  
285 satisfaction in organic infertile women as compared to women without fertility problems, but  
286 – on the other hand – no significant differences in relational satisfaction level in women with  
287 unexplained infertility as compared to women without fertility problems. Also, Monga et al.

288 (2004) found significantly and non-significantly lower levels of relational satisfaction in  
289 infertile versus fertile women and infertile versus fertile men, respectively.

290 In our study, we observed no association of a current unfulfilled wish to conceive and  
291 infertility-related concerns with sexual satisfaction in PCOS women and their partners. This is  
292 in line with the Tan et al. (2008) study in which no difference was found in women's  
293 satisfaction with their sex life – as measured by using a VAS – between a group of PCOS  
294 women with or without a wish to conceive. Similarly, the Iris et al. (2013) study found no  
295 significant differences in sexual satisfaction levels between a sample of infertile women and a  
296 control group. In contrast Shoji et al. (2014) reported lower sexual satisfaction levels in both  
297 partners of infertile couples as compared to both partners of pregnant couples.

298 Second, since PCOS is often accompanied by changes in women's physical appearance (e.g.,  
299 obesity, hirsutism and acne), one should expect a substantial influence of these symptoms on  
300 couple's sexual and relational satisfaction. In line with this expectation we observed – taking  
301 into account that only overweight women with PCOS were included in the current study – a  
302 trend towards an association between a higher BMI and lower levels of sexual and relational  
303 satisfaction in PCOS women. To our knowledge, there is currently no evidence available  
304 about the association of BMI with relational satisfaction in a general female population. Our  
305 findings on sexual satisfaction are in line with the study by Månsson et al. (2011) in which a  
306 trend towards a negative association of an increased BMI with PCOS women's sex life was  
307 found. Also in the Yaylali et al. (2010) study a significant negative correlation between  
308 weight and the level of sexual satisfaction was found; Brody & Weiss (2013) reported a  
309 significant negative correlation between women's waist circumference and her level of sexual  
310 satisfaction.

311 A series of studies also documents the opposite pattern. For example, Elsenbruch et al. (2003)  
312 and Stovall et al. (2012) concluded that differences in BMI status were not associated with  
313 PCOS women's level of sexual satisfaction. Similarly, two studies – performed in a general  
314 female sample – found that overweight and obesity (as expressed by BMI) were no risk  
315 factors for sexual satisfaction (as measured by the Female Sexual Function Index) (Kadioglu  
316 et al., 2010; Yaylali et al., 2010).

317 Within partners of PCOS women, a higher BMI of PCOS women tended to be associated with  
318 higher levels of sexual and relational satisfaction. To our knowledge, there is currently no  
319 evidence available from other PCOS studies, nor from non-PCOS studies about this  
320 association in a general male sample with which our results could be compared.

321 We also observed that higher levels of acne-related concern in PCOS women were  
322 significantly associated with lower levels of sexual satisfaction within both PCOS women and  
323 their partners. The study by Hahn et al. (2005) and by Stovall et al. (2012) reported no  
324 significant association of the objective presence of acne with the level of sexual satisfaction  
325 and sexual functioning of PCOS women. However, our results reflect the association of PCOS  
326 women's concern about the presence of acne with satisfaction, rather than the association of  
327 the objective degree of acne with satisfaction.

328 As the evidence about the association of PCOS characteristics (e.g., BMI, infertility) with  
329 sexual/relational satisfaction is inconsistent across samples of infertile and obese women, no  
330 conclusions can be drawn about the nature of these associations within those samples.  
331 Moreover, since we do not know with certainty whether all women included in these studies  
332 were women without PCOS, it is not possible to make a statement about these associations in  
333 a non-PCOS population. Taken together, it is hard to compare our findings with evidence



334 from a non-PCOS population and it is even harder to decide if our findings are unique to a  
335 PCOS population.

336 It should be noted however, that the association of PCOS characteristics with the level of  
337 sexual/relational satisfaction might possibly be explained by the influence of confounding  
338 factors. For example, depression might influence the association of PCOS with sexual  
339 satisfaction, given – on the one hand – the increased depression level in PCOS women  
340 compared to age-matched controls (Elsenbruch et al., 2003), and – on the other hand - the  
341 significant association of an increased depression level with a decreased sexual satisfaction  
342 level in a general sample of sexually active females (Kadioglu et al., 2010). Unfortunately, we  
343 were not able to correct our analyses for this confounding factor since we had no detailed  
344 information about the presence of depression at the time of recruitment. Nevertheless, given  
345 this existing evidence, caution is warranted when interpreting the association of PCOS with  
346 the level of sexual satisfaction as reflecting a direct association. This also stresses the  
347 importance of adjusting the performed analyses for confounding factors in future research.

348 Third, we found significantly lower levels of sexual and relational satisfaction in PCOS  
349 women as compared to their partners. Thus far, only one study reported on the differential  
350 influence of a chronic disease on the satisfaction of both partners in a couple. A study by Van  
351 Son-Schoones (1994), investigating the sexual and relational satisfaction (among others) of  
352 patients with a chronic kidney disease, observed significantly higher levels of relational  
353 satisfaction in patients than their partners ( $t = -3.46, p < .001$ ). It should be noted, however,  
354 that the study by Van Son-Schoones (1994) included female as well as male patients and the  
355 interdependence of both partners in a couple was not taken into account (only half of the  
356 patient's partners participated in the study and no dyadic statistical analyses were performed).

357 To further clarify this finding we compared our results with published normative data on the  
358 MMQ (Joseph et al., 2007). In that reference sample, the level of sexual and relational  
359 satisfaction seemed to be lower in married women than in married men. Although no  
360 significance level is reported by Joseph et al. (2007), this finding is in line with our results.  
361 However, we must be aware of the fact that our group of partners include one female partner.

362 The observed relational satisfaction levels of the PCOS women as well as their partners in our  
363 sample were both found to be significantly higher than those in a reference sample (Joseph et  
364 al., 2007). These findings suggest that couples participating in our study were generally  
365 satisfied about the non-sexual aspect of their intimate relationship; our results therefore await  
366 replication within samples of distressed couples dealing with PCOS.

367 The present study both complements and elaborates upon existing research on PCOS and  
368 intimate relationships. An important strength of this study is that dealing with PCOS was  
369 analyzed from a dyadic point of view, by including PCOS women and their partners, focusing  
370 on multiple aspects of intimate relationships, and by conducting dyadic statistical analyses  
371 taking into account the interdependence of both partners in a couple. We should, however,  
372 note some limitations of the current study. The most important of these undoubtedly have to  
373 do with the small sample used in the present study. A simulation study to explore the power  
374 to detect effects of varying size in the current study was performed. Mimicking the data-  
375 structure and the observed within-cluster correlation, we found that with 30 couples the study  
376 has about 80% power to detect large effects at the 5% significance levels. The power to detect  
377 low to medium effects is smaller than 50%. This might be a reason why certain small effects,  
378 found in other studies, were not detected in our study. And although the response rate on all  
379 questionnaires was quite high, data were partially missing in some couples which resulted in  
380 an unbalanced data set. This limitation was dealt with by using linear mixed models. Due to  
381 these limitations we suggest that this study should be replicated in a larger sample using the

382 same standardized questionnaires and statistical dyadic analytic techniques in order to  
383 enhance the generalizability of the results. Additionally - since this study was performed in a  
384 sample of PCOS women who were all overweight - it is also recommended to recruit from a  
385 broader population including normal weight PCOS women as well, in order to further clarify  
386 the association of overweight with couple's sexual and relational satisfaction and to enhance  
387 the generalizability of the results to a general population of couples dealing with PCOS.  
388 Finally, causal relationships can't be tested in the present data and the issue of causal ordering  
389 remains for future research to resolve.

390 In conclusion, our results suggest that objective PCOS characteristics as well as subjective  
391 PCOS-related concerns are associated with the sexual and relational satisfaction of couples  
392 dealing with this chronic disease. The second conclusion that can be drawn from our findings  
393 is that there is a differential association of these characteristics with satisfaction levels for  
394 PCOS women and their partners. This is an important finding which should be kept in mind  
395 during the psychological guidance of couples dealing with PCOS.

**396 Authors' roles**

397 All authors have seen and approved the final version of this article. No author has conflicts of  
398 interest.

399 V. De Frène: researcher, has designed and executed the study; gathered, analyzed and  
400 interpreted the data; drafted the manuscript and the critical discussion.

401 L. Verhofstadt: has designed the study; interpreted the data; drafted the manuscript and the  
402 critical discussion.

403 T. Loeys: analyzed the data and contributed to data interpretation, manuscript drafting and  
404 critical discussion.

405 I. Stuyver: has contributed to study execution, data gathering, manuscript drafting and critical  
406 discussion.

407 A. Buysse: has contributed to study design, data interpretation, manuscript drafting and  
408 critical discussion.

409 P. De Sutter: supervisor, has contributed to study design, study execution, data interpretation,  
410 manuscript drafting and critical discussion.

411

**412 Acknowledgements**

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**415 Funding**

416 Veerle De Frène is holder of a Special PhD Fellowship by the Flemish Foundation for  
417 Scientific Research (FWO-Vlaanderen). Petra De Sutter is holder of a fundamental clinical

418 research mandate by the Flemish Foundation for Scientific Research (FWO-Vlaanderen). This  
419 research also received financial support by Merck Serono and the Artevelde University  
420 College Ghent.

421

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