Associations Between Postpartum Depressive Symptoms and Couples' Sexual Function and Sexual

Distress Trajectories across the Transition to Parenthood

Dawson, S. J., Leonhardt, N., Impett, E. A., & **Rosen, N. O.** (2021). Associations between

postpartum depression and couples' sexual function and sexual distress trajectories across the

transition to parenthood. *Annals of Behavioral Medicine.* https://doi.org/10.1093/abm/kaaa117

1   Abstract

2   **Background:** The transition to parenthood is associated with changes to new parents' mood and

3   sexual health. Sexual dysfunction—problems with sexual function accompanied by sexual distress

4   (i.e., worries and concerns about one's sex life)—is linked to poorer overall health, yet few studies

5   have examined how sexual dysfunction unfolds for couples during this transition. Postpartum

6   depression is a risk factor for sexual dysfunction; however, the association between depressive

7   symptoms and how postpartum sexual dysfunction evolves has not been examined.

8   **Purpose:** To establish trajectories of sexual function and sexual distress for mothers and partners and

9   to examine if postpartum depressive symptoms were associated with these trajectories.

10 **Methods:** Data were collected from 203 first-time parent couples from mid-pregnancy until 12-

11 months postpartum. Sexual function and sexual distress were assessed at six time points (two

12 prenatal) and depressive symptoms were assessed at 3-months postpartum.

13 **Results:** Dyadic latent piece-wise growth curve models revealed significant declines in mothers' and

14 partners' sexual function between pregnancy and 3-months postpartum and significant improvements

15 from 3- to 12-months postpartum. Mothers' sexual distress increased between pregnancy and 3-

16 months postpartum and decreased thereafter, whereas partner's sexual distress remained stable.

17 Depressive symptoms were associated with poorer sexual function and higher sexual distress at 3-

18 months postpartum for both partners but did not predict change over time.

19 **Conclusions:** Mothers and their partners experience changes to their sexual function during the

20 transition to parenthood; however, mothers are at greater risk of sexual dysfunction. Depressive

21 symptoms are a risk factor for poorer sexual health at 3-months postpartum for both parents.

22 *Keywords:* sexual health, sexual dysfunction, sexual distress, postpartum depressive symptoms,

23 transition to parenthood, actor-partner interdependence model.

24

1   The transition to parenthood (TTP), which includes experiences during pregnancy up to 12-

2   months postpartum, is associated with changes to new parents' mood and sexual health (1-4). Up to

3   26% of new mothers and fathers experience postpartum depressive symptoms. Compared to

4   depressive symptoms outside of the transition to parenthood, postpartum depressive symptoms occur

5   following the birth of a child and are more likely to include symptoms related to low mood/mood

6   swings, psychomotor agitation, and restlessness and are less likely to include suicidal ideation and

7   anhedonia (4). Problems with sexual function—low desire and satisfaction, arousal and orgasm

8   difficulties, and pain during intercourse—are even more prevalent (e.g., 20% to 68% of new mothers

9   and 22% to 45% of new fathers), often emerging during pregnancy and persisting up to 12-months

10   postpartum (1, 2). Changes to the sexual relationship can be concerning for new parents and are often

11   accompanied by sexual distress (i.e., worries or concerns regarding one's sex life; 5, 6, 7), yet very

12   limited research has examined sexual distress beyond pregnancy and sexual distress among partners.

13   Sexual health is an important component of health and well-being, with evidence that sexual

14   health uniquely contributes to better mental and physical health outcomes (8). Despite the inherently

15   interpersonal context of sexuality and importance to overall health (8), no research has examined

16   how *couples'* sexual function and distress change during the TTP. Although cross-sectional studies

17   suggest that postpartum depressive symptoms are negatively associated with sexual function and

18   positively associated with sexual distress (1), no research has examined these factors in a dyadic

19   context to explore whether an individual's depressive symptoms predicts change in their own and

20   their partner's sexual outcomes. The purpose of the current study was twofold. First, we established

21   average trajectories of sexual function and sexual distress for mothers and partners beginning mid-

22   pregnancy through 12-months postpartum within an actor-partner interdependence model. That is, a

23   model that includes actor effects (i.e., the association between one's own intercept and one's own

24   slope), as well as partner effects (i.e., the association between one's own intercept and their partner's

1 slope). Second, we examined the associations between one's own and one's partner's postpartum

2 depressive symptoms at 3-months postpartum and these trajectories.

3 **Sexual Function and Sexual Distress in Pregnancy and Postpartum**

4   Biopsychosocial models of postpartum sexual function (1), highlight the importance of

5 biological (e.g., physiological changes associated with pregnancy, birth, and postpartum),

6 psychological (e.g., depression, anxiety, fatigue), and social factors (e.g., relationship adjustment) for

7 sexual dysfunction. Mothers may experience these factors to a greater degree (9), which would then

8 contribute to more marked changes to their sexual function and sexual distress. However, consistent

9 with family systems theory (10), the biopsychosocial factors affecting one parent likely influence the

10 other in a reciprocal manner, underscoring the importance of adopting a dyadic approach.

11   Existing cross-sectional and longitudinal studies suggest that sexual function declines during

12 pregnancy for expectant mothers (2, 11) and their partners (2, 12) and improves gradually over the

13 postpartum period (1-3, 12). Much of this research is underpowered, and the clinical utility of the

14 findings is limited by the use of non-validated measures (e.g., 11, 12). The longitudinal studies that

15 do exist compare responses across time-points (e.g., comparing mean scores at 3-months with those

16 at 6-months; 2, 12); however, this approach precludes an estimation of the degree of change and

17 variability in change over time (i.e., slopes). The one exception is a recent study examining

18 trajectories of postpartum sexual function among 646 first-time mothers, which reported significant

19 heterogeneity in the degree of improvement in sexual function from 3- to 12-months postpartum

20 (13). No studies have established trajectories of sexual function from pregnancy through postpartum,

21 nor accounted for the interdependence of mothers' and partners' sexual function by modeling data

22 from both members of the couple. We hypothesized that sexual function would decrease during

23 pregnancy and then increase during the postpartum period for mothers and partners **(Hypothesis 1)**.

24   Sexually-related personal distress involves negative feelings (e.g., worries, frustration) about

1   one's sexual relationship (5). Sexual distress is necessary for a diagnosis of sexual dysfunction (14),

2   yet sexual distress during the TTP has received limited attention. Although sexual distress is a

3   determinant of treatment-seeking behaviour (15), only 15% of new parents discuss sexual concerns

4   with health care providers (16). Clinically-significant sexual distress pertains to a level of sexual

5   distress that distinguishes groups with and without sexual dysfunction (5). Sexual distress in

6   pregnancy is common, with 42% of pregnant women experiencing clinically-significant levels (7).

7   Another study found that women experience clinically elevated sexual distress postpartum (17).

8   There is limited information about partners' sexual distress; however, a cross-sectional study (6)

9   found that nearly 90% of new mothers and partners endorsed more than 10 sexual concerns that they

10   perceived to be moderately distressing, suggesting that partners also experience worries about their

11   sexuality during the TTP. Although none of these studies are longitudinal, given that both parents

12   experience changes to their sexual function during this transition, we hypothesize that they will

13   experience stable or increasing levels of sexual distress during pregnancy and then either stable or

14   declining levels of sexual distress during the postpartum period **(Hypothesis 2)**. We hypothesized

15   interdependence for both sexual function and sexual distress, such that these would be positively

16   associated between mothers and partners **(Hypothesis 3;** e.g., mothers with higher sexual function

17   will have partners who also report higher sexual function).

18   **Depressive Symptoms and Sexuality in an Interpersonal Context**

19   One factor that may contribute to changes in sexual function and sexual distress for both

20   mothers and partners during the TTP is depressive symptoms. Between 33% and 67% of mothers and

21   33% and 77% of partners reported concerns about the impact of postpartum depressive symptoms on

22   their sexual relationship (6, 18). Meta-analyses estimate between 10% to 25% of mothers and 10% to

23   26% of partners are affected by postpartum depression or significant symptoms of depression (4, 19)

24   and that mothers' and partners' depressive symptoms are positively related (4, 20).

1   Cross-sectional and longitudinal studies sampling individuals and couples with sexual

2   dysfunction who are not in the TTP support bidirectional links between greater depressive symptoms

3   and poorer sexual function (21) and higher sexual distress (22). In addition, cross-sectional studies

4   have linked greater postpartum depressive symptoms with poorer sexual function in new mothers

5   (reviewed in 1, 3). In a prospective longitudinal study of first-time mothers, postpartum depressive

6   symptoms at 3-months postpartum predicted membership in trajectories characterized by moderate

7   and marked problems with sexual function (13). We are unaware of equivalent studies of sexual

8   distress.

9   According to empirically-supported cognitive theories (23), depression is characterized by

10   biased cognitive processing of information, such as greater attention to negative cues and discounting

11   positive cues in the environment. It follows that increased depressive symptoms might contribute to

12   poorer sexual function and higher sexual distress in the postpartum period by increasing attention to

13   negative sexual cues (e.g., genital pain, signs of partner sexual disinterest) and impairing processing

14   of positive sexual cues (e.g., pleasure, intimacy). As such, postpartum depressive symptoms

15   experienced by either partner may put both partners at increased risk for problems with sexual

16   function and increased sexual distress.

17   Given cross-sectional evidence that postpartum depressive symptoms are linked with sexual

18   outcomes, we also hypothesized that an individual's greater depressive symptoms at 3-months

19   postpartum would be associated with their own and their partner's lower sexual function and with

20   their own and their partner's higher sexual distress at 3-months postpartum (**Hypothesis 4a**). No

21   studies, however, have examined how an individual's postpartum depressive symptoms are

22   associated with *changes* in their own or their partner's sexual function and distress during the TTP.

23   We hypothesized that depressive symptoms would be associated with the degree to which sexual

24   function and sexual distress *change* over time, such that higher depressive symptoms at 3-months

1 postpartum would predict less improvement in sexual function and sexual distress over time for both

2 partners **(Hypothesis 4b)**. Given that mothers typically experience more adverse biopsychosocial

3 changes associated with pregnancy, birth, and postpartum (1, 9), we predicted that for all our

4 hypotheses, the effects would be stronger for mothers (who gave birth) compared to partners

5 **(Hypothesis 5)**.

6   Despite the inherently interpersonal context of sexuality and the importance of sexual health

7 for couples' health and well-being, dyadic longitudinal studies examining sexual function and sexual

8 distress, including predictors of change during the TTP do not exist. The purpose of the current study

9 was to (1) model average change in sexual function and sexual distress from pregnancy to 12-months

10 postpartum for mothers and partners (i.e., trajectories), (2) test associations between couples'

11 trajectories based on the actor-partner interdependence model, and (3) examine postpartum

12 depressive symptoms as a predictor of these trajectories. We also examined biopsychosocial factors

13 commonly thought to influence sexual health during the TTP (i.e., sociodemographic, labor and

14 delivery, and parent and infant characteristics) as covariates to ensure our main findings remained

15 consistent. Given the longitudinal and dyadic study design, our findings may advance understanding

16 of sexual health during the TTP for both members of the couple by establishing dyadic trajectories

17 and testing associations with a known risk factor—depression.

18   **Method**

19 **Participants**

20   First-time parent couples were recruited mid-pregnancy (*M* = 19.39 weeks; *range,* 13 to 24

21 weeks, *SD* = 1.56). Recruitment occurred between May 2016 and April 2018, online (40.0%),

22 through advertising in the community (e.g., doctor's offices; 24.2%), or word of mouth (14.4%).

23 Some of the sample was recruited in-person during their routine 20-week ultrasound appointment at

24 the [*masked*] diagnostic imaging clinic in [*masked*] (15.3%). To be eligible, both members of the

1   couple were required to: 1) be over 18 years of age; 2) be in a romantic relationship of at least six

2   months; 3) be fluent in English; 4) have access to a personal email account; 5) reside in Canada or

3   the United States. Mothers[1] were required to: 5) have not previously given birth; 6) have an

4   uncomplicated, singleton pregnancy. Two-hundred and fifty-two couples were recruited and eligible;

5   a sample of 215 were eligible to be included in the current analyses (see Figure 1). Couples who

6   became pregnant for a second time during the study period ($n = 12$) were excluded, given that they

7   may have a different TTP experience (24), leaving 203 couples for the analyses.

8   **Procedure**

9   Online advertisements were posted on Canadian and US websites (e.g., Kijiji, Facebook),

10   whereas physical advertisements were posted in community centers, doctor's offices, and stores in

11   urban centres. For in-person recruitment at the ultrasound clinic, research staff reviewed parity

12   information from the patient requisition forms to identify potential participants prior to their 20-week

13   appointment. Once identified, a research assistant approached patients before their appointment to

14   describe the study and if interested and eligible, enrolled the couple. All participants provided

15   informed consent online before accessing the first online survey.

16   Qualtrics was the survey platform (Baseline: 20-weeks pregnant, 32-weeks pregnant, 2-weeks

17   postpartum, and 3-, 6-, 9- and 12-months postpartum). Secure survey links were emailed to

18   participants, expiring after four weeks. Retention strategies included reminder phone calls within the

19   first 48 to 72 hours if the survey was not completed (13, 25), and reminder emails sent one week

20   before the next survey and one week and three weeks following the email with the survey link.

21   Couples were eligible to receive $105 CDN (or a US equivalent) in the form of Amazon.ca/.com gift

---

[1] All participants who gave birth indicated that their gender/sex was woman/female, with one person identifying as a trans woman and female. We therefore refer to this group collectively as "mothers".

1   cards. The study was approved by the ethical review boards at [*masked*].

2   **Measures**

3   Sociodemographic information was collected in the baseline survey. Sexual function and

4   sexual distress were collected at six timepoints. Labor and delivery characteristics (i.e., vaginal

5   delivery (no/yes), episiotomy (no/yes), perineal tearing (no/yes), epidural (no/yes), induction

6   (no/yes), gestational age, infant weight, time in NICU (no/yes), infant health issues (no/yes),

7   previous pregnancies (no/yes), breastfeeding (no/yes)) were collected in the 2-weeks postpartum

8   survey. Infant/parent characteristics (i.e., parental difficulty caring for and soothing their infant (1 to

9   7), infant sleep quality (1 to 7), parent fatigue (1 to 7), and parent sleep quality (0 to 10)), and

10   postpartum depressive symptoms were collected in the 3-months postpartum survey.

11   *Sexual Function*

12   Sexual function during the past four weeks was assessed at each timepoint using the 19-item

13   Female Sexual Function Index (FSFI; 26) and the 15-item International Index of Erectile Function

14   (IIEF; 27). Both measures assess a range of sexual problems including sexual arousal, sexual desire,

15   orgasm, and sexual satisfaction and both measures have been used to assess sexual function in

16   pregnancy and postpartum (2, 13). Women who were not sexually-active in the previous 4 weeks did

17   not get a total score for that particular time point (28). FSFI total scores based on this scoring method

18   range from 7.2 to 36, IIEF total scores range from 5 to 75, and higher scores indicate better sexual

19   function (27). Both the FSFI and IIEF have demonstrated strong psychometric properties (26, 27)

20   and in our sample showed similar internal consistency (Cronbach's αs = .96 to .97 for the FSFI and

21   Cronbach's αs = .72 to .79 for the IIEF). To ensure that scores were comparable across participants,

22   the following adjustment was made to the FSFI to re-scale the scores on the same metric as the IIEF:

23    $[(\chi - 2) \times (75/34)]$. Trajectories were interpreted using established clinical cut-offs for the FSFI (i.e.,

24   < 26.55 indicative of problems with sexual function, adjusted score < 54.15; 29). No established

1   clinical cut-offs for the IIEF have been published; however, a number of studies have reported mean

2   total scores for men with diagnosed sexual dysfunction (32.2 to 40) and community men without

3   sexual dysfunction (55.4 to 63.2) (27, 30, 31). We used a total IIEF score < 55 as indicative of

4   clinically significant problems with sexual function.

5   *Sexual Distress*

6   Distress about one's sex life in the past four weeks was assessed using the 13-item Female

7   Sexual Distress Scale (FSDS) (5), which is validated for use in men (32) and has been used to assess

8   sexual distress in pregnancy and postpartum (7, 13). Total scores range from 0 to 52, with higher

9   scores indicative of greater sexual distress. Different cut-offs exist for evaluating clinically

10   significant sexual distress associated with sexual problems for women (>11) and men (>19.5) (5, 32).

11   The FSDS has demonstrated good psychometric properties and showed strong internal consistency in

12   the current study for mothers and partners (Cronbach's α = .93 to .96 and .92 to .94, respectively).

13   *Postpartum Depressive Symptoms*

14   Postpartum depressive symptoms were assessed using the Edinburgh Postnatal Depression

15   Scale (EPDS) (33). This 10-item measure assesses depressive symptoms in the past week and is

16   validated for use in both women and men (33, 34). Total scores range from 0 to 30, with higher

17   scores indicative of greater depressive symptoms. A total score of 13 or higher suggests clinically

18   significant postpartum depressive symptoms (35). This measure has demonstrated excellent

19   psychometric properties (33) and showed strong internal consistency in our sample of mothers and

20   partners (Cronbach's αs = .86 and .80, respectively).

21   **Data Analysis**

22   Our predictions and analysis plan were pre-registered prior to analyzing (but after collecting)

23   the data (https://osf.io/kz4d3/). Descriptive statistics were calculated with SPSS version 25.0 and all

24   other analyses were estimated with M*plus* version 8.4. Prior to calculating total scores for our

1   measures, maximum likelihood imputation was used for item-level missing data, provided that the

2   missing data were less than 20% of the total number of items in a given measure (36). Imputation

3   was not used for the calculation of FSFI or IIEF as per recommendations (28).

4   Unconditional dyadic latent growth curve models (DLGCM) within a structural equation

5   model (SEM; 37) were used to establish trajectories of sexual function and distress, respectively.

6   These DLGCM were tested within an Actor-Partner Interdependence Model (APIM; 37). Members

7   of the couple were distinguished based on the person who gave birth (i.e., mother) and the person

8   who did not give birth (i.e., partner). We tested a piece-wise model (38), with the 3-month

9   postpartum time point used as the knot, that is, the point at which we expected a shift in the

10   trajectories to occur based on prior research (1, 3, 11). We adjusted the weights for each time point to

11   account for the varied sampling time-frames pre- and postpartum. The unconditional DLGCMs

12   allowed us to test our first three hypotheses: 1) and 2) changes in sexual function and sexual distress

13   from pregnancy to 3-months postpartum and from 3-months to 12-months postpartum; and 3) the

14   covariances among mothers' and partners' intercepts and slopes reported as correlation coefficients.

15   Following the unconditional DLGCMs, to test our fourth hypothesis we conducted conditional

16   models in which depressive symptoms at 3-months postpartum (own and partner's) were included as

17   time-invariant predictors of the postpartum intercepts and slopes. To test our fifth hypothesis, we

18   conducted Wald χ^2 tests within the DLGCMs to examine differences between mothers and partners

19   for intercepts, slopes, and the effect of depressive symptoms on intercepts and slopes.

20   Missing data due to attrition over time were treated using the full information maximum

21   likelihood function (FIML; 39) when running the DLCGMs. Overall model fit was tested by

22   considering several fit indices: a statistically non-significant chi-square value; a Comparative Fit

23   Index (CFI) and Tucker Lewis Index (TLI) of .95 or higher; and a root mean square error of

24   approximation (RMSEA) below .06 (40).

1   **Results**

2   Sociodemographics for the sample are available in Table 1. Descriptives related to labor and

3   delivery and infant and parent characteristics are available in Supplemental Table 1. Descriptives and

4   correlations among sexual function, sexual distress, and postpartum depressive symptoms across

5   time-points and between partners are available in Supplemental Table 2. Correlations were in the

6   expected directions, such that for both mothers and partners, sexual function was negatively

7   correlated with sexual distress. Mothers' and partners' sexual outcomes and depressive symptoms

8   were significantly correlated. In general, the majority of mothers and partners reported being

9   sexually active in the previous four weeks for at least one time point (99.5%). Across the time points

10   between 80.9% to 90.8% of mothers and 89.5% to 97.4% of partners reported being sexually active

11   with oneself or a partner in the previous four weeks. Trajectories of sexual frequency for this sample

12   are reported elsewhere (41). Results are organized by hypotheses with the exception of Hypothesis 5,

13   which is examined in each of the models.

14   **Unconditional Dyadic Latent Growth Curve Models**

15   ***Changes to Sexual Function Among Mothers and Partners (Hypotheses 1 and 5)***

16   The unconditional DLGCMs enable an examination of change from mid-pregnancy to 3-

17   months postpartum (pregnancy slope), an intercept (at 3-months postpartum), and change from 3-

18   months to 12-months postpartum (postpartum slope). Model fit for sexual function was good: $\chi^2(45)$

19   = 59.65, p = .07; CFI = 0.98, TLI = 0.97, RMSEA = 0.04 [CI = 0.00 – 0.07]. Consistent with

20   Hypothesis 1, mothers' and partners' sexual function declined significantly during pregnancy (-1.21,

21   p <.001; -0.27, p <.001) and improved significantly postpartum (1.07, p <.001; 0.23, p =.001; see

22   Figure 2a). Mothers' sexual function intercept (44.08, p <.001) was below clinical cut-offs at 3-

23   months postpartum, whereas partners' intercept was not (61.13, p <.001), suggesting that only

24   mothers experienced clinically significant problems with their sexual function. Random estimates of

1   the intercept were significant for mothers (125.77, p <.001) and partners (34.44, p <.001) indicating

2   variability in sexual function at 3-months postpartum. Random estimates of the slopes (pregnancy

3   and postpartum) were significant for mothers (1.09, p = .002; 0.68, p = .03) and partners (0.30, p

4   =.003; 0.21, p =.05), indicating variability in patterns of change over time. With respect to

5   Hypothesis 5, mothers' sexual function intercept was significantly lower than partners' sexual

6   function intercept, Wald $\chi^2(1)$ = 347.35, p < .001. Compared to their partners, mothers showed

7   significantly stronger declines in their sexual function in pregnancy, Wald $\chi^2(1)$ = 63.53 p < .001,

8   and significantly stronger improvements in their sexual function postpartum, Wald $\chi^2(1)$ = 57.37, p <

9   .001.

10   ***Changes to Sexual Distress Among Mothers and Partners (Hypotheses 2 and 5)***

11   The initial unconditional model revealed negative residual variance for one of the latent

12   constructs—partners' sexual distress postpartum slope. The residual variance was therefore fixed to

13   zero, precluding an estimation of variability for partners' slope of postpartum sexual distress. The

14   unconditional model fit for sexual distress was adequate: $\chi^2(51)$ = 86.87, p =.001; CFI = 0.97, TLI =

15   0.97, RMSEA = 0.06 [CI = 0.04 – 0.08] (see Figure 2b). Consistent with Hypothesis 2, mothers'

16   sexual distress increased significantly during pregnancy (0.44, p <.001) and declined significantly

17   postpartum (-0.20, p =.01). Contrary to Hypothesis 2, partners' sexual distress did not change

18   significantly during pregnancy (0.13, p =.07) or postpartum (-0.01, p =.84). Mothers' (16.62, p

19   <.001) but not partners' (10.60, p <.001) sexual distress intercept was above clinical cut offs,

20   suggesting that at 3-months postpartum only mothers were experiencing clinically significant sexual

21   distress. Random estimates of the intercepts were all significant, indicating variability in sexual

22   distress at 3-months postpartum for both mothers (71.46, p <.001) and partners (59.00, p <.001).

23   Random estimates of mothers' postpartum (0.38, p = .03), but not pregnancy (0.31, p =.10) slopes

24   were also significant, indicating variability in mothers' postpartum sexual distress over time.

1   Random estimates of partners' pregnancy slope were significant (0.44, $p <$.001), indicating

2   variability in change for partners' sexual distress in pregnancy only. With respect to Hypothesis 5,

3   mothers' sexual distress intercept was significantly higher than partners', Wald $\chi^2(1) = 49.53$ $p <$

4   .001. Compared to their partners, mothers showed stronger increases in their sexual distress in

5   pregnancy, Wald $\chi^2(1) = 9.36$ $p = .002$, but no significant difference in change (between mothers and

6   fathers) in sexual distress postpartum, Wald $\chi^2(1) = 3.74$, $p = .05$.

7   ***Interdependence between Couples' Sexual Outcomes (Hypothesis 3)***

8   Only significant correlations are reported below for examining the interdependence between

9   couples' sexual function and sexual distress (see Table 2). Mothers' and partners' sexual function

10   intercepts were positively associated, suggesting that mothers with higher sexual function had

11   partners who also had higher sexual function at 3-months postpartum (0.42, $p <$.001). All other

12   partner effects for sexual function (e.g., between mothers' sexual function intercepts and their

13   partners' sexual function slopes and vice versa) were not significant, suggesting that one's own

14   sexual function at 3-months was not significantly related to partners' change in sexual function and

15   that mothers' and partners' sexual function during pregnancy and postpartum were not changing in

16   parallel. Mothers' and partners' sexual distress intercepts were positively associated (0.26, $p = .004$),

17   suggesting that mothers with higher sexual distress at 3-months postpartum had partners who also

18   had higher sexual distress. All other partner effects were not significant, suggesting that mothers' and

19   partners' intercepts were unrelated to their own and their partners' change in sexual distress over

20   time and that the pregnancy and postpartum slopes were not associated.

21   ***Sexual Function and Postpartum Depression (Hypotheses 4a, 4b, and 5)***

22   To examine the relationship between postpartum depressive symptoms and sexual function

23   and sexual distress, mothers' and partners' depressive symptoms total scores were included as time-

24   invariant predictors of their own and their partners' intercept and postpartum slope for each sexual

1   outcome in separate models. The model predicting mothers' and partners' sexual function intercepts

2   and postpartum slopes provided good fit indices: $\chi^2(61) = 84.43$, $p = .03$; CFI = 0.97, TLI = 0.96;

3   RMSEA = 0.04 [90%CI = 0.02 – 0.07]. Hypothesis 4a was partially supported. Mothers' higher

4   depressive symptoms at 3-months postpartum predicted their own (i.e., actor effect; -0.49, $p = .02$)

5   and their partners' (i.e., partner effect; -0.26, $p = .01$) lower sexual function at 3-months, such that

6   for every 1-unit increase in mothers' depressive symptoms at 3-months, there was a 0.49 and 0.26

7   reduction in sexual function intercepts for mothers and partners, respectively. Partners' higher

8   depressive symptoms at 3-months postpartum predicted their own lower sexual function at 3-months

9   (i.e., actor effect; -0.56, $p <.001$) but not mothers' sexual function (i.e., partner effect; -0.04, $p = .86$),

10   such that for every one unit increase in partners' depressive symptoms at 3-months, there was a 0.56

11   reduction in their own sexual function intercept. There was no significant difference in the strength

12   of the effect of mothers' and partners' own depressive symptoms on their own sexual function, Wald

13   $\chi^2(1) = 1.42$ $p = .23$. Inconsistent with Hypothesis 4b, mothers' depressive symptoms did not predict

14   change in their own (i.e., actor effect; 0.05, $p = .07$) or their partners' postpartum sexual function

15   slopes (i.e., partner effect; 0.03, $p = .07$). Similarly, partners' depressive symptoms did not predict

16   change in their own (i.e., actor effect; 0.03, $p = .16$) or mothers' postpartum sexual function slopes

17   (i.e., partner effect; -0.009, $p = .77$).

18   The effects of depressive symptoms on sexual function held when the significant covariates

19   were included. In this model, breastfeeding remained significantly associated with mothers' lower

20   sexual function intercept (-16.17, $SE = 7.67$, $p = .04$) and relationship length was significantly

21   associated with partners' lower sexual function intercept (-0.02, $SE = 0.01$, $p = .02$) (all data and

22   syntax are available at https://osf.io/kz4d3/ and see Supplemental Table 1 for a summary of the

23   univariate effect of each covariate on the intercepts).

24   ***Sexual Distress and Postpartum Depression (Hypotheses 4a, 4b, and 5)***

1   The conditional model fit for sexual distress was adequate: $\chi^2(68) = 129.24$, $p < .001$; CFI =

2   0.96, TLI = 0.94; RMSEA = 0.07 [90%CI = 0.05 – 0.08]. Partially consistent with Hypothesis 4a,

3   mothers' higher depressive symptoms at 3-months postpartum predicted their own higher sexual

4   distress at 3-months (i.e., actor effect; 0.40, $p = .008$) but was not related to their partners' sexual

5   distress (i.e., partner effect; -0.06, $p = .60$). Partners' higher depressive symptoms at 3-months

6   postpartum predicted their own (i.e., actor effect; 0.86, $p < .001$) sexual distress, but was not related

7   to mothers' sexual distress (i.e., partner effect; 0.22, $p = .26$). For every one unit increase in mothers'

8   and partners' depressive symptoms at 3-months postpartum there was a 0.40 and 0.86 increase in

9   their own sexual distress intercepts for mothers and partners, respectively. The strength of the actor

10   effect (i.e., own depressive symptoms on own sexual distress) was statistically different for mothers

11   and partners, Wald $\chi^2(1) = 7.54$ $p = .006$, and contrary to Hypothesis 5 was stronger for partners.

12   Contrary to Hypothesis 4b, depressive symptoms (own and their partners') did not predict the degree

13   of change (i.e., slopes) in postpartum sexual distress for mothers (-0.01, $p = .45$; 0.02, $p = .42$,

14   respectively). These effects held when significant covariates from the univariate models (see

15   Supplemental Table 1 for univariate effects) were included in a single model. Only gestational age

16   and infant birthweight remained significant covariates, such that gestational age was significantly

17   associated with mothers' higher sexual distress (0.85, $SE = 0.40$, $p = .03$) and birthweight was

18   significantly associated with partners' higher sexual distress (1.40, $SE = 0.44$, $p = .002$).

19   **Discussion**

20   This study is the first to our knowledge to establish dyadic trajectories of the two core

21   symptoms of sexual dysfunction—sexual function and sexual distress—from pregnancy until 12-

22   months postpartum. We observed significant changes in sexual function and sexual distress that

23   hinged on the birth event, with evidence of interdependence between mothers' and partners' sexual

24   function and sexual distress at 3-months postpartum. However, we did not find an association

1   between how mothers' and partners' sexual function and distress evolved over time. Further, greater

2   postpartum depressive symptoms at 3-months postpartum were associated with poorer sexual

3   function and higher sexual distress for both partners, but depressive symptoms did not relate to the

4   degree to which sexual function and sexual distress changed over time.

5   On average, sexual function declined significantly during pregnancy and improved

6   significantly postpartum for both mothers and partners; however, only mothers (who gave birth)

7   experienced clinically significant problems in pregnancy that persisted at 12-months postpartum (i.e.,

8   < 54.15). Partners' sexual function never reached clinically significant levels (i.e., < 55). Despite

9   changes in sexual function for both parents, only mothers experienced fluctuations in their sexual

10   distress in pregnancy and postpartum that were within the clinical range (i.e., > 11). Taken together,

11   these results suggest that mothers are at greater risk of experiencing sexual dysfunction during

12   pregnancy and the postpartum. This finding is likely due to biopsychosocial factors that are known to

13   interfere with sexual function that uniquely or disproportionately affect mothers (e.g., physical and

14   hormonal changes during pregnancy, childbirth, and child rearing; 1).

15   Despite significant interdependence between mothers' and partners' sexual function and

16   sexual distress at 3-months postpartum, we did not find that couples' sexual function or distress

17   trajectories moved together, even though there were similarities in the overall shape of the

18   trajectories. Although sexual behavior is often an interpersonal experience, our results suggest that

19   intra-individual differences specific to this transition (e.g., differences in role expectations, social

20   support) or more generally (e.g., attachment styles) may be more important contributors to how

21   sexual function and sexual distress change over time rather than how their partner's sexual outcomes

22   are changing. Indeed, these intra-individual differences have been shown to be relevant for

23   understanding changes to relationship satisfaction during the TTP (for a review see 42) and for

24   sexual function in community couples and couples with other sexual health problems (43-45). For

1   example, individuals higher in attachment anxiety and avoidance report more problems with sexual

2   function, with possible mediators of this link being sexual assertiveness, motivation for sexual

3   activity, and sexual frequency (43-45).

4   Consistent with prior cross-sectional studies (reviewed in 1, 3), greater depressive symptoms

5   were associated with lower sexual function and higher sexual distress at 3-months postpartum. There

6   was also some evidence of interdependence, such that mothers' higher depressive symptoms were

7   associated with partners' lower sexual function at 3-months postpartum. Depressive symptoms did

8   not predict the degree of improvement in sexual function or distress over time, suggesting that these

9   symptoms may not be a risk factor for persistent postpartum sexual dysfunction. Still, the

10   relationship between sexual dysfunction and postpartum depressive symptoms (own and partner's)

11   may be relevant for understanding precipitating factors contributing to risk of sexual dysfunction for

12   new parents. Although depressive symptoms (e.g., diminished interest in enjoyable activities, loss of

13   pleasure) share some conceptual overlap with sexual function problems (e.g., diminished interest in

14   sexual activity, low sexual satisfaction), the current findings support depressive symptoms and

15   sexual difficulties as distinct phenomena given the relatively small to moderate correlations.

16   There was significant variability in changes to sexual function and sexual distress over time

17   for mothers and partners (i.e., some individuals showed greater change than others), consistent with

18   prior research (13, 41). It is likely that within our average trajectory there are unique trajectories

19   capturing improving, worsening, and stable change in sexual function and sexual distress. Given that

20   postpartum depressive symptoms were not predictive of the average change in sexual function and

21   sexual distress, future research should examine what other factors may be associated with this

22   variability. For example, there is preliminary evidence to support links between dyadic processes

23   (e.g., dyadic empathy, communal motivation, perceived partner responsiveness) and sexual desire

24   and satisfaction among mothers and couples in the TTP (25, 46, 47).

Strengths and Limitations

Strengths of our study include the large sample size, sampling both partners, and the prospective longitudinal design. By using validated measures with established clinical cut-offs, clinicians will be able to use our data to identify mothers and partners at risk of sexual dysfunction (i.e., FSFI/IIEF and FSDS scores in clinical range, elevated postpartum depressive symptoms) who could benefit from early assessment and intervention. Although, we assessed two core criteria of sexual dysfunction, our procedure did not include a clinical assessment or diagnosis. Interpretation of the postpartum sexual function and distress scores do, however, support that mothers (who gave birth) would likely meet diagnostic criteria for sexual dysfunction (48). Scoring for the sexual function measures necessitates that total scores are only valid for those who report sexual activity in the previous four weeks, which is a limitation because individuals may choose not to engage in sexual activity because they are experiencing sexual function problems. Previous research sampling first-time mothers found no significant differences between sexually-active versus inactive groups for sexual distress, relationship satisfaction, or biomedical factors associated with labour and delivery (13). Regardless of the scoring method, almost all of our couples (99.5%) had valid sexual function scores for at least one time-point and were able to be retained in the analyses. Our sample was relatively homogenous with respect to gender, sexual orientation, ethnicity, and socioeconomic status, limiting generalizability. While we chose to examine the trajectories using a piece-wise model that hinged on the 3-months postpartum time point (Perales, 2019), it is possible that other events and trajectories may fit the data.

Clinical Implications

Despite the high prevalence of distressing problems with sexual function postpartum, only 15% of those experiencing sexual problems discuss them with health professionals (16) and very few expectant or new parents (e.g., 18%) receive information regarding possible changes to their sexual

1   function following childbirth (16). An important contribution of this study is that although sexual

2   function and sexual distress are negatively impacted during pregnancy and early in the postpartum

3   period, they do improve significantly postpartum. This knowledge could be integrated into

4   psychoeducation and sexual health interventions to foster more realistic expectations for new

5   parents, which may help to normalize their experience and reduce associated distress and

6   impairment, contributing to better overall health and well-being (8). Clinicians working with

7   individuals or couples during this transition could use the established trajectories to inform their

8   assessment and intervention planning. For example, clinicians could administer brief validated

9   measures to assess and monitor sexual function (49, 50), sexual distress (51), and depressive

10   symptoms (33). Individuals who do not follow patterns similar to the average trajectories reported

11   here (i.e., those who show stable and low, fluctuating, or slow improvements in sexual function or

12   distress) may be at risk of more persistent sexual dysfunction and in need of more intensive

13   intervention. In addition to providing more targeted and nuanced information about this transition,

14   our results highlight the need for the development of prenatal and postpartum sexual health programs

15   that address the concerns of both partners.

16   **Conclusions**

17   New parents experience significant changes to their sexual function and sexual distress

18   during the transition to parenthood, with some evidence of interdependence. The results of this study

19   revealed that greater postpartum depressive symptoms at 3-months postpartum were associated with

20   poorer sexual function and higher sexual distress for both partners, but did not predict how sexual

21   function and sexual distress evolved over time.

22

1   Table 1. Sociodemographics

	Mothers	Partners
	M ± SD or N (%)	M ± SD or N (%)
*Age (years)^*	30.04 ± 3.49	31.58 ± 4.51
Years of Education Completed (since Grade 1)	17.33 ± 2.79	17.00 ± 3.07
Sex		
Female	203 (100%)	7 (3.4%)
Male	-	196 (96.6%)
Sexual Orientation		
Heterosexual	182 (89.7%)	194 (95.6%)
Lesbian/Gay	6 (3.0%)	4 (2.0%)
Bisexual	12 (5.9%)	3 (1.5%)
Pansexual	2 (1.0%)	-
Asexual	1 (0.5%)	1 (0.5%)
Other (between bisexual and lesbian)	-	1 (0.5%)
Relationship Status		
Married/Engaged/Commonlaw	186 (91.6%)	185 (91.1%)
Living with/Dating one partner	17 (8.4%)	17 (8.4%)
Other	-	1 (0.5%)
Relationship Length (months)	79.66 ± 43.24	79.66 ± 43.24
Country of Residence		
Canada	145 (71.4%)	145 (71.4%)
United States of America	58 (28.6%)	58 (28.6%)
Ethnicity		
Caucasian	160 (78.8%)	164 (80.8%)
Asian American/Asian	19 (9.4%)	10 (4.9%)
Biracial/Multiracial	9 (4.4%)	7 (3.4%)
African American/Black	3 (1.5%)	3 (1.5%)
East Indian	6 (3.0%)	5 (2.5%)
Middle Eastern/Central Asian/South Asian	3 (1.5%)	7 (3.4%)
Other (e.g., not specified, Ashkenazi, First Nations, Hispanic, Pacific Islander)	3 (1.5%)	7 (3.5%)
Annual Income[#]		
<$60,000	39 (19.3%)	39 (19.3%)
>$60,000	163 (80.7%)	163 (80.7%)
Gestational Age at Delivery (in weeks) [!]	39.25 (1.95)	
Infant Birthweight (in pounds)[@]	6.98 (1.26)	
Breastfeeding[$]		
Yes	189 (99.0%)	
No	2 (1.0%)	

2   *Note.* ^ Age is based on data from 198 mothers and 195 partners due to missing data on this variable.

3   [#] is based on data from 202 mothers and 202 partners due to missing data from one couple. [!] is based

4   on data from 187 couples due to missing data on this variable. [@] is based on data from 190 couples

5   due to missing data on this variable. [$] is based on data from 191 mothers due to missing data on this

6   variable.

Table 2. *Unconditional Dyadic Latent Growth Curve Model Standardized (STDYX) Coefficients for APIM relationships for Sexual Function and Sexual Distress*

	Mothers' Pregnancy Slope	Mothers' Intercept (3m pp)	Mothers' Postpartum Slope	Partners' Pregnancy Slope	Partners' Intercept (3m pp)	Partners' Postpartum Slope
Sexual Function						
Mothers' Pregnancy Slope	-	0.28*	0.03	0.20	0.02	0.10
Mothers' Intercept (3m pp)		-	-0.47***	0.16	0.42***	-0.33
Mothers' Postpartum Slope			-	-0.11	-0.22	0.46
Partners' Pregnancy Slope				-	0.29*	-0.04
Partners' Intercept (3m pp)					-	-0.72***
Partner's Postpartum Slope						-
Sexual Distress						
Mothers' Pregnancy Slope	-	0.23	-0.29	0.46	-0.04	n/a
Mothers' Intercept (3m pp)		-	0.10	0.08	0.26**	n/a
Mothers' Postpartum Slope			-	0.06	0.13	n/a
Partners' Pregnancy Slope				-	0.38***	n/a
Partners' Intercept (3m pp)					-	n/a
Partner's Postpartum Slope						-

Note. *p < .05. **p < .01. ***p < .001. n/a = not applicable because partner's postpartum slope could not be covaried because residual variance was fixed to zero to address issues with model fit.

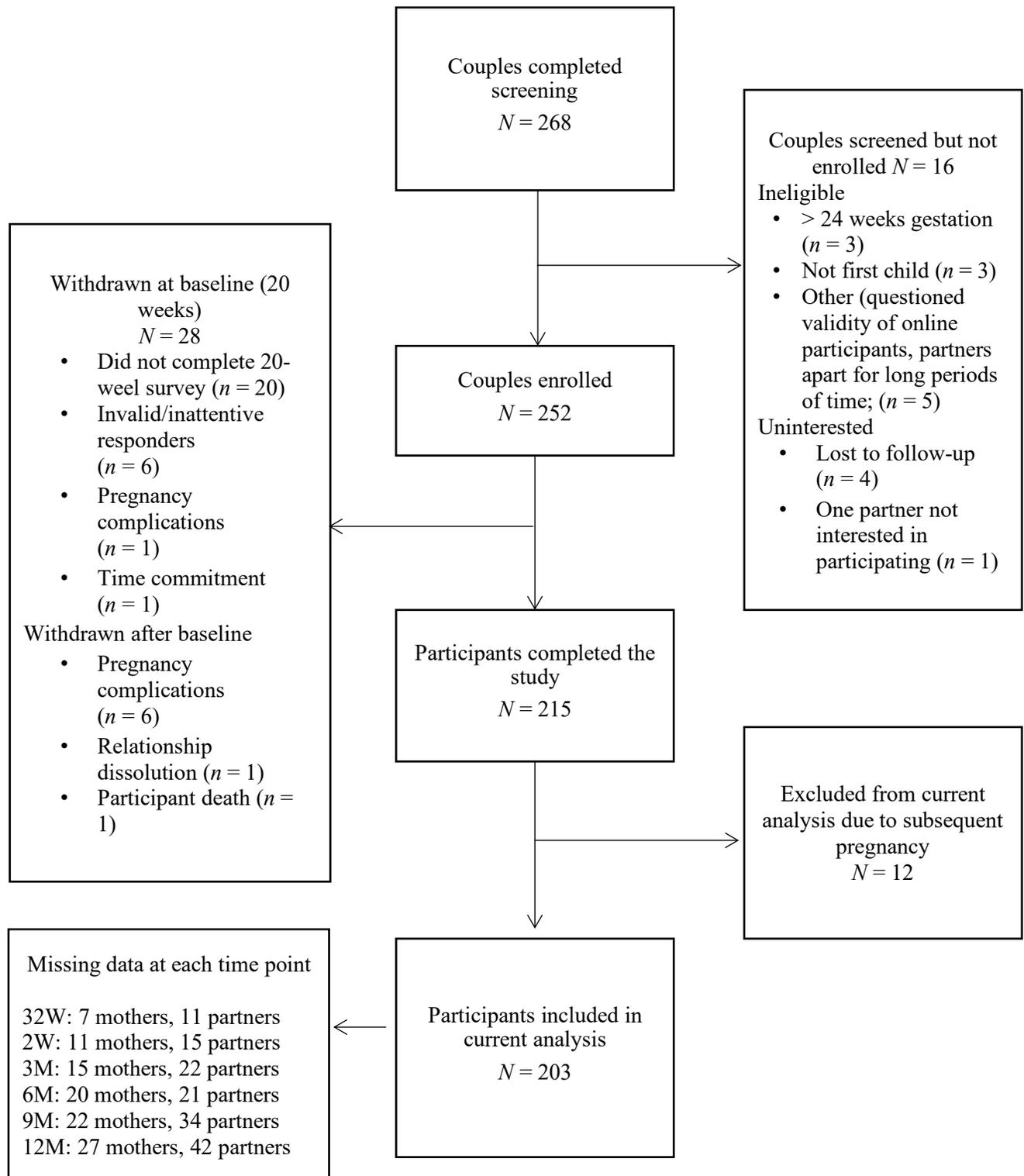Figure 1. Participant recruitment flow.

Couples completed screening
$N = 268$

Couples screened but not enrolled $N = 16$
Ineligible
- \> 24 weeks gestation ($n = 3$)
- Not first child ($n = 3$)
- Other (questioned validity of online participants, partners apart for long periods of time; ($n = 5$)
Uninterested
- Lost to follow-up ($n = 4$)
- One partner not interested in participating ($n = 1$)

Withdrawn at baseline (20 weeks)
$N = 28$
- Did not complete 20-weel survey ($n = 20$)
- Invalid/inattentive responders ($n = 6$)
- Pregnancy complications ($n = 1$)
- Time commitment ($n = 1$)
Withdrawn after baseline
- Pregnancy complications ($n = 6$)
- Relationship dissolution ($n = 1$)
- Participant death ($n = 1$)

Couples enrolled
$N = 252$

Participants completed the study
$N = 215$

Excluded from current analysis due to subsequent pregnancy
$N = 12$

Missing data at each time point

32W: 7 mothers, 11 partners
2W: 11 mothers, 15 partners
3M: 15 mothers, 22 partners
6M: 20 mothers, 21 partners
9M: 22 mothers, 34 partners
12M: 27 mothers, 42 partners

Participants included in current analysis
$N = 203$

Figure 2. Trajectories of sexual function (a) and sexual distress (b) mid-pregnancy to 12-months postpartum for mothers and partners.
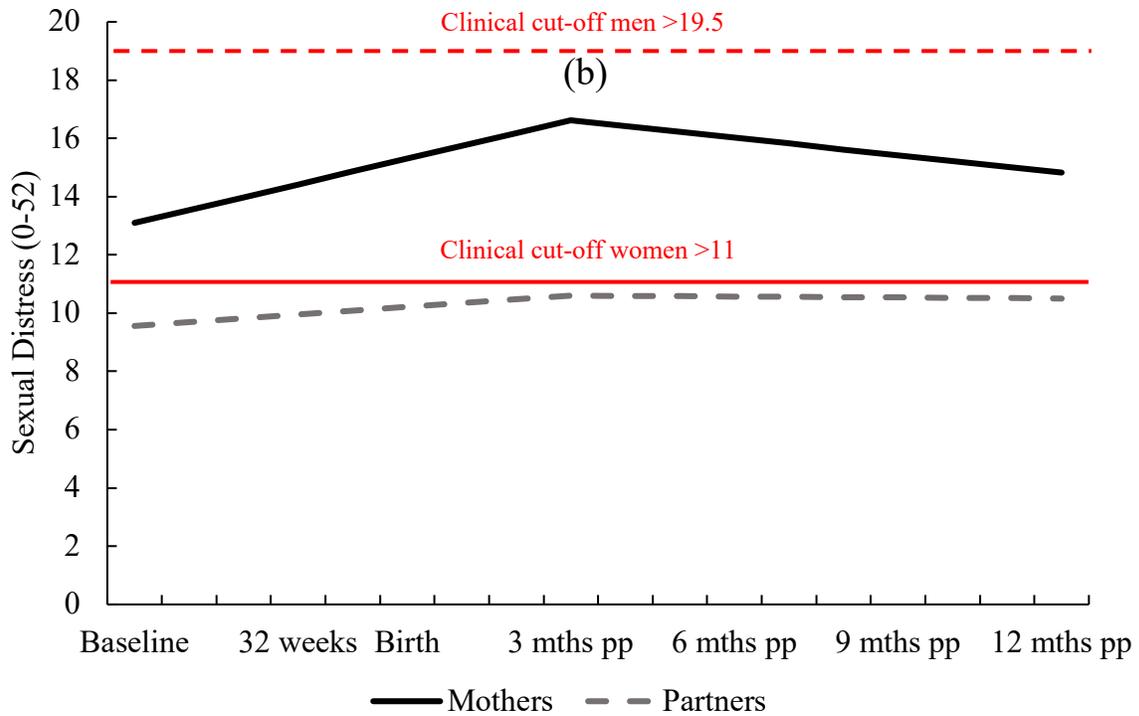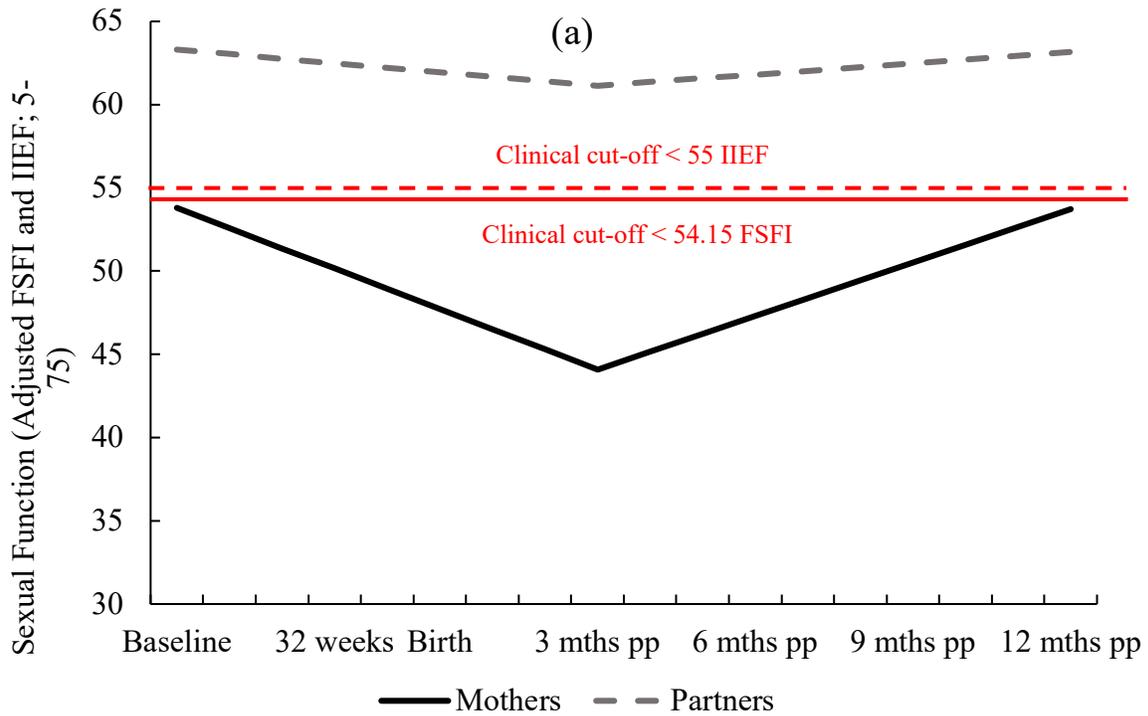
Note. IIEF = International Index of Erectile Function. FSFI = Female Sexual Function Index.

References

1.   McBride HL, Kwee JL: Sex after baby: Women's sexual function in the postpartum period. *Current Sexual Health Reports.* 2017, *9:*142-149.

2.   Saotome TT, Yonezawa K, Suganuma N: Sexual dysfunction and satisfaction in Japanese couples during pregnancy and postpartum. *Sexual Medicine.* 2018, *6:*348-355.

3.   Serati M, Salvatore S, Siesto G, et al.: Female sexual function during pregnancy and after childbirth. *The Journal of Sexual Medicine.* 2010, *7:*2782-2790.

4.   Paulson JF, Bazemore SD: Prenatal and postpartum depression in fathers and its association with maternal depression: a meta-analysis. *JAMA : The Journal of the American Medical Association.* 2010, *19:*1961-1969.

5.   Derogatis LR, Rosen RC, Leiblum SR, Burnett A, Heiman JR: The Female Sexual Distress Scale (FSDS): Initial validation of a standardized scale for assessment of sexually related distress in women. *Journal of Sex & Marital Therapy.* 2002, *28:*317-330.

6.   Schlagintweit H, Bailey K, Rosen NO: A new baby in the bedroom: Frequency and severity of postpartum sexual concerns and their associations with relationship satisfaction in new parent couples. *The Journal of Sexual Medicine.* 2016, *13:*1455-1465.

7.   Vannier SA, Rosen NO: Sexual distress and sexual problems in pregnancy: Associations with sexual and relationship satisfaction. *The Journal of Sexual Medicine.* 2017, *14:*387-395.

8.   Diamond LM, Huebner DM: Is good sex good for you? Rethinking sexuality and health. *Social and Personality Psychology Compass.* 2012, *6:*54-69.

9.   Buultjens M, Murphy G, Robinson P, Milgrom J: The perinatal period: A literature review from the biopsychosocial perspective. *Clinical Nursing Studies.* 2013, *1:*19-31.

10.   Cox MJ, Paley B: Understanding families as systems. *Current Directions in Psychological Science.* 2003, *12:*193-196.

11.   Pauleta JR, Pereira NM, Graça LM: Sexuality during pregnancy. *The Journal of Sexual Medicine.* 2010, *7:*136-142.

12.   Condon JT, Boyce P, Corkindale CJ: The First-Time Fathers Study: A prospective study of the mental health and wellbeing of men during the transition to parenthood. *Australian and New Zealand Journal of Psychiatry.* 2004, *38:*56-64.

13.   Dawson SJ, Vaillancourt-Morel M-P, Pierce M, Rosen NO: Biopsychosocial predictors of trajectories of postpartum sexual function in first-time mothers. *Health Psychology.* 2020.

14.   American Psychiatric Association: *Diagnostic and statistical manual of mental disorders* (5th Ed.). Washington, DC: American Psychiatric Publishing, 2013.

15.   Evangelia N, Kirana PS, Chiu G, et al.: Level of bother and treatment-seeking predictors among male and female in-patients with sexual problems: a hospital-based study. *The Journal of Sexual Medicine.* 2010, *7:*700-711.

16.   Barrett G, Pendry E, Peacock J, et al.: Women's sexual health after childbirth. *British Journal of Obstetrics and Gynaecology.* 2000, *107:*186-195.

17.   Zamani M, Latifnejad Roudsari R, Moradi M, Esmaili H: The relationship between frequency of breastfeeding and sexual distress in postpartum women. *Journal of Midwifery and Reproductive Health.* 2018, *6:*1447-1453.

18.   Pastore L, Owens A, Raymond C: Postpartum sexuality concerns among first-time parents from one US academic hospital. *The Journal of Sexual Medicine.* 2007, *4:*115-123.

19.   Shorey S, Ing CCY, Ng ED, et al.: Prevalence and incidence of postpartum depression among healthy mothers: A systematic review and meta-analysis. *Journal of Psychiatric Research.* 2018, *104:*235-248.

20.   Fredriksen E, von Soest T, Smith L, Moe V: Depressive symptom contagion in the transition to parenthood: Interparental processes and the role of partner-related attachment. *Journal of Abnormal Psychology.* 2019, *128:*397-403.

21.   McCabe MP, Sharlip ID, Lewis R, et al.: Risk factors for sexual dysfunction among women and men: a consensus statement from the Fourth International Consultation on Sexual Medicine 2015. *The Journal of Sexual Medicine.* 2016, *13:*153-167.

22.   Pâquet M, Rosen NO, Steben M, et al.: Daily anxiety and depressive symptoms in couples coping with vulvodynia: Associations with pain, sexual function, and both partners' sexual distress *The Journal of Pain.* 2018.

23.   Beck AT: The evolution of the cognitive model of depression and its neurobiological correlates. *American Journal of Psychiatry.* 2008, *165:*969-977.

24.   Figueiredo B, Field T, Diego M, et al.: Partner relationships during the transition to parenthood. *Journal of Reproductive and Infant Psychology.* 2008, *26:*99-107.

25.   Rosen NO, Williams L, Vannier SA, Mackinnon SP: Sexual intimacy in first-time mothers: Associations with sexual and relationship satisfaction across three waves. *Archives of Sexual Behavior.* 2020*:*1-13.

26.   Rosen RC, Brown C, Heiman J, et al.: The female sexual function index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *Journal of Sex and Marital Therapy.* 2000, *26:*191-208.

27.   Rosen RC, Riley A, Wagner G, et al.: The international index of erectile function (IIEF): A multidimensional scale for assessment of erectile dysfunction. *Urology.* 1997, *49:*822-830.

28.   Meyer-Bahlburg HF, Dolezal C: The female sexual function index: a methodological critique and suggestions for improvement. *Journal of Sex & Marital Therapy.* 2007, *33:*217-224.

29.   Wiegel M, Meston C, Rosen R: The Female Sexual Function Index (FSFI): Cross-

validation and development of clinical cutoff scores. *Journal of Sex & Marital Therapy.* 2005,

*31:*1-20.

30.   Forbes MK, Baillie AJ, Schniering CA: Critical flaws in the female sexual function index

and the international index of erectile function. *The Journal of Sex Research.* 2014, *51:*485-491.

31.   Gomes ALQ, Nobre P: The International Index of Erectile Function (IIEF-15):

Psychometric properties of the Portuguese version. *The Journal of Sexual Medicine.* 2012,

*9:*180-187.

32.   Santos-Iglesias P, Mohamed B, Danko A, Walker LM: Psychometric validation of the

Female Sexual Distress Scale in male samples. *Archives of Sexual Behavior.* 2018, *47:*1733-

1743.

33.   Cox JL, Holden JM, Sagovsky R: Detection of postnatal depression: development of the

10-item Edinburgh Postnatal Depression Scale. *The British Journal of Psychiatry.* 1987,

*150:*782-786.

34.   Matthey S, Barnett B, Kavanagh DJ, Howie P: Validation of the Edinburgh Postnatal

Depression Scale for men, and comparison of item endorsement with their partners. *Journal of

Affective Disorders.* 2001, *64:*175-184.

35.   Matthey S, Henshaw C, Elliott S, Barnett B: Variability in use of cut-off scores and

formats on the Edinburgh Postnatal Depression Scale–implications for clinical and research

practice. *Archives of Women's Mental Health.* 2006, *9:*309-315.

36.   Newman DA: Longitudinal modeling with randomly and systematically missing data: A

simulation of ad hoc, maximum likelihood, and multiple imputation techniques. *Organizational

Research Methods.* 2003, *6:*328-362.

37.   Kenny DA, Kashy DA, Cook WL: *Dyadic data analysis*. New York: Guilford Press, 2006.

38.   Perales F: Modeling the consequences of the transition to parenthood: Applications of panel regression methods. *Journal of Social and Personal Relationships.* 2019, *36:*4005-4026.

39.   Muthén LK, Muthén BO: *Mplus user's guide* (7th Ed.). Los Angeles, CA: Muthén & Muthén, 1998-2015.

40.   Kline RB: *Principles and practice of structural equation modeling* (4th Ed.). New York: Guilford Press, 2015.

41.   Rosen NO, Dawson SJ, Leonhardt ND, Vannier SA, Impett EA: Trajectories of sexual well-being among couples in the transition to parenthood. *Journal of Family Psychology.* in press.

42.   Kluwer ES: From partnership to parenthood: A review of marital change across the transition to parenthood. *Journal of Family Theory & Review.* 2010, *2:*105-125.

43.   Stefanou C, McCabe MP: Adult attachment and sexual functioning: A review of past research. *The Journal of Sexual Medicine.* 2012, *9:*2499-2507.

44.   Leclerc B, Bergeron S, Brassard A, et al.: Attachment, Sexual Assertiveness, and Sexual Outcomes in Women with Provoked Vestibulodynia and Their Partners: A Mediation Model. *Archives of Sexual Behavior.* 2015, *44:*1561-1572.

45.   Purcell-Lévesque C, Brassard A, Carranza-Mamane B, Péloquin K: Attachment and sexual functioning in women and men seeking fertility treatment. *Journal of Psychosomatic Obstetrics & Gynecology.* 2019, *40:*202-210.

46.   Muise A, Rosen NO, Kim JJ, Impett EA: Understanding when a partner is not in the mood: Sexual communal motivation in couples transitioning to parenthood. *Archives of Sexual Behavior.* 2017, *46:*1993-2006.

47.   Rosen NO, Mooney K, Muise A: Dyadic empathy in the transition to parenthood: Associations with sexual, relationship, and psychological wellbeing. *Journal of Sex & Marital Therapy.* 2016, *43:*543-559.

48.   ter Kuile MM, Brauer M, Laan E: The female sexual function index (FSFI) and the female sexual distress scale (FSDS): psychometric properties within a Dutch population. *Journal of Sex & Marital Therapy.* 2006, *32:*289-304.

49.   Isidori AM, Pozza C, Esposito K, et al.: Outcomes assessment: Development and validation of a 6-item version of the Female Sexual Function Index (FSFI) as a diagnostic tool for female sexual dysfunction. *The Journal of Sexual Medicine.* 2010, *7:*1139-1146.

50.   Rosen RC, Cappelleri JC, Smith MD, Lipsky J, Pena BM: Development and evaluation of an abridged, 5-item version of the International Index of Erectile Function (IIEF-5) as a diagnostic tool for erectile dysfunction. *International Journal of Impotence Research.* 1999, *11:*319-326.

51.   Santos-Iglesias P, Bergeron S, Brotto LA, Rosen NO, Walker LM: Preliminary validation of the Sexual Distress Scale-Short Form: Applications to women, men, and prostate cancer survivors. *The Journal of Sex and Marital Therapy.* 2020, *46:*542-563.