

BASIC SCIENCE

Sexual Dysfunction and Satisfaction in Japanese Couples During Pregnancy and Postpartum



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ABSTRACT

Introduction: Sexual function and frequency can change between couples during pregnancy and postpartum, with a decline in sexual function in women.

Aim: To investigate sexual function in couples during pregnancy and postpartum.

Methods: This questionnaire-based cross-sectional descriptive study solicited data from 551 couples, 127 (23%) of whom responded: 15 during the first trimester; 26 during the second trimester; and 21, 22, 21, and 22 at 1, 3, 6, and 12 months postpartum, respectively. The Female Sexual Function Index (FSFI) and International Index for Erectile Function (IIEF) questionnaires were used for female and male participants, respectively, and included questions about delivery, breastfeeding, partner's contribution to housework, and desire to have more children for women, and about aspects of their partner's pregnancy and postpartum life for men. Data about maternal/paternal age, parity, body mass index, and mode of delivery were also collected.

Main Outcome Measure: FSFI and IIEF total and subcategory scores with attributable factors.

Results: The total and subcategory scores related to female and male sexual functions were lowest at 1 and 3 months postpartum, with 79 women reporting female sexual dysfunction (score <26.55). The FSFI subcategory scores (except desire and satisfaction) differed between 1 and 12 months postpartum. The IIEF scores showed no significant differences. The total mean IIEF scores were 17.9 ± 9.6 and 54.9 ± 12.0 in men with and without erectile dysfunction (ED), respectively. The FSFI scores were 8.6 ± 7.2 and 18.2 ± 8.6 in women whose partner had and did not have ED, respectively. No significant differences ($P = .76$) were observed between the male satisfaction subcategories.

Conclusion: Sexual function decreased around the time of delivery for men and women, but did not correlate with the sexual satisfaction of men. Type of delivery, breastfeeding, intimacy, and partner's contribution to housework did not affect sexual dysfunction. **Saotome TT, Yonezawa K, Suganuma N. Sexual dysfunction and satisfaction in Japanese couples during pregnancy and postpartum. Sex Med 2018;6:348–355.**

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Key Words: Female Sexual Function Index (FSFI); International Index for Erectile Function (IIEF); Delivery; Sexual Dysfunction

INTRODUCTION

During pregnancy and postpartum, physiological and mental changes occur in both men and women, and these may affect their sexual function and desires. Studies have shown that in women, sexual function during pregnancy may be related to physical factors including back and leg aches, cramping, and

constipation, as well as factors such as age, educational level, and gestational weeks.¹ The sex life of a woman may also be affected by the length of the postpartum period (broadly described as 1 month to 2 years after delivery), mode of delivery (vaginal or cesarean section), or whether an episiotomy was performed.^{2,3} Hormonal changes have also been noted in fathers as in expectant mothers. Testosterone and estradiol levels have been reported to decrease in men, although no changes have been reported for cortisol and progesterone levels, whereas the levels of these hormones have shown large increases in women.⁴

A few studies have reported about male partner neglect and non-sexual partnership between couples during pregnancy.⁵ The available literature mentions that couples undergo an adjustment period, which may result in changes in intimacy and frequency of

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sexual activity, including during the postpartum period and when women are breastfeeding.^{3,6,7} Expectant fathers may experience ambivalent feelings of joy and anxiety about their partner's pregnancy and about becoming a father.

In Japan, the number of couples who are not sexually intimate after the birth of their child has increased.⁸ This descriptive, cross-sectional study aimed to collect data on factors that influence the decline in intimacy between couples during pregnancy and postpartum, with a view to providing more effective and targeted interventions, including counseling to affected couples. In this study, how and when sexual function changed were examined, and options to mitigate these changes were identified.

METHODS

Participants

This was a cross-sectional descriptive study of 127 couples who delivered at a hospital in Japan. Couples were given questionnaires to complete between March and May 2015. Questionnaires were handed out when the couples attended the outpatient clinic for their regular maternity checks in the first (10–14 weeks' gestation) and second (26–32 weeks' gestation) trimesters, and during the 1-month postpartum follow-up. The couples were asked to leave their completed questionnaires in the outpatient clinic box or to return them by post.

The questionnaires were standardized in Japanese and sent to 551 couples every 2 weeks to collect responses at 3, 6, and 12 months postpartum. These couples were asked to return their questionnaires by post. A total of 127 couples responded (response rate, 23%), including 15 couples during the first trimester; 26 during the second trimester; and 21, 22, 21, and 22 at 1, 3, 6, and 12 months postpartum, respectively (Supplemental Figure 1).

Japanese singleton pregnant women aged ≥ 20 years and their partners were included in this study. Non-Japanese women, women with multiple pregnancies, women aged ≤ 20 years, women who were hospitalized during pregnancy and did not physically cohabit with their partner during pregnancy and postpartum, and women who had premature labor and their partners were excluded from this study.

The couples were provided with verbal and written descriptions of the study, and only those who provided written consent were included. This study was approved in 2015 by the ethical committee of Kyoto University (E2465) and by the participating hospital.

Study Design

In this study, eligible participants were asked to complete the questionnaires described in the following and in Appendices A–D.

The Female Sexual Function Index (FSFI) was standardized with the questionnaire related to sexual activity, intercourse, and

stimulation. The questionnaire consisted of 19 items and 6 subcategories (desire, arousal, lubrication, orgasm, satisfaction, and pain).^{9,10}

The standardized questionnaire for postpartum women assesses the responses of women to questions about their satisfaction relating to delivery, whether their partner attended the delivery, whether they were breastfeeding, whether they had concerns about their child, whether their partner contributed to housework, and whether they wished to have more children.

The International Index for Erectile Function (IIEF) was standardized with the questionnaire related to erectile issues, and covers sexual activity, sexual intercourse, sexual stimulation, ejaculation, and orgasm. It consists of 25 items and 5 subcategories (desire, excitement, orgasm, intercourse satisfaction, and overall satisfaction).^{11,12}

The standardized questionnaire for men is composed of questions about whether they were present at delivery, their feelings during the delivery, whether they contributed to housework, whether they wished to have more children, and how they rated their relationship with their partner.

Data on maternal and paternal age, parity, body mass index (BMI), and mode of delivery were also collected from medical records. All data were corrected with anonymization.

Main Outcome Measure

The main outcome measures were the FSFI and IIEF total and subcategory scores.

Statistical Analyses

Data were analyzed using the JMP Pro version 11.2.0 (SAS Institute Inc., Cary, NC, USA) statistical software package. Non-parametric data samples were evaluated using the Wilcoxon test, and intergroup comparisons were performed with the Dunnett test. A conventional critical 2-sided α -error of 0.05 was set. Variables such as age, BMI, mode of delivery, desire to have more children, breastfeeding, partner's participation in housework, partner's presence at birth, and satisfaction with the delivery were treated as ordinal variables.

RESULTS

Participant Profiles

The mean age of the participants was 32.8 ± 4.4 years for women and 34.5 ± 4.8 for men ($P < .0001$; Table 1). All of the couples were married, and 58 (45.7%) of the women were primiparous (Table 1). Age was not a factor in the sexual function of women ($P = .13$); however, the sexual function of men slightly decreased with age ($P = .02$; data not shown). BMI did not affect the sexual function scores of women ($P = .54$), but it had a slightly negative effect on the IIEF total scores of men ($P = .02$; data not shown).

Table 1. Characteristics of the study couples

	Women	Men	<i>P</i>
Number (n)	127 (86 postpartum)	127	
Age range (years)	24–42	24–46	
Mean age (years)	32.8 ± 4.4	34.5 ± 4.8	<.0001
20–24 years, n (%)	2 (1.6)	1 (0.8)	
25–29 years, n (%)	32 (25.2)	22 (17.3)	
30–34 years, n (%)	46 (36.2)	43 (33.9)	
35–39 years, n (%)	41 (32.3)	43 (33.9)	
40–44 years, n (%)	6 (4.7)	14 (11.0)	
≥45 years, n (%)	0	4 (3.1)	
Body mass index, kg/m ²	23.4 ± 7.4	23.0 ± 6.1	.54
Parity			
0	58 (45.7%)		
Postpartum	38 (44.2%)		
≥1	69 (54.3%)		
Postpartum	48 (55.8%)		
Mode of delivery			
Vaginal (%)	66 (76.7)		
Cesarean (%)	20 (23.3)		
Erectile dysfunction (subscale score)			
<15		61 (postpartum 39)	
≥15		66 (postpartum 47)	

Sexual Function of Women

The arousal, lubrication, orgasm, and pain scores generally decreased from 1 to 3 months postpartum (Table 2). The total scores differed between 1 and 12 months postpartum ($P = .002$). When the subcategories of arousal, lubrication, orgasm, and pain were examined, the results at 12 months postpartum differed from the results obtained at 1 month postpartum. The results for the desire and satisfaction subcategories did not differ from the results obtained for the arousal, lubrication, and orgasm subcategories.

The data from the postpartum group showed that episiotomy and mode of delivery did not affect female sexual function (Supplemental Table 1). Women who had a cesarean section ($n = 20$) had a mean FSFI score of 11.7 ± 8.47 ($P = .03$), whereas those who delivered vaginally ($n = 66$) had a mean FSFI score of 14.25 ± 9.61 ($P = .14$; Supplemental Table 1). A desire for more children resulted in a higher FSFI score, but this was not statistically significant ($P = .17$). Breastfeeding and partner's contribution to housework did not affect the FSFI scores (Supplemental Table 1).

Table 2. Female Sexual Function Index scores during pregnancy and postpartum

FSFI domain	First trimester	Second trimester	1 month postpartum	3 months postpartum	6 months postpartum	12 months postpartum
Total	15.2 ± 9.4 $P = .22$	14.2 ± 9.5 $P = .27$	9.6 ± 6.9 $P = 1.00$	11.8 ± 8.6 $P = .88$	14.3 ± 9.7 $P = .3$	19.5 ± 9.3 $P = .002$
Desire	2.4 ± 1.0 $P = .92$	2.7 ± 1.2 $P = .16$	2.1 ± 1.1 $P = 1.00$	2.1 ± 0.7 $P = 1.00$	2.4 ± 1.1 $P = .77$	2.8 ± 0.9 $P = .15$
Arousal	1.9 ± 1.6 $P = .27$	1.8 ± 1.7 $P = .21$	0.9 ± 1.3 $P = 1.00$	1.6 ± 1.6 $P = .53$	1.7 ± 1.6 $P = .34$	2.4 ± 1.5 $P = .01$
Lubrication	2.6 ± 2.2 $P = .19$	2.1 ± 2.4 $P = .56$	1.2 ± 2 $P = 1.00$	1.5 ± 1.9 $P = .99$	2.4 ± 2.4 $P = .22$	3.5 ± 2.0 $P = .0037$
Orgasm	2.3 ± 1.9 $P = .21$	1.9 ± 2.0 $P = .45$	1.0 ± 1.6 $P = 1.00$	1.5 ± 1.9 $P = .88$	2.1 ± 2.2 $P = .31$	3.3 ± 2.1 $P = .0014$
Satisfaction	3.3 ± 1.8 $P = .81$	3.8 ± 1.7 $P = .99$	3.6 ± 1.5 $P = 1.00$	3.4 ± 1.6 $P = .99$	3.1 ± 1.4 $P = .8$	4.1 ± 1.7 $P = .81$
Pain	2.8 ± 2.8 $P = .27$	2 ± 2.4 $P = .83$	1.4 ± 2.3 $P = 1.00$	1.7 ± 2.1 $P = .99$	2.4 ± 2.7 $P = .49$	3.6 ± 2.2 $P = .0105$

FSFI = Female Sexual Function Index.

Table 3. International Index of Erectile Function scores during pregnancy and postpartum

IIEF domain	First trimester	Second trimester	1 month postpartum	3 months postpartum	6 months postpartum	12 months postpartum
Total	35.8 ± 16.1 <i>P</i> = .89	38.9 ± 21.8 <i>P</i> = .47	30.1 ± 19.7 <i>P</i> = 1.00	35.1 ± 20.7 <i>P</i> = .9	43.5 ± 23.4 <i>P</i> = .15	45.4 ± 21.8 <i>P</i> = .08
Erectile function	13.8 ± 8.3 <i>P</i> = .99	15.5 ± 11.1 <i>P</i> = .76	12.3 ± 10.3 <i>P</i> = 1.00	15.3 ± 11.2 <i>P</i> = .08	18.0 ± 11.0 <i>P</i> = .29	20.5 ± 10.8 <i>P</i> = .05
Orgasmic function	7.5 ± 3.5 <i>P</i> = .11	6.5 ± 4.1 <i>P</i> = .33	4.4 ± 4.4 <i>P</i> = 1.00	4.2 ± 4.3 <i>P</i> = .99	6.9 ± 4.5 <i>P</i> = .21	6.9 ± 4.2 <i>P</i> = .21
Sexual desire	6.6 ± 2.4 <i>P</i> = .69	6.2 ± 1.9 <i>P</i> = .91	5.7 ± 2.9 <i>P</i> = 1.00	5.5 ± 1.8 <i>P</i> = .99	6.7 ± 2.6 <i>P</i> = .5	6.4 ± 2.4 <i>P</i> = .79
Intercourse satisfaction	2.7 ± 4.5 <i>P</i> = 1.00	4.8 ± 5.4 <i>P</i> = .45	2.7 ± 4.8 <i>P</i> = 1.00	4.1 ± 4.6 <i>P</i> = .82	5.4 ± 5.7 <i>P</i> = .26	6.6 ± 4.8 <i>P</i> = .05
Overall satisfaction	5.2 ± 2.9 <i>P</i> = .98	5.9 ± 2.7 <i>P</i> = .46	4.76 ± 3.0 <i>P</i> = 1.00	6.0 ± 1.3 <i>P</i> = .41	6 ± 2.8 <i>P</i> = .38	5.0 ± 2.5 <i>P</i> = .99

The *P* values (from the Dunnett test) are the comparison of scores at 1 month postpartum. IIEF = International Index of Erectile Function.

Sexual Function of Men

The IIEF total scores and the scores for the erectile function, orgasmic function, sexual desire, and intercourse satisfaction subcategories were low at 1 and 3 months postpartum, but there was no significant difference (*P* = .08; Table 3). This trend was similar to that seen in women. No significant differences were found among the results for the overall satisfaction subcategory. The scores for attendance at birth, partner's happiness, desire to have more children, and contribution to housework did not affect the IIEF scores (Supplemental Table 2).

Comparison of Couples With and Without Erectile Dysfunction (ED)

Of 86 postpartum women, 79 (91.5%) had sexual dysfunction (Supplemental Table 1); however, whether a relationship exists between the sexual dysfunction of women and the sexual

function of men could not be determined. On the basis of the IIEF scores, the men could be divided into 2 groups: 39 men (45.3%) with ED (defined as <15 points for the subcategories of erectile function) and 47 men without ED. The total mean IIEF score was 17.9 ± 9.6 for the ED group and 54.9 ± 12.0 for the group without ED (*P* = .76). The FSFI scores for the women were 8.6 ± 7.2 for those having a partner with ED and 18.2 ± 8.6 for those having a partner without ED (*P* < .0001; Table 4).

Attributable Factors and Sexual Function

The participants were asked to complete additional questionnaires (Appendices B and D) to investigate attributable factors related to sexual function. Parity, mode of delivery, partner's contribution to housework, and intimacy did not affect sexual function (Table 5). No physical changes were observed in men when their partners were pregnant or during the postpartum

Table 4. Sexual function comparison between couples with and without erectile dysfunction

IIEF domain	Without ED (mean ± SD)	With ED (mean ± SD)	<i>P</i> *
Total	54.9 ± 12.0	17.9 ± 9.6	<.0001
Erectile function	25.5 ± 5.3	5.8 ± 4.8	<.0001
Orgasmic function	8.5 ± 2.5	2.1 ± 3.7	<.0001
Sexual desire	7.3 ± 1.7	4.6 ± 2.4	<.0001
Intercourse satisfaction	8.3 ± 4.1	0.3 ± 1.2	<.0001
Overall satisfaction	6.0 ± 2.3	4.8 ± 2.6	.76
FSFI domain			
Total	18.2 ± 8.6	8.6 ± 7.2	<.0001
Desire	2.7 ± 1.0	2.0 ± 0.7	<.0001
Arousal	2.4 ± 1.4	0.8 ± 1.2	<.0001
Lubrication	3.0 ± 2.1	1.1 ± 1.9	<.0001
Orgasm	2.8 ± 2.0	0.9 ± 1.7	<.0001
Satisfaction	4.0 ± 1.4	3.0 ± 1.7	<.0001
Pain	3.4 ± 2.3	0.9 ± 1.8	<.0001

ED = erectile dysfunction; FSFI, Female Sexual Function Index; IIEF, International Index of Erectile Function.

*The *P* values between couples with and without erectile dysfunction were calculated using the Wilcoxon test.

Table 5. Co-factors contributing to sexual function scores

Attributable factors	FSFI (mean \pm SD)	<i>P</i> *	IIEF (mean \pm SD)	<i>P</i> *
Parity [†]				
0 (n = 38)	13.1 \pm 8.3		35.37 \pm 21.3	
≥ 1 (n = 48)	14.4 \pm 10.1	.38	41.1 \pm 22.1	.06
Mode of delivery [†]				
Vaginal (n = 66)	14.5 \pm 9.5		40.8 \pm 21.7	
Cesarean (n = 20)	11.7 \pm 8.5	.02	31 \pm 21.7	.0002
Breastfeeding [†]				
Exclusive (n = 53)	13.8 \pm 10.1		39.2 \pm 21.9	
Mixed (n = 19)	14.9 \pm 8.5	.42	38.8 \pm 26.3	.66
Formula (n = 12)	16.3 \pm 9.7	.23	38.6 \pm 20.6	.79
Delivery satisfaction [†]				
Yes (n = 50)	13.2 \pm 9.8		40.4 \pm 22.4	
No (n = 12)	17.1 \pm 9.5	.12	38.1 \pm 26.2	.55
Unknown (n = 16)	13.3 \pm 7.9	.97	38.8 \pm 19.6	.86
Housework [‡]				
Yes (n = 43)	13.0 \pm 9.1		37.8 \pm 20.8	
No (n = 22)	13.0 \pm 8.1	.95	40.0 \pm 23.6	.77
Not enough (n = 19)	16.7 \pm 11.1	.14	39.2 \pm 23.5	.82
Intimacy [‡]				
No (n = 2)	4.0 \pm 0.56	.5	47 \pm 31.1	1.00
Almost [§] (n = 23)	13.3 \pm 9.2	.45	38 \pm 22.5	.72
Intimate [§] (n = 58)	14.3 \pm 9.3		38.5 \pm 21.8	

FSFI = Female Sexual Function Index; IIEF = International Index of Erectile Function; SD = standard deviation.

**P* values were calculated using the Wilcoxon test.

[†]Contributing to female sexual function scores.

[‡]Contributing to male sexual function scores.

[§]Per the response of men to the question about whether their relationship was good (intimate), fair (almost), or poor (no). *Statistically significant.

period, although erectile and orgasmic functions decreased parallel to the sexual function of women (with the exception of desire).

The satisfaction level relating to intercourse was low during pregnancy and just after delivery, but was significantly higher at 6 and 12 months postpartum (Table 3). The overall satisfaction level was high except for the early period of pregnancy and at 1 month postpartum.

In the postpartum couples (n = 86), 38 primiparous women had an FSFI total score of 13.1 \pm 8.3, whereas 48 parous women had a score of 14.4 \pm 10.1 (*P* = .06; Table 5). 79 women (91.5%) had a sexual dysfunction score of <26.55 (Supplemental Table 1).

The FSFI scores did not significantly differ (*P* = .38) between the 38 primiparous women (13.1 \pm 8.3) and the 48 multiparous women (14.4 \pm 10.1; Supplemental Table 1). The FSFI score was 14.25 \pm 9.61 for the 61 vaginal births and 11.7 \pm 8.47 for the 20 cesarean births. The cesarean section score was lower (*P* = .03) than the vaginal score (*P* = .14; Supplemental Table 1). No significant differences were observed between women who had an episiotomy (14.36 \pm 9.45) and those who did not have an episiotomy (14.5 \pm 9.64; Supplemental Table 1).

The partner's presence at birth may be related to the sexual function scores. The FSFI scores were 4.2 \pm 0.43 for women

whose partners did not attend the delivery (n = 4) and 14.85 \pm 9.73 for those whose partners attended the delivery (n = 48; *P* < .0001; Supplemental Table 1), whereas the IIEF scores were 33.0 \pm 28.97 (n = 8) for men who did not attend the delivery and 39.01 \pm 21.95 (n = 53; *P* < .0001) for those who attended the delivery, respectively (Supplemental Table 2). No significant differences were found between the cesarean and vaginal delivery modes (Supplemental Table 1). Sexual desire was low throughout pregnancy but increased from 6 months for women and from 3 months for men. The difference was not biological but was related to the partner's level of desire. The scores for orgasm of women and men were related (*P* < .0001). A significant relationship was observed between the intercourse satisfaction scores (*P* = .0001) of men and women, but no significant relationship was found between their total satisfaction scores (*P* = .76; Table 4).

DISCUSSION

The sexual relationship between men and women during and after pregnancy has implications on their quality of life. In Japan, a few studies have ascertained that the quality of the sexual relationship of a couple declines after they have had a child. Additional studies are required to investigate issues that lead to the decline in the quality of sexual relationships and to

investigate any appropriate interventions than can resolve the potential issues.

A longitudinal study in postpartum women investigated sexual inactivity and dysfunction during the perinatal period.¹³ The scores for desire and satisfaction did not change significantly during pregnancy or postpartum even when the frequency of sexual activities was lower. A low level of sexual activity did not necessarily mean low desire and satisfaction. In the present study, despite the cross-sectional design, similar results showing that the sexual functions of women and men and their satisfaction levels declined from 1 to 3 months postpartum were observed; however, the differences were not statistically significant.

Although no significant association between breastfeeding and sexual function of women was observed in this study, other studies reported lower levels of sexual activity in women who breastfed.² Another study showed that multiparous women had fewer orgasms and that nulliparous women had more pain postpartum than women who had previously given birth.¹⁴ This is consistent with the present observations of a decline in orgasm in women and men from 1 to 3 months postpartum. These findings can be attributed to the decline in estrogen level that leads to vulvovaginal atrophy and possible dyspareunia.² The limitation of this study related to its small sample size can be a reason for not observing any significant differences in the sexual activity of women who were breastfeeding. In contrast to the results of the present study showing no impact of the partner's happiness on sexual function, Witting et al¹⁴ reported a higher degree of sexual satisfaction and fewer sexual function issues in couples who were happy in their relationship.

Parity, mode of delivery, the partner's contribution to housework, and intimacy were found not to influence sexual function. These are consistent with the findings of Gungor et al¹⁵ about the overall sexual function of men being not affected by their partner's parity or mode of delivery. A longitudinal study showed that men had lower sexual desire during the third trimester of their partner's pregnancy, although no change was observed in sexual desire between men and women.¹⁶

1 study investigated the levels of sexual desire in a large group of women in the United States. Of the women, 27% reported a low level of sexual desire.¹⁷ Another study¹⁸ showed that women who had anal sphincter laceration were less likely to engage in sexual activity at 6 months postpartum, whereas Khajehei et al¹⁹ reported that two-thirds of women experience sexual dysfunction during the first year after giving birth. Consistent with the previous reports, the results of this study identified that sexual desire was low throughout pregnancy. However, the sexual desire of men was low only toward their own partner. A study conducted in Nigeria observed that men took multiple partners when they did not have sexual access to their wives during pregnancy and postpartum.²⁰

Data from the present study revealed that 22.7% of men had ED, whereas women had low sexual function and 77.3% had experienced sexual dysfunction 12 months after delivery. Data from studies conducted in Japan and Vietnam also revealed low

levels of sexual activity.^{21,22} This could partially be caused by cultural and social views about sexual activity in Asian countries that do not exist in Western countries. The high rate of ED in the present study can be attributed to significant differences in perceptions of aging or adaptation of lifestyles with aging, in perceptions of sexual function, and in willingness to report sexual problems between the cultures.²³ Discrepancies were also found between the sexual activities of men and women in Asian countries when compared with those in Western countries. In addition to the cultural differences, the difference in sexual activities of men and women in Asian and Western countries is also attributed to the avoidance of acknowledging a lack of sexual desire.²³

Physical and mental factors, including age and educational level, episiotomy, vaginal tears, weight, anxiety about harming the baby during pregnancy, anxiety about child rearing, and other social factors also contribute to the decrease in the sexual function of pregnant and postpartum women.^{1,16,21,24–31} These factors may affect the sexual function of women at different times throughout the pregnancy and postpartum period.^{7,32–35} Overall, studies have shown that adjustments in sexual activity occur in married couples during pregnancy.^{6,36}

As the present study had a small sample size, no differences in episiotomy incidence, breastfeeding, mode of delivery, parity, intimacy, delivery satisfaction, and sexual function could be found in the cohort. No significant differences in sexual function were found between couples whose child was delivered vaginally and those whose child was delivered via cesarean section. Most participants reported that they were intimate, the men contributed to housework, and the women were breastfeeding. Had the participants reported that they were not intimate, then whether these factors may have played a role in sexual function could have been analyzed.

A previous study showed that ED in a male partner could affect the sexual function of the female partner.³⁰ The present study found that ED in men contributed to the sexual function of postpartum women. As previously stated, couples make adjustments in their sexual activity during pregnancy and postpartum.⁷ These adjustments can last for 1 or 2 years postpartum; thus, healthcare providers need to offer more support to these couples, especially if the women are less understanding of the issues surrounding ED in their partners. Further research must be conducted to investigate this issue.

Overall, the participants in this study were willing to answer intimate questions about their sexual relationships. Some recognized it as an opportunity to seek information and potentially receive counseling that could help them address the issues they were experiencing in their relationships during pregnancy and postpartum.

LIMITATIONS

One limitation of the present study is that information about the participants' sexual functions before pregnancy was not available. This meant that the results before, during, and after

childbirth could not be compared. More studies will need to be conducted to collect this type of data.

Another limitation is that the number of solicited participants who responded was significantly low. Owing to the low response rate and cross-sectional nature of the study, it was not possible to record the responses of all the couples at each different interval and to perform principal component analysis. Future studies should consider using a longitudinal study design and conducting a similar analysis at multiple facilities to increase the study cohort.

CONCLUSION

This study showed that sexual dysfunction in men contributed to the sexual dysfunction of their female partners. Of the women, 91% had sexual dysfunction; however, women whose partners had ED had a lower sexual function score than those whose partners had no ED. In addition, this study found that sexual dysfunction was not related to sexual satisfaction in a relationship.

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REFERENCES

1. Tosun FG, Gördeles NB. Evaluation of sexual functions of the pregnant women. *J Sex Med* 2014;11:146-153.
2. Byrd JE, Hyde JS, Delamater JD, et al. Sexuality during pregnancy and the year postpartum. *J Fam Pract* 1998; 47:305-308.
3. Ejegard H, Ryding EL, Sjogren B. Sexuality after delivery with episiotomy: A long-term follow-up. *Gynecol Obstet Invest* 2008;66:1-7.
4. Edelstein RS, Wardecker BM, Chopik WJ, et al. Prenatal hormones in first-time expectant parents: Longitudinal changes and within-couple correlations. *Am J Hum Biol* 2015; 27:317-325.
5. von Sydow K. Sexuality during pregnancy and after childbirth: A metacontent analysis of 59 studies. *J Psychosom Res* 1999;47:27-49.
6. Goldberg WA, Michaels GY, Lamb ME. Husbands' and wives' adjustment to pregnancy and first parenthood. *J Fam Issues* 1985;6:483-503.
7. Williamson M, McVeigh C, Baafi M. An Australian perspective of fatherhood and sexuality. *Midwifery* 2008;24:99-107.
8. Moriki Y, Hayashi K, Matsukura R. Sexless marriages in Japan: Prevalence and reasons. In: Ogawa N, Shah I, eds. Low fertility and reproductive health in East Asia. International studies in population, volume 11. Dordrecht, the Netherlands: Springer; 2015. p. 161-185.
9. Rosen R, Brown C, Heiman J, et al. The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *J Sex Marital Ther* 2000;26:191-208.
10. Takahashi M, Inokuchi T, Watanabe C. The Female Sexual Function Index (FSFI): Development of a Japanese version. *J Sex Med* 2011;8:2246-2254.
11. 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.
12. Japanese Society for Sexual Medicine (JSSM) Guidelines for Erectile Dysfunction Edition 2012. Tokyo, Japan: The Japanese Society for Sexual Medicine, RichHill Medical Inc; 2012. p. 102-103.
13. Wallwiener S, Muller M, Doster A, et al. Sexual activity and sexual dysfunction of women in the perinatal period: A longitudinal study. *Arch Gynecol Obstet* 2017;295:873-883.
14. Witting K, Santtila P, Alanko K, et al. Female sexual function and its association with number of children, pregnancy, and relationship satisfaction. *J Sex Marital Ther* 2008; 34:89-106.
15. Gungor S, Baser I, Ceyhan T, et al. Does mode of delivery affect sexual functioning of the man partner? *J Sex Med* 2008;5:55-63.

16. Bogren LY. Changes in sexuality in women and men during pregnancy. *Arch Sex Behav* 1991;20:35-45.
17. Rosen RC, Shifren JL, Monz BU. Correlates of sexuality related distress in women with low sexual desire. *J Sex Med* 2009;6:1549-1560.
18. Brubaker L, Handa VL, Bradley CS, et al. Sexual function 6 months after first delivery. *Obstet Gynecol* 2008;111:1040-1044.
19. Khajehei M, Doherty M, Tilley PJ, et al. Prevalence and risk factors of sexual dysfunction in postpartum Australian women. *J Sex Med* 2015;12:1415-1426.
20. Lawoyin TO, Larsen U. Male sexual behavior during wife's pregnancy and postpartum abstinence period in Oyo State, Nigeria. *J Biosoc Sci* 2002;34:51-63.
21. Imamura K, Kayashima K. Female sexual function and influence factors in women 4 to 5 months postpartum. *J Japan Sex Sci Soc* 2015;31:15-26.
22. Van Vo T, Hoang HD, Thanh Nguyen NP. Prevalence and associated factors of erectile dysfunction among married men in Vietnam. *Front Public Health* 2017;5:94.
23. Lewis RW. Epidemiology of sexual dysfunction in Asia compared to the rest of the world. *Asian J Androl* 2011;13:152-158.
24. Chang SR, Chen KH, Lin HH, et al. Comparison of the effects of episiotomy and no episiotomy on pain, urinary incontinence, and sexual function 3 months postpartum prospective follow-up study. *Int J Nurs Stud* 2011;48:409-418.
25. O'Malley D, Higgins A, Smith V. Postpartum sexual health: A principle-based concept analysis. *J Adv Nurs* 2015;71:2247-2257.
26. Brtnicka H, Weiss P, Zverina J. Human Sexuality during pregnancy and the postpartum period. *Bratisl Lek Listy* 2009;110:427-431.
27. Radestad I, Olsson A, Nissen E, et al. Tears in the vagina, perineum, sphincter ani, and first sexual intercourse after childbirth: A nationwide follow-up. *Birth* 2008;35:98-106.
28. Sayed Ahmed WA, Kishk EA, Farhan RI, et al. Female sexual function following different degrees of perineal tears. *Int Urogynecol J* 2017;28:917-921.
29. Ribero MC, Nakamura MU, Torloni MR, et al. Maternal overweight and sexual function in pregnancy. *Acta Obstet Gynecol Scand* 2016;95:45-51.
30. Pagidas K, Carson SA, McGovern PG, et al. Body mass index and intercourse compliance. *Fertil Steril* 2010;94:1447-1450.
31. Hipps LE, Low LK, van Anders SM. Exploring women's postpartum sexuality: social, psychological, relational, and birth-related contextual factors. *J Sex Med* 2012;9:2330-2341.
32. Faisal-Cury A, Menezes PR, Quayle J, et al. The relationship between mode of delivery and sexual health outcomes after childbirth. *J Sex Med* 2015;12:1212-1220.
33. Rezaei N, Azadi A, Sayehmiri K, et al. Postpartum sexual functioning and its predicting factors among Iranian women. *Malays J Med Sci* 2017;24:94-103.
34. De Souza A, Dwyer PL, Charity M, et al. The effects of mode delivery on postpartum sexual function: A prospective study. *BJOG* 2015;122:1410-1418.
35. Lipschuetz M, Cohen SM, Liebergall-Wischnitzer M, et al. Degree of bother from pelvic floor dysfunction in women one year after first delivery. *Eur J Obstet Gynecol Reprod Biol* 2015;191:90-94.
36. Kisa S, Zeyneglu S, Yilmaz D, et al. Quality of sexual life and its effect on marital adjustment of Turkish women in pregnancy. *J Sex Marital Ther* 2014;40:309-322.

SUPPLEMENTARY DATA

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.esxm.2018.08.003>.