



# The Relationship Between the Type of Delivery and Sexual Function in Mothers Referring to Kourdistan (Sanandaj) Health Centers in 2015-2016

Marzieh Moghadam<sup>1</sup>, Farzaneh Zaheri<sup>2\*</sup>, Narges Shams Alizadeh<sup>1</sup>, Siroos Shahsavari<sup>3</sup>

## Abstract

**Objectives:** Sexual dysfunction is one of the most serious problems that may occur in the postpartum period and can lead to physical, psychological, and social adverse effects in women. The type of delivery is one of the factors that may affect the prevalence of sexual disorders in this period. The present study evaluated the relationship between the mode of delivery and women's sexual function in 6 months and one year after the delivery.

**Materials and Methods:** The participants of this cohort study included all nulliparous mothers aged 18 to 35 years, who referred to healthcare centers in Sanandaj, the capital city of Kurdistan province, Iran. The sample size for the vaginal delivery with episiotomy and cesarean section (C-section) was 68 women. Sexual function was evaluated using the Female Sexual Function Index (FSFI) 6 and 12 months after the delivery.

**Results:** There was no significant difference between the two groups before pregnancy regarding women's sexual function ( $P=0.9$ ) while both types of deliveries resulted in a significant reduction in sexual function 6 months after the childbirth. In addition, vaginal delivery reduced sexual function more than C-section. The mean scores of sexual function were 24.4 for the vaginal delivery group and 26.8 for cesarean delivery ( $P=0.01$ ). Finally, women in the C-section group had significantly higher levels of sexual desire one year after the delivery ( $P=0.03$ ).

**Conclusions:** Overall, sexual function in the C-section group was better than the vaginal delivery group 6 months after the delivery. However, this difference was only significant in the domain of sexual desire one year after the childbirth.

**Keywords:** Mode of delivery, Sexual dysfunction, Cesarean section, Episiotomy

## Introduction

Sexual dysfunction is considered as one of the most critical problems which may occur in the postpartum period and thus can cause physical, psychological, and social complications in the patient (1).

Unfortunately, in developing societies, sexual problems are not discussed with healthcare providers due to some culture-related issues such as shame and modesty, and medical staff also avoid inquiring about these problems (2). In the postpartum period, attention is focused on the baby and the health and needs of the mother are forgotten even in developed societies. Therefore, untreated sexual problems, along with other issues, lead to distances between the parents and thus emotional separation is predictable (3).

In addition, the prevalence of sexual problems in the postpartum period is high and the incidence of female sexual dysfunction in over 18 years of age and middle-aged women is estimated to range from 5.5% to 73.2% and 40.9%, respectively (4). According to Zhang et al,

25.6% of the married women reported at least one form of sexual dysfunction (5). Khajehei et al also showed that about two-thirds of Australian women (64.3%) experience sexual dysfunction during the first year after childbirth (6). Further, Rezaei et al found that the majority of women (76.3%) suffered from sexual dysfunction (2).

Different factors are considered to be effective in the development of sexual dysfunction during the postpartum period (7) and the type of delivery is one of these factors (8). For this reason, many women and even more than 50% of gynecologists prefer cesarean section (C-section) due to a lower rate of sexual dysfunction after this type of childbirth (1,9).

The results of studies in this area are still inconsistent and controversial. For instance, Klein et al reported no statistically significant difference between women with vaginal childbirth without episiotomy, women who had a perineal tear, and those who underwent an elective C-section (10). Similarly, Alesheikh et al reported that the total score of the Female Sexual Function Index (FSFI) did

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<sup>1</sup>Department of Psychiatry and Behavioral Sciences, Neurosciences Research Center, Faculty of Medicine, Kurdistan University of Medical Sciences, Sanandaj, Iran. <sup>2</sup>Clinical Care Research Center, Research Institute for Health Development, Kurdistan University of Medical Sciences, Sanandaj, Iran. <sup>3</sup>Health Faculty of Sanandaj, Kurdistan University of Medical Sciences, Sanandaj, Iran

\*Corresponding Author: Farzaneh Zaheri, Tel: 09186486801, E-mail: f.zaheri1968@gmail.com



not significantly differ across different types of delivery and elective C-section was not a protective factor for sexual dysfunction after childbirth (11). According to the findings of some other studies, no significant difference was observed in the quality of life after vaginal and cesarean delivery (12, 13).

Reviewing the risk factors and the role of the type of delivery on postpartum sexual problems, Sayasneh et al indicated that the results of previous studies were inconsistent in this respect. For example, in this study, the prevalence of dyspareunia 2 years after the childbirth was higher in the vaginal delivery group compared with the C-section group (1), which contradicts the results of Klein et al (10).

Likewise, Lurie et al concluded that the total score of FSFI failed to significantly differ among the types of delivery and elective C-section was not considered as a protective factor for sexual dysfunction after delivery (14).

However, Safarinejad et al demonstrated that women in the selective cesarean group had a higher sexual function score than those in the vaginal delivery group with or without episiotomy (15). Based on the results of another study by Hantoushzadeh et al, the satisfaction of marital relations in the vaginal delivery group was significantly higher than that of the cesarean group (16). Given the inconsistent results of studies in this field and the role of sexual function in maintaining and improving the quality of the life of the husband and wife, the present study aimed to compare the sexual function between women who underwent the C-section and vaginal delivery (with mediolateral episiotomy) 6 months and one year after childbirth.

## Materials and Methods

This research was a longitudinal study and the participants included the nulliparous mothers aged 18-35 years who referred to healthcare centers in Sanandaj during 2015-16. The sample size was determined considering the  $\alpha=5\%$  and  $\beta=20\%$ , and one-way assumption, thus 68 women were included in each group (vaginal delivery with episiotomy and cesarean section). Considering the cultural, economic, and geographical conditions of Sanandaj, the participants were selected from five randomly selected healthcare centers, located in different parts of the city, and recruited using a convenience sampling technique.

The exclusion criteria were women who underwent vaginal delivery with tears, assisted delivery (forceps or vacuums), or vaginal delivery with an intact perineum, as well as those who underwent cesarean delivery after starting the delivery process. Other exclusion criteria were as follows:

- Preterm labor (before 37 weeks), stillbirth, and twins;
- Baby with a birth weight more than 4 kg;
- A newborn with congenital anomaly;
- High-risk pregnancy (i.e., diabetes and high blood pressure);

- The presence of any recognized chronic medical diseases;
- A history of surgery on the uterus before pregnancy and childbirth;
- The husband with multiple partners;
- The infection of the episiotomy location;
- A history of diagnosed psychiatric disorders before pregnancy;
- The presence of moderate to severe depression during this study.

The data collection tool was a 3-part questionnaire. The first part included questions about demographic characteristics, obstetric, and the delivery history of the samples. Further, the second part was related to the FSFI and the third part was the Beck Depression Inventory (BDI).

The FSFI is a 19-item questionnaire that evaluates sexual function in 6 domains such as desire, arousal, lubrication, pain, satisfaction, and orgasm. The individual domain score is calculated by the summation of individual items that belong to the domain and then the sum is multiplied by the domain factor. The full scale (overall) score is obtained by adding all the 6 domain scores. The maximum score in each domain is 6 with a maximum overall score of 36. In addition, a higher overall score indicates better sexual functioning. This questionnaire is known as a reliable and standard tool for measuring sexual dysfunction and can be used as a screening tool (17). Furthermore, it is translated into Persian, and Fakhri et al confirmed its validity, reliability, and acceptability of its Persian version. The overall test-retest reliability coefficients were high for each domain of the Iranian version-FSFI ( $r$  ranging from 0.73 to 0.86) and the internal consistencies were within an acceptable range ( $\alpha$  from 0.72 to 0.90). Moreover, principal component analysis with varimax rotation revealed a best fitting five-factor structure similar to the original FSFI ( $\chi^2=2.1$ ,  $df=17$ ,  $P<0.001$ ). Confirmatory factor analysis approved the underlying domain structure and supported the factorial validity of the IV-FSFI as well (18).

In order to conduct this study, 2 midwifery experts were selected as research assistants and received the necessary training on how to fill out the FSFI questionnaires. After obtaining permissions, they referred to the health centers and obtained written consent forms from eligible women who attended the healthcare centers to vaccinate their 6-month-old infants. Then, these experts filled the demographic questionnaire, the BDI, and the FSFI for the pre-pregnancy period and the first 6 months after the delivery for each participant. It should be noted that at this stage, participants' sexual function before pregnancy was investigated retrospectively through FSFI completion. In the second stage of the study, the participants' sexual function and depression were measured 12 months after delivery. Finally, the collected data were analyzed using inferential and descriptive statistics via the SPSS software, version 22. Additionally, the paired  $t$  test and

multiple logistic regression models were used, followed by calculating the adjusted odds ratio with a 95% confidence interval. A  $P < 0.05$  was considered as a significant level.

## Results

In this study, due to attrition, the total sample included 107 participants, 58 of whom (54.2%) underwent cesarean section (C-section) while the other 49 (45.8%) underwent vaginal delivery with episiotomy. The mean age of the total sample was  $27.2 \pm 4.52$  years, and women in the cesarean group were older than those in the vaginal delivery group with a mean age of  $28.2 \pm 5.11$  and  $26.65 \pm 3.95$  years, respectively. However, there was no statistically significant difference between the 2 groups in terms of age and educational status (Table 1).

Table 2 presents the comparison of the overall score of sexual function and the domain scores before pregnancy and 6th months after delivery for the vaginal delivery group with episiotomy. As shown, there was a statistically significant decrease in all domains of the questionnaire except for the pain in the 6th month of postpartum. In other words, the changes in the domain of pain were not statistically significant between the 2 groups.

As regards the cesarean delivery group, the comparison of the overall score of sexual function and the domain scores before pregnancy and sixth months after delivery is provided in Table 3. Based on the data, a small but statistically significant decrease was observed in all domains of the questionnaire except for lubrication and pain. Lubrication domain score slightly increased while the pain score slightly decreased 6 months after delivery, though these differences were statistically significant.

Similarly, Table 4 summarizes the comparison of the overall score of sexual function and the domain scores before pregnancy, 6, and 12 months after delivery between both groups. According to this table, no statistically significant difference was found between the 2 groups in the pre-pregnancy period in the domains of sexual function. Contrarily, 6 months after childbirth, the overall score of sexual function was significantly lower in the vaginal delivery group as compared to the cesarean delivery group. Regarding the sexual function domains, women in the cesarean delivery group obtained significantly higher scores in the domains of sexual desire and arousal. Twelve months after childbirth, the women in the cesarean group received a statistically significantly

**Table 1.** The Demographic Characteristics of Participants in Both Groups

Variable	Vaginal Delivery (n=49)	Cesarean Section (n=58)	P Value
Age in year (Mean and SD)	26.65 $\pm$ 3.95	28.2 $\pm$ 5.11	0.07
Educational level (n)			
Primary	9 (18.4%)	3 (5.2%)	0.186
Guidance school	8 (16.3%)	14 (24.1%)	
High school diploma	18 (36.7%)	21 (36.2%)	
University degree	14 (28.6%)	20 (34.5%)	
Occupation			
Housewife	49 (100%)	49 (84.5%)	0.04
Employee	0 (0%)	9 (15.5%)	
Breastfeeding			
Six months after childbirth	47 (94%)	56 (96.6%)	0.52
Twelve months after childbirth	48 (96%)	56 (96.6%)	

SD, standard deviation.

**Table 2.** The Relationship Between Vaginal Childbirth and Sexual Function Before Pregnancy and 6 Months After Childbirth

Variable	Time	Mean	Standard Deviation	P Value
Sexual desire	Before pregnancy	3.9	0.79	0.000
	Six months after childbirth	3.2	0.71	
Sexual arousal (Excitement)	Before pregnancy	4.2	0.97	0.000
	Six months after childbirth	3.6	1.06	
Lubrication (wetness)	Before pregnancy	4.9	0.77	0.001
	Six months after childbirth	4.5	0.93	
Pain	Before pregnancy	4.1	1.11	0.95
	Six months after childbirth	4.1	1.13	
Satisfaction	Before pregnancy	5.1	0.82	0.003
	Six months after childbirth	4.6	1.23	
Orgasm	Before pregnancy	4.9	0.82	0.002
	Six months after childbirth	4.3	0.83	
Total	Before pregnancy	27.2	3.8	0.000
	Six months after childbirth	24.4	4.8	

**Table 3.** The Relationship Between Cesarean Section and Sexual Function Before Pregnancy and 6 Months After Childbirth

Variable	Time	Mean	Standard Deviation	P Value
Sexual desire	Before pregnancy	3.9	0.88	0.000
	Six months after childbirth	3.8	0.93	
Sexual arousal (Excitement)	Before pregnancy	4.2	0.95	0.000
	Six months after childbirth	4.1	0.91	
Lubrication	Before pregnancy	4.7	1.08	0.000
	Six months after childbirth	4.8	0.9	
Pain	Before pregnancy	4.2	1.3	0.000
	Six months after childbirth	4.4	1.2	
Satisfaction	Before pregnancy	5.3	0.71	0.000
	Six months after childbirth	5.01	1.05	
Orgasm	Before pregnancy	4.8	1.16	0.000
	Six months after childbirth	4.7	1.01	
Total	Before pregnancy	27.1	4.4	0.000
	Six months after childbirth	26.8	4.0	

**Table 4.** The Relationship Between the Mode of Delivery and Sexual Function Before Pregnancy, 6 Months, and 12 Months After Childbirth

Variable	Time	Method of Childbirth	Mean	Standard Deviation	P Value	
Sexual desire	Before pregnancy	The caesarian section	3.9	0.96	0.516	
		Vaginal childbirth	3.8	0.94		
	Six months after childbirth	The caesarian section	3.8	1.006		0.001
		Vaginal childbirth	3.4	0.87		
	Twelve months after childbirth	The caesarian section	3.8	0.87		0.03
		Vaginal childbirth	3.4	0.92		
Sexual arousal (Excitement)	Before pregnancy	The caesarian section	4.2	1.01	0.601	
		Vaginal childbirth	4.1	1.02		
	Six months after pregnancy	The caesarian section	4	0.98		0.02
		Vaginal childbirth	3.6	0.96		
	Twelve months after pregnancy	The caesarian section	4.3	1.02		0.27
		Vaginal childbirth	4.07	0.91		
Lubrication	Before pregnancy	The caesarian section	4.7	1.04	0.2	
		Vaginal childbirth	4.9	0.84		
	Six months after pregnancy	The caesarian section	4.8	0.90		0.1
		Vaginal childbirth	4.6	0.90		
	Twelve months after pregnancy	The caesarian section	4.9	0.88		0.6
		Vaginal childbirth	4.8	0.82		
Orgasm	Before pregnancy	The caesarian section	4.8	1.08	0.9	
		Vaginal childbirth	4.8	0.92		
	Six months after childbirth	The caesarian section	4.7	0.01		0.1
		Vaginal childbirth	4.4	0.95		
	Twelve months after childbirth	The caesarian section	4.8	0.91		0.3
		Vaginal childbirth	4.7	0.90		
Pain	Before pregnancy	The caesarian section	4.1	1.28	0.9	
		Vaginal childbirth	4.1	1.19		
	Six months after childbirth	The caesarian section	4.4	1.21		0.2
		Vaginal childbirth	4.1	1.11		
	Twelve months after childbirth	The caesarian section	4.3	1.11		0.3
		Vaginal childbirth	4.5	1.27		
Satisfaction	Before pregnancy	The caesarian section	5.3	0.80	0.2	
		Vaginal childbirth	5.1	0.93		
	Six months after childbirth	The caesarian section	5.1	1.15		0.1
		Vaginal childbirth	4.8	1.17		
	Twelve months after childbirth	The caesarian section	5.1	0.97		0.2
		Vaginal childbirth	4.9	0.94		
Total	Before pregnancy	The caesarian section	27	4.31	0.9	
		Vaginal childbirth	27	4.12		
	Six months after childbirth	The caesarian section	26.8	4.24		0.01
		Vaginal childbirth	24.7	4.45		
	Twelve months after childbirth	The caesarian section	27.5	4.28		0.1
		Vaginal childbirth	26.2	4.29		

higher score in the desire domain. Generally, the overall score of sexual function in the caesarian group was higher than that of the vaginal delivery group, but this difference was not statistically significant.

In addition, multiple logistic regression models were applied to determine the association between the type of delivery with sexual function and its various domains at 6 and 12 months after childbirth. Further, all the significant variables in the Univariate logistic regression model with a  $P < 0.2$  were introduced into a multiple logistic regression model in order to eliminate the potential confounding variables. In the multiple logistic regression model, sexual function and the domain of sexual desire had simultaneously a significant statistical association with the type of delivery at 6 months after childbirth ( $P < 0.05$ ), using the stepwise method (backward stepwise) and after adjusting for the confounders (i.e., age, educational, job, income, infant weight, sex per week, and contraceptive method). In other words, the total score of sexual function in women who had cesarean was 1.14 (95% CI: 1.02-1.27) times higher than those who had natural childbirth at 6 months after childbirth. Further, the score of sexual desire in women who had cesarean was 2.47 (95% CI: 1.15-5.32) times higher than those women who experienced vaginal with episiotomy delivery at 6 months after childbirth (Table 5).

However, using the stepwise method (backward stepwise) and after adjusting for the confounders (i.e., age, educational, job, income, infant weight, sex per week, and contraceptive method), none of the items of the total score of sexual function and its various domains had a significant statistical correlation with the type of delivery at 12 months after childbirth ( $P > 0.05$ ) in the multiple logistic regression model simultaneously (Table 6).

## Discussion

The aim of this study was to evaluate the sexual function of nulliparous women who referred to healthcare centers in Sanandaj during 6 and 12 months after delivery in 2015-2016. The findings of this study are discussed with regard to the changes in sexual function before pregnancy and after childbirth regardless of the mode of delivery and the impact of the type of childbirth on sexual function 6 and 12 months after delivery.

### Changes in Sexual Function Before Pregnancy and After Childbirth Regardless of the Mode of Delivery

In both types of childbirth, a statistically significant reduction was observed in sexual function 6 months after the childbirth.

The sexual activity of postpartum women may be influenced by cultural and social differences, leading to different results in various populations. Rezaei et al concluded that demographic factors including age, education, family income, breast-feeding, and parity were associated with women's sexual functioning (2).

**Table 5.** The Relationship Between the Mode of Delivery With Sexual Function and its Various Domains at 6 Months After Childbirth by Multiple Logistic Regression Model

Domain	OR	95% CI	P Value
Sexual desire	2.47	(1.15- 5.32)	0.02
Sexual arousal (Excitement)	0.91	(0.46- 1.78)	0.78
Lubrication	0.97	(0.45- 2.06)	0.94
Orgasm	1.49	(0.65- 3.38)	0.33
Satisfaction	0.76	(0.42- 1.36)	0.36
Pain	1.18	(0.74- 1.87)	0.47
Total score of sexual function	1.14	(1.02- 1.27)	0.01

OR, odds ratio.

**Table 6.** The Relationship Between the Mode of Delivery With Sexual Function and its Various Domains at 12 Months After Childbirth by Multiple Logistic Regression Model

Domain	OR	95% CI	P Value
Sexual desire	1.50	(0.79-2.84)	0.213
Sexual arousal (Excitement)	0.97	(0.42-2.21)	0.952
Lubrication	0.83	(0.38- 1.81)	0.653
Orgasm	1.08	(0.43-2.71)	0.867
Satisfaction	1.13	(0.53-2.42)	0.744
Pain	1.24	(0.80- 1.94)	0.327
Total score of sexual function	1.10	(0.98- 1.23)	0.07

OR, odds ratio.

Further, several other factors affect women during the postpartum period in both modes of delivery as follows: Physical discomfort, body dissatisfaction, the reduction of physical abilities, fatigue, vaginal dryness during breastfeeding, increased vaginal discharge in the early postpartum period, less comfort due to playing the maternal role, disturbed sleep pattern, contraceptive methods, the lack of privacy due to the presence of the infant (19).

In another study conducted by Ghana et al, breastfeeding, breast changes, maternal fatigue, and child care, were reported as the causes of a change in the sexual relationships of participants during breastfeeding (20).

### The Impact of the Mode of Childbirth on Sexual Function Six Months After Childbirth

Based on the findings of this study, the mean scores of the domains of sexual function in vaginal delivery was lower than the C-section, but statistically significant differences were only found in the FSFI overall score ( $P = 0.01$ ) and the domains of sexual arousal ( $P = 0.02$ ) and desire ( $P = 0.01$ ). The score of sexual desire in women who had caesarean was 2.47 (CI 95%: 1.15-5.32) and the total score of sexual function in women who had caesarean was 1.14 (CI 95%: 1.02-1.27) times higher than those who had vaginal with episiotomy delivery at 6 months after childbirth. It meant that poor sexual function in women with vaginal delivery compared to the women with C-section could be attributed to their lower level of sexual arousal and desire.

In the study conducted by Kahramanoglu et al, the FSFI total scores decreased at 3 and 6 months of postpartum

in vaginal delivery with episiotomy and C-section groups, this difference was statistically significant and in line with the findings of our study. The decrease in FSFI total score in vaginal delivery with mediolateral episiotomy group was greater than the C-section group (4).

In explaining this decline in the vaginal delivery with episiotomy group, Hosseini et al reported that the pressure of the fetus's head during vaginal delivery resulted in damage to the pudendal nerve, which innervated the clitoris, vulva, and perineum. In addition, the hypotonic vaginal muscle reduced the women's ability to achieve orgasm during sexual activity due to vaginal prolapse (21).

Hantoushzadeh et al also found that marital satisfaction in the vaginal delivery group was significantly higher than cesarean delivery on the 40th day, 3rd, 6th, and 12th months after delivery. Further, the reduction in sexual desire in the C-section group was more than the vaginal delivery group (16).

Moghimi Hanjani and Mehdizadeh Tourzani (22) indicated that the mean score of sexual function and sexual satisfaction were significantly higher in normal vaginal delivery with episiotomy at the third and 6th months after delivery when compared to elective C-section group ( $P < 0.001$ ).

Mousavi et al showed that all domains of the quality of life after childbirth in the vaginal childbirth group were higher as compared to the caesarean childbirth group (23).

However, the method of childbirth had no effect on women's sexual function after childbirth in some other studies. It should be noted that in these studies sexual function was mainly evaluated in the sixth month after delivery (24-26).

The results of these studies contradicted the results of our study. In general, it seems that there is controversy among different studies regarding the effect of delivery method on sexual function in the 6th month of the postpartum period and thus it is necessary to perform more studies with higher sample sizes.

### The Impact of the Mode of Delivery on Sexual Function Twelve Months After Childbirth

Sexual desire in the C-section group was higher compared with the vaginal childbirth group and the overall score of sexual function was higher 1.10 (CI 95%: 0.98-1.23) in the C-section group although it was not statistically significant ( $P = 0.07$ ). Unfortunately, a few studies evaluated the sexual function of women in this period. For instance, Hosseini et al. reported no statistically significant differences in the 6 domains of sexual function between both types of delivery 2 years after childbirth (21). In another study by De Souza et al, there was no difference in the total FSFI and the domain scores with the mode of delivery between antenatal assessment and 12 months after delivery (27).

Breastfeeding is one of the factors that effectively reduce the amount of estrogen secretion in the postpartum

period, resulting in the decreased strength of pelvic floor muscle, greater fragility of vaginal muscles, and eventually, dyspareunia (28). Furthermore, it leads to vaginal dryness and a reduction in sexual desire (29, 30).

In our study, no statistically significant differences were found between the groups in both time points in terms of the number of lactating women (94% & 96%). Therefore, breastfeeding cannot justify the changes in women's sexual function between the 2 groups and in both time points of the study.

According to the researchers of this study, vaginal tissue damage during vaginal delivery with episiotomy may have a major role in reducing the women's sexual function in a period of 6 months after childbirth. Perhaps, the partial recovery of the lesions after one year decreases the differences between the groups in terms of the overall sexual function between both types of delivery. However, sexual desire in the cesarean group was still higher compared to the vaginal delivery group at this time point (one year after childbirth).

One of the strengths of our study was its longitudinal design and the evaluation of the outcome in 2 periods of 6 and 12 months after delivery. As mentioned above, there are a negligible number of studies that have examined women's sexual function at a longer period after delivery. Moreover, before the completion of the questionnaire, the participants were completely justified by the reliable midwifery experts who followed them up for a year and a half. Therefore, our participants responded to questions without any shame and with a high degree of confidence.

### Research Limitations

One of the limitations of this study was the high rate of group out from T1 (6 months after delivery) to T2 (12 months after delivery), which had different reasons such as a long interval between T1 and T2, the exclusion of women with moderate to severe depression at T2, and the lack of time for data collection. Another limitation was conducting the study on nulliparous women, which makes it impossible to generalize the results to other women in the postpartum period.

Additionally, the retrospective nature of the data collection using the FSFI may put the data collection at the risk of bias. Therefore, it is suggested that future studies in this field take into account biological, psychological, and environmental factors as well. Eventually, to achieve generalizable and meaningful results, it is necessary to conduct a study with a larger sample size, more time intervals, and the inclusion of multiparous women in the study, and to examine the sexual function of the spouses during the postpartum period.

### Conclusions

Based on the findings, the total sexual function score in cesarean section (C-section) group was better compared

to the vaginal delivery with mediolateral episiotomy group 6 months after delivery. One year after childbirth, women in the C-section group had significantly higher levels of sexual desire as well.

### Conflict of Interests

Authors have no conflict of interests.

### Ethical Issues

This research was approved by the Ethics Committee of Kurdistan University of Medical Sciences under the ethical code of MUK.REC.1391.11 in 2012.

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