

The Relationship between Mode of Delivery and Sexual Function in Nulliparous Women

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ARTICLE INFO	ABSTRACT
<p><i>Article type:</i> Original article</p>	<p>Background & aim: Sexual activity is one of the most important aspects of a marital life. Childbirth is also a major event in the life of women, and the period of postpartum is a time of emotional upheaval. Since women believe that vaginal delivery could negatively affect their sexual function after childbirth, they tend to give birth through caesarean section. Therefore, this study aimed to evaluate the relationship between mode of delivery and sexual function in nulliparous women referred to healthcare centers in Mashhad, Iran.</p> <p>Methods: This correlational study was conducted on 450 nulliparous women, divided into two groups of vaginal delivery and cesarean section in 2014. Subjects were selected via multistage sampling. Data collection tools included Female Sexual Function Index (FSFI), Depression, Anxiety and Stress scale (DASS-21), and Cassidy social support scale. Data was analyzed in SPSS version 16 using Spearman correlation coefficient and Mann-Whitney test, T-test, ANOVA, and Kruskal-Wallis. Moreover, general linear model was used to control confounding variables, and P-value of less than 0.05 was considered statistically significant.</p> <p>Results: Independent t-test results indicated that mean scores of sexual function in two groups of the study were 26.11 ± 4.36 and 26.38 ± 4.41, respectively, which revealed no statistically significant difference between the groups ($P=0.509$).</p> <p>Conclusion: No significant difference was observed between the vaginal delivery and caesarean section groups regarding sexual function. Therefore, it seems that cesarean section does not necessarily lead to pleasing sexual relationships in postpartum period compared to vaginal delivery.</p>
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Introduction

Throughout the history, it has been known that survival of human kind is impossible without the fulfillment of particular prerequisites, including intercourse. According to the viewpoints of researchers, intercourse is the foundation of a family and sexual satisfaction is an important factor for a successful marital life (1). Sexuality is a phenomenon not to be neglected, as similar to other instinctive desires of mankind, it has existed since birth and has evolved in accordance with human development (2-3). Statistics have demonstrated that 19-45% of women suffer

from at least one type of sexual dysfunction (4).

The World Health Organization (WHO) defined sexual health as integrity and harmony between mind, emotion, and body, which pushes an individual to improve the social and intellectual aspects of his/her personality and leads to relationship and love. Therefore, any problem that could lead to inconsistency and sexual satisfaction might cause sexual dysfunction (1, 5, 6). A few factors, such as mental health, sexual relationships, and sexual function of partners, are responsible for the incidence of sexual dysfunction. Other factors

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in this regard might be related to personality, infertility, medications, chronic diseases, gynecological surgery in the pelvic area, gynecologic diseases and malignancies, diabetes, pregnancy, and postpartum period (7).

According to the literature, the overall prevalence of postpartum sexual problems has been estimated at 22-86% (8). Expectant mother might have to cope with significant physical, mental, and emotional changes after delivery. Therefore, it comes with no surprise that sexual health of women could be affected by changes associated with the childbirth (9). Studies have shown that sexual function changes, such as unwillingness to have sexual relations, are common among women and have been estimated at 22%-86%.

In a number of studies, these disorders have been attributed to the mode of delivery or complications during pregnancy (10, 11). A number of studies have suggested that mode of delivery was not associated with start time of intercourse and sexual function (libido, arousal phase, orgasm, and sexual satisfaction) (12). However, in one study, women with cesarean section returned to sexual intercourse earlier compared to women with vaginal delivery (9).

A study was conducted by Mohammadi et al. (2007) to evaluate the favorable mode of delivery in nulliparous women in Tehran, Iran. According to the results, 34.8% of women with cesarean section and 30% of those with vaginal delivery believed that mode of delivery significantly affected their postpartum sexual relations (13). Therefore, since couples believe that vaginal delivery has an adverse effect on the quality of their sexual relations after delivery, they have a higher tendency towards cesarean section. Moreover, women choose cesarean section as a way to prevent perineal trauma and postpartum sexual dysfunction (10).

Evidence suggests that the increase of cesarean sections in the United States of America was estimated at 50% in the past decade, which could be the result of women's concerns about physical changes (in genital tract) caused by vaginal delivery (14). A study in Great Britain demonstrated that 31% of women chose cesarean section to protect their sexual health (15). However, previous studies do not confirm the hypothesis that elective

caesarean section leads to improved sexual function compared to vaginal delivery (16, 17).

The results of a study by Asadzadeh et al. (2011) marked a significant correlation between sexual issues and mode of delivery, with more problems observed in the group of vaginal delivery compared to the cesarean section group ($P=0.039$). On the other hand, Ozgoli et al. (2009) and Heidari et al. (2009) indicted no significant difference between women with vaginal delivery and cesarean section in terms of sexual activity. It seems that various physical and mental factors are involved with sexual function of individuals (10, 18).

A study by Dabiri et al. (2014) was conducted on nulliparous women, the results of which were indicative of no significant relationship between mode of delivery and postpartum sexual function (19). However, in a study by Baksu et al. (2007) on nulliparous women, vaginal delivery (with mediolateral episiotomy) had a significant effect on postpartum sexual function of women (20).

Given the role of sexual function as a crucial factor for strengthening a marriage, and due to the contradictory results of previous studies in this area, this study aimed to evaluate the relationship between mode of delivery and sexual function in women referred to health centers in Mashhad, Iran.

Materials and Methods

This descriptive correlational study was performed on 450 nulliparous women (vaginal delivery: 225, cesarean section: 225) referred to healthcare centers in Mashhad, Iran in 2014. Samples were selected via multistage and available sampling. At first, 14 healthcare centers were randomly selected based on the population covered by one of the five healthcare centers in Mashhad (No. 1, 2, 3, 5, and Samen), and the samples were drawn using the 'lottery' method of selection.

Sample size was calculated based on a pilot study using the formula of comparing the means with 99% confidence interval and 90% test power. Each group at least consisted of 185 cases; however, 225 cases were considered in each group for more accuracy.

Inclusion criteria of this study were: 1) age range of 18-45 years, 2) a healthy singleton neonate, 3) an interval of 12 weeks to six

months after birth, 4) having no other sexual partners, 5) no history of severe diseases and 6) addiction to drugs and alcohol.

Exclusion criteria were as follows: 1) severe or very severe psychological disorders based on the scores of Depression, Anxiety and Stress scale (DASS-21), 2) lack of sexual activity in the last four weeks, 3) obstetric problems during labor, 4) a third or fourth degree perineal tear, 5) intense physical defects in the couples, 6) receiving drug therapy and psychiatrist consultation due to severe mental disorders in the couples, 7) a history of stressful events during the last six months, 8) incomplete responses to questionnaires and 9) unwillingness to cooperate at every stage of the research.

Our researcher referred to the selected healthcare centers after obtaining the ethics committee approval. The objectives of the study were explained to the subjects, followed by receiving written informed consent from the participants prior to study. The DASS-21 questionnaire was completed by eligible mothers after entering the study. Any patient with the score of severe and very severe from the scope of this questionnaire was excluded from the study. Other remaining subjects received demographic questionnaire (e.g., pregnancy, childbirth, and postpartum period), Cassidy social support scale, and Female Sexual Function Index (FSFI) to complete (21). DASS-21 contains 21 items, including stress (seven items), depression (seven items), and anxiety (seven items), which are scored within a range of 0-2.

If the item does not apply for the individual, it is scored zero, and if the item mostly applies for the individual, it is graded with the maximum score of three. If the item sometimes (or most of times) applies for the individual, it is scored one or two points (22). Cassidy social support scale includes seven items and is answered with "yes/not sure/no"; moreover, a score range of zero-two is allocated for each item of this questionnaire. Total score of this scale ranges between 0-14; which signifies poor (0-4), medium (5-9) and satisfactory social support (10-14) (23).

Another research tool of this study was the 19-item questionnaire of Female Sexual Function Index (FSFI) with six subscales (e.g., libido, sexual arousal, vaginal lubrication, orgasm, pain during

intercourse, and sexual satisfaction). In this questionnaire, the possible minimum total score is two, while the maximum score could be 36. In addition, higher scores indicate better sexual function in individuals (24).

The validity of sampling method and demographic questionnaire was confirmed by content validity. Moreover, validity of Persian version of DASS-21 was investigated in Iran by Sahebi et al. using confirmatory factor analysis and criterion validity and through stimulus implementation of Beck Depression Inventory (BDI), Zhang anxiety and Perceived Stress Scales in 2005 (22). The validity of sexual function questionnaire was confirmed by Rosen (2000) and by Mohammadi (2008) in Iran (21, 24); meanwhile, its reliability was approved using Cronbach's alpha ($r=0.88$).

On the other hand, the reliability of Cassidy social support scale was generally confirmed by Cassidy (1996) and specifically by Karke Abadi (1998) in Iran (25, 26). Reliability of the obstetric-demographic questionnaire was determined using the test-retest method at a one-week interval, and agreement coefficient was calculated for each question, with the minimum and maximum coefficient agreement of 0.71 and 1.00, respectively. The reliability of DASS-21 and Cassidy social support scale was confirmed using Cronbach's alpha ($r=0.87$) and ($r=0.70$), respectively.

Data analysis was performed in SPSS version 16 using Spearman correlation coefficient and Mann-Whitney U and T-test. In addition, Kruskal-Wallis test was used for comparison of the groups with more than two states. However, a Bonferroni-corrected Mann-Whitney U test was subsequently applied for pairwise comparison. Moreover, general linear model was used to control confounding variables, and P-value of less than 0.05 was considered statistically significant.

Results

In this study, the subjects of both vaginal delivery and cesarean section groups were homogenous in terms of educational level (both the participants and their spouses), occupational status (both the participants and their spouses), housing condition, physical condition of the house (e.g., separated bedrooms for children, living with other people in addition to the spouse, and calm environment during intercourse),

income status, planned pregnancy, feeding mode of neonates, and contraceptive methods.

In terms of educational level of the samples, 4.9% of the subjects had elementary or less education, while 13.8%, 46.9%, and 34.4% had secondary, high school, and university educational levels. Among the participants, 400 (88.9%) were housewives, 30 (6.7%) were employed, and 20 (4.4%) were university students. Mean age of the subjects in the vaginal delivery group was 24.35±4.12 years, while it was 25.27±4.24 years in the cesarean section group, which was indicative of a statistically significant difference between the groups (P=0.024, Z=-2.26).

The results of independent t-test and Mann-Whitney U demonstrated that mean score of FSFI and its components were not significantly different in the study groups (Table 1).

Other variables in the two groups were evaluated to identify the confounding variables in evaluation of the relationship between sexual function and mode of delivery. The results indicated that based on Mann-Whitney U test, no significant difference was observed between the groups in terms of the onset of sexual activity after delivery (P=0.604). In addition, the results of Mann-Whitney U were indicative of no significant difference between the groups regarding the responses of the samples to the question "sexual satisfaction compared to pre-pregnancy" (P=0.851).

Meanwhile, the results of Mann-Whitney U marked a significant difference between the vaginal delivery and cesarean section groups

regarding duration of menstruation bleeding, with a higher rate of bleeding observed in cesarean section group compared to the other group (P=0.037). According to the results, mean score of social support was 11.08±2.78 in the vaginal delivery group and 11.12±3.07 in the cesarean section group, and Mann-Whitney U test revealed no significant difference between two groups in this regard (P=0.398). However, family support was higher in the cesarean section group compared to the vaginal delivery group (P=0.049). In addition, the results of this test suggested no significant difference between the study groups regarding depression (P=0.778), anxiety (P=0.885), and stress (P=0.089).

With regard to mean onset of menstruation after childbirth (P=0.534) and mean duration of sleep per day (P=0.248), no significant difference was found between the groups. Moreover, mean score of FSFI was significantly different between the samples in terms of occupational status of spouse, calm environment during intercourse, and need for consultation about sexual issues (Table 2). According to the results of ANOVA test, sexual function was higher in women with employed spouses compared to other women (P=0.009).

In the paired comparison of the groups, the results of Mann-Whitney U test marked a significant difference regarding sexual function between women with worker spouses compared to women with employed or self-employed spouses; however, the difference was not significant in other cases. According to the findings

Table 1. Mean score of sexual function of the research units based on mode of delivery

Variables	Groups		Test results	
	Vaginal delivery	Cesarean section		
Sexual function	26.11±4.36	26.38±4.41	t= -0.66	P=0.509(b)
Libido	3.60 (1.20)	3.60 (1.20)	Z= -0.47	P=0.638 (a)
Sexual arousal	3.90 (1.20)	4.20 (1.50)	Z= -1.71	P= 0.087(a)
Vaginal lubrication	4.80 (1.50)	5.10 (1.50)	Z= -1.87	P=0.062(a)
Orgasm	4.80 (1.60)	4.80 (1.60)	Z= -0.11	P=0.913(a)
Satisfaction	5.20 (1.20)	5.20 (1.20)	Z= -0.19	P=0.846(a)
Pain	4.00 (1.20)	4.00 (1.60)	Z= -0.22	P=0.827(a)

(a)Non-normal variables with median (interquartile range)

(b)Normal variables with Mean±SD

Table 2. Mean and standard deviation of sexual function with variables of husband's job, peace during intercourse, need for consultation about sexual issues, and onset of menstruation after delivery in the subjects

Variables	N (%)
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Occupational status of the spouse		
Worker	89 (19.8%)	24.85±4.82
Employee	104 (23.1%)	26.64±4.90
Self-employed	246 (54.7%)	26.95±3.93
Student	7 (1.6%)	25.66±2.25
ANOVA test results	3.918	P=0.009
Calm environment during intercourse		
Yes	308 (68.4%)	27.24±3.93
No	33 (7.3%)	23.06±5.79
Slightly calm	109 (24.2%)	
ANOVA test results	30.066	P<0.001
Need for consultation about sexual issues		
Yes	143 (31.8%)	24.31±4.94
No	307 (68.2%)	27.14±3.77
Independent t-test result	44.876	P<0.001
Onset of menstruation after delivery		
Yes	260 (58.8%)	26.70±4.11
No	190 (42.2%)	25.61±4.66
Independent t-test result	6.932	P=0.009

of ANOVA and Mann-Whitney U tests, better sexual function was observed in the subjects with calm environment during intercourse compared to the other participants ($P<0.001$).

Sexual function had no significant difference between subjects with and without a calm environment during intercourse. Based on the findings of independent t-test, need for consultation about sexual issues was associated with low score of sexual function ($P<0.001$). This test also revealed an association between sexual function and onset of menstruation after delivery. Therefore, women who experienced the onset of menstruation after childbirth had better sexual function scores compared to the other participants ($P=0.009$) (Table 2).

Spearman's rank correlation coefficient was applied to evaluate the relationship between sexual function and quantitative or ranked variables of the studied samples. The results indicated that sexual function had an inverse association with the influencing factors involved with the effect of delivery on sexual relations ($P<0.001$, $r=-0.344$), the effect of childcare on sexual relations ($P<0.001$, $r=-0.167$), anxiety ($P<0.001$, $r=-0.216$), depression ($P<0.001$, $r=-0.358$) and stress ($P<0.001$, $r=-0.232$). In addition, sexual function had a positive and significant linear correlation with the variables of housing condition ($P=0.002$, $r=0.146$), income status ($P=0.005$, $r=0.133$), social support ($P<0.001$,

$r=0.265$), family support ($P<0.001$, $r=0.315$), frequency of intercourse during the last four weeks ($P=0.001$, $r=0.157$), and sexual satisfaction compared to before the pregnancy ($P<0.001$, $r=0.376$).

General linear model was also used to evaluate the effects of all variables on sexual function, and backward method was used to modify the model. By controlling other confounding variables, sexual function demonstrated no significant difference in the two groups of cesarean section and vaginal delivery ($P=0.56$). The effects of other confounding factors for sexual function in the simultaneous model are presented in Table 3. Meanwhile, significantly lower sexual function scores were observed in the samples with calm environment during intercourse compared to the other subjects. It seems that the greater the interval between delivery and first intercourse, the lower the sexual function score.

Nevertheless, a better sexual function score was observed in the participants with previous higher sexual satisfaction. In addition, there was a significant adverse relationship between sleep duration and sexual function in the participants. With regard to need for sexual consultation, those who did not need consult had better sexual function scores compared to those with need for sexual consultation. Moreover, lower

Table 3. Evaluation of effect of variables on sexual function using general linear mode

Variables	Beta-coefficient	Coefficient standard error	r	P-value
Mode of delivery				
Vaginal delivery (reference)				
Cesarean section	0.20	0.34	0.58	0.561
Calm environment during intercourse				
Yes (reference)				
No	-2.99	0.68	-4.41	<0.001
Slightly	-1.40	0.42	-3.35	<0.001
The number of days from delivery to onset of intercourse	-0.05	0.01	-4.32	<0.001
Satisfaction of sexual function compared to before delivery				
Very low (reference)				
Low	1.74	0.60	2.91	0.004
No difference	3.08	0.60	5.10	<0.001
High	3.48	0.76	4.61	<0.001
Very high	6.25	1.69	3.69	<0.001
Sleep duration per day	-0.19	0.08	-2.35	0.019
Need to advice about sexual matters				
Yes (reference)				
No	1.44	0.38	3.79	<0.001
Depression	-0.36	0.05	-6.96	<0.001
Constant	26.61	1.22	21.79	<0.001

significance of regression: P<0.001

Adjusted R Square=0.347

sexual function score was observed in depressed women of the study.

Discussion

According to the results of the present study, no significant relationship was observed between mode of delivery and postpartum sexual function of the participants. The results of studies by Heydari (2009), Ozgoli (2009), Baghdari (2012), and Dabiri (2014) revealed no significant relationship between sexual issues and delivery mode. Therefore, sexual function cannot be affected by mode of delivery (10, 18-19, 27), which was consistent with our findings. In a study by Asadzadeh (2011), a significant relationship was found between sexual issues before and after vaginal delivery and cesarean section, with higher rate of sexual problems in the vaginal delivery group compared to the other group (28).

Moqimi (2012) demonstrated that total mean scores of the participants were improved in women with vaginal delivery compared to cesarean section group, and a significant difference was observed between the two groups in terms of mode of delivery (29). It is worth mentioning that both of the aforementioned studies were inconsistent with

the present study, which might be due to different inclusion criteria and research units. A prospective study was performed by De Souza (2015), in which no significant difference was found between the sexual function scores of the study groups (e.g., cesarean section, vaginal delivery, and assisted vaginal delivery) before and 12 months after delivery (30); however, these results were not in line with our findings.

Eid (2015) conducted a cohort study to evaluate the effects of delivery mode on sexual function after childbirth in nulliparous women. The results were indicative of a statistically significant difference between the mean scores of sexual function in the participants 12 weeks after delivery compared with before the delivery. The results suggested that the score of libido was decreased in the cesarean section group, while the scores of libido, arousal, and vaginal lubrication were significantly reduced in the vaginal delivery group compared to before the delivery (31).

According to the results of the current research, no statistically significant difference was observed between sexual function score and its components in both groups after delivery. In addition, mode of delivery had no affect on sexual function, which is not in

congruence with the results obtained by Eid (2015). This discrepancy might be due to the fact that sexual function was assessed before and after delivery in the study by Eid, while sexual function was assessed only after delivery in the present study.

In a prospective longitudinal study by Chang (2015), higher prevalence of depression, lower sexual satisfaction, and higher scores of libido were reported in the cesarean section group compared to the vaginal delivery group (32); nevertheless, these findings were not in accordance with our results. This lack of consistency could be due to differences in methodology and research tools of the studies.

Inconsistent with our results, Sepehrian (2012) indicated a significant correlation among the variables of sexual function, stress, and anxiety (33). In addition, no significant difference was observed between the vaginal delivery and caesarean section groups regarding the scores of depression, anxiety, and stress. In another study by Nickpour (2012), it was revealed that mean depression score was not significantly different at two and eight weeks after delivery (34). However, Hadizadeh (2003) reported that mean depression score was higher in the cesarean section group compared to the vaginal delivery group, which might be due to stress for surgery (35).

Buhling et al. (2006) conducted a study on nulliparous women divided into four groups: 1) vaginal delivery with episiotomy or perineal laceration, 2) vaginal delivery without episiotomy or perineal laceration, 3) cesarean section and 4) assisted vaginal delivery. The results indicated that 47% of women started their sexual activity after eight weeks of delivery, and no significant difference was observed between the onset of sexual activity and mode of delivery in the groups (36).

In our investigation, evaluation of the onset of sexual activity after delivery revealed no significant difference between the groups. However, in a study by Lurie et al. (2013), women were randomly divided into five groups as follows: 1) vaginal delivery with episiotomy, 2) vaginal delivery without episiotomy, 3) assisted vaginal delivery, 4) planned emergency cesarean section, and 5) elective cesarean section. The results of the mentioned study

suggested that mean onset of sexual activity was earlier in the vaginal delivery group with and without episiotomy compared to other groups, and the difference was statistically significant ($P=0.013$) (37). Safarinejad et al. (2009) evaluated the relationship of the delivery mode with variables of sexual dysfunction and quality of life of women and their spouses. However, the results were indicative of a lower sexual function score in women with vaginal delivery and emergency cesarean section compared to those with planned cesarean section.

According to the results of this study, women with planned cesarean section experienced less pain at their first intercourse after delivery, while women with vaginal delivery experienced discomforting pain during the first sexual activity ($P=0.001$) (38). A previous study was conducted by Gungor et al. (2007) on nulliparous women with vaginal delivery (with mediolateral episiotomy) and cesarean section. According to the results, the prevalence of sexual dissatisfaction was 4.4% in the cesarean delivery group, while it was 14.6% in the vaginal delivery group, and no significant difference was observed between the two groups in this regard (39). However, the findings of the mentioned study were in line with the present study. Inconsistent with our results, higher perceived social support was observed in women with cesarean section in a study by Chen (2002) (40). Even though no significant difference was found between the two groups of this study in terms of social support, family support was higher in the cesarean section group compared to the other group. This lack of consistency in results might be due to differences in research units and tools of the studies.

The main objective of this study was to evaluate the effect of mode of delivery on sexual function. Among the key limitations of this study were cultural issues, including lack of confidence to respond and discuss sexual issues, which was controlled through justifying the research subjects. In addition, no sexual function baseline was determined in the subjects before pregnancy. However, a history of sexual disorders was orally obtained, and samples with any problem were excluded from the study.

Conclusion

The results of this study indicated that mean scores of sexual function and its components were not significantly different in women with vaginal delivery and cesarean section. Therefore, it seems that selection of cesarean delivery due to desirable sexual relations after delivery was not justified. Given the importance of sexual function in marital life, it is recommended that educational programs be conducted by midwives and healthcare providers in order to provide appropriate information to couples, and consequently reduce the tendency of women towards caesarean section.

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Conflicts of interest

There is no conflict of interest

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