

Effects of pregnancy on sexual function

Findings from a survey of Saudi women

Sharifa A. Alsibiani, MBBCH, ABOG.

ABSTRACT

الأهداف: تقييم الوظيفة الجنسية أثناء فترة الحمل للنساء السعوديات.

الطريقة: أجريت الدراسة في مستشفى جامعة الملك عبد العزيز، جدة، المملكة العربية السعودية، (مستشفى مرجعية طبية وتعليمية) حيث شاركت في هذه الدراسة 454 سيدة سعودية نشطة جنسياً، منهن 221 سيدة حامل، و233 غير حامل، أثناء زيارتهن لعيادة النساء والولادة، في الفترة ما بين مايو وأكتوبر 2011، حيث أُجبن على النسخة العربية من الاستبيان الخاص بمؤشر الوظيفة الجنسي للإناث (FSFI). وبعد حساب المجموع العام للمؤشر والمؤشر الفردي للرغبة والاستثارة، الترطيب، النشوة، والإشباع والألم. تمت مقارنة بين المجموعتين الحوامل وغير الحوامل وذلك للمجموع العام للمؤشر والمؤشرات الفردية لمراحل الحمل الثلاثة.

النتائج: لا توجد فروق يعتد بها إحصائياً بين المجموعتين في المؤشر الوظيفي الجنسي للإناث (FSFI) سواء المؤشر الفردي أو الكلي. ومع ذلك تبين في مجموعة الحوامل عند مقارنة مراحل الحمل الثلاثة (كل الثلث بالآخر) من فترة الحمل أن هناك انخفاضاً يعتد به إحصائياً للمؤشر الفردي والكلي مع تقدم الحمل.

الخاتمة: لا توجد هناك أي اختلاف في مؤشرات القياسية للوظيفية الجنسية بين النساء السعوديات الحوامل وغير الحوامل. ومع ذلك أظهرت الأرقام القياسية للوظيفة الجنسية انخفاضاً ملحوظاً مع مرور الوقت أثناء الحمل عند الحوامل. وقد يكون هناك حاجة لإقتراح مستوى مؤشر قطعي معدل للتشخيص العجز الجنسي لنساء السعوديات.

Objective: To assess sexual function during pregnancy in Saudi women.

Methods: We recruited 454 sexually active Saudi women (221 pregnant women, and 233 non-pregnant women) from the antenatal and gynecological clinics

of King Abdulaziz University Hospital in Jeddah, Saudi Arabia, a tertiary referral university hospital, between May and October 2011. Participants were asked to complete an Arabic version of the Female Sexual Function Index (FSFI) questionnaire. This questionnaire assesses all the major domains of sexual dysfunction: desire, arousal, lubrication, orgasm, satisfaction, and pain. The overall FSFI scores, and those for each domain, were calculated for the pregnant and non-pregnant women. The scores were compared between pregnant and non-pregnant women, as well as among women in each trimester of the pregnancy.

Results: The pregnant and non-pregnant women did not differ significantly in any of the 6 domains of the FSFI or in the overall scores. However, among the pregnant group, FSFI scores in each domain and overall scores decreased progressively from each trimester of pregnancy to the next. In general, FSFI scores were lower in our sample, as compared with those found in other populations in previous studies.

Conclusion: There are no differences in indices of sexual function between pregnant and non-pregnant Saudi women. However, indices of sexual function show significant declines over time during pregnancy. A modified FSFI cutoff score for diagnosis of sexual dysfunction in Saudi women may be needed.

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From the Department of Obstetrics and Gynecology, Faculty of Medicine, King Abdulaziz University, Jeddah, Kingdom of Saudi Arabia.

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Address correspondence and reprint request to: Dr. Sharifa A. Alsibiani, Department of Obstetrics and Gynecology, Faculty of Medicine, King Abdulaziz University, PO Box 122413, Jeddah 21332, Kingdom of Saudi Arabia. E-mail: sharisibiani@yahoo.com

Sexuality is a major quality-of-life issue. According to the World Health Organization, “sexuality is an integral part of the personality of every human being and full development of sexuality is essential for individual, interpersonal, and societal wellbeing.”¹ Female sexual dysfunction (FSD) is a disorder characterized by decreased sexual desire, arousal, lubrication, satisfaction, and frequency of orgasm, and by the presence of pain associated with intercourse, resulting in significant personal distress.² Female sexual dysfunction is a common, worldwide problem, with widely varying estimates of prevalence from 15.7-93.4% of all women.³⁻¹⁵ Sexual dysfunction is more prevalent in women than in men.⁴ Despite this fact, FSD has not been studied as extensively as male sexual dysfunction.² Female sexual dysfunction is multifactorial in etiology, and is associated with numerous diseases and physiological conditions such as pregnancy.² Pregnancy induces physiological and psychological changes that affect almost every system in the female body. In addition, the psychological changes caused by pregnancy may be complicated by social and cultural influences. Taken together, these factors can significantly affect sexual function.¹⁶ For instance, avoiding sexual intercourse during pregnancy, due to the fear of its effects on the woman or the fetus, may lead to tension in the relationship between the parents.¹⁷ Several studies have attempted to explore sexual activity during pregnancy and the possibly interrelated factors that affect it.¹⁸ Despite the different methods and definitions used to evaluate FSD during pregnancy, most studies have reported an association between pregnancy and sexual dysfunction. Hormonal changes, such as increased levels of estrogen, progesterone, and prolactin, are considered responsible for nausea and vomiting, breast tenderness, weight gain, anxiety, and fatigue, which may be collectively responsible for the impaired arousal and sexual desire.¹⁹ In addition, erroneous beliefs that intercourse is associated with adverse events such as fetal injury, bleeding, infection, and onset of preterm labor, may also drive women to avoid sexual relations during pregnancy. These beliefs are more prevalent among certain cultures and social

classes.²⁰⁻²² Serati et al¹² reviewed the studies that addressed female sexual function during pregnancy published from 1960 to 2009. Their conclusion was that female sexual function undergoes a significant global decline during pregnancy, particularly during the third trimester. Further, a meta-analysis of studies¹⁷ on sexual activity during pregnancy demonstrated that coital activity declines during the first trimester, shows variable patterns in the second trimester, and declines sharply in the third trimester of pregnancy. However, all studies evaluated in this meta-analysis were conducted prior to the development of objective measures of female sexual function.

Many tools have been developed to assess female sexual function. Some focus on a particular population or aspect of female sexual function, such as hypoactive sexual desire disorder in postmenopausal women.²³ However, no instrument has been specifically designed to evaluate sexual function during pregnancy. The Female Sexual Function Index (FSFI) developed by Rosen et al in 2000²⁴ is the most reliable and valid tool for assessing female sexual function.¹¹ Despite growing interest in the study of changes in female sexuality during pregnancy, and the postpartum period, the data on female sexual function from the Arab world are scarce. The few studies on female sexual function have been conducted in Arab nations such as Egypt, Jordan, and Saudi Arabia.^{6,7,11,13-15,25} The rarity of studies related to sexual function in the Arab world, particularly in women, can largely be attributed to the conservative attitude of the Arab culture toward sex. We believe that this attitude tends to be more pronounced during pregnancy among Saudi women; however, objective data are lacking. We conducted a comprehensive thematic literature review to get a clear understanding of the existing literature in this field. Previous research was sourced from an online search of databases, using “female sexual function,” “female sexual dysfunction,” “Saudi pregnant,” “Saudi women,” “FSFI,” “FDS,” and so forth, as key words. However, our review yielded no studies on sexual function among pregnant Saudi women. The lack of data on this population makes it difficult for health care professionals to provide appropriate guidance in relation to sexual activity during pregnancy. To address these issues, we performed the present study to evaluate sexual function among pregnant Saudi women by using the FSFI.

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Methods. We recruited 454 healthy, sexually active women, between May and October 2011, from the antenatal and gynecological clinics at King Abdulaziz University Hospital in Jeddah, Saudi Arabia, a referral

center for the western part of the Kingdom. The exclusion criteria included past or present psychological disorders, medical/obstetric conditions that make sexual intercourse inadvisable (for example, placenta previa, antepartum hemorrhage, threatened preterm labor, and severe cardiac disease), non-Saudi nationality, unstable marital relationship, and illiteracy. The Institutional Review Board at King Abdulaziz University Hospital approved this study. Each woman who agreed to take part in this project, was asked to sign a form indicating informed consent, after the objective of the study was explained to her. Each participant was asked to complete a specially prepared questionnaire that collected demographic data as well as information regarding sexual activity. The author's phone number was included in the questionnaire to enable the patient to contact her, as needed, with any questions or concerns.

For the purpose of this study, we decided to use the FSFI questionnaire²⁴ developed by Rosen et al in 2000, to assess sexual function in our sample. This tool was chosen not only because it is the most commonly used tool to assess female sexual function, but also because it is the most well-validated one. Several validation studies^{11,26-31} have shown that the FSFI is highly reliable and valid. This index was also selected because its contents are not overly sexually explicit, making it suitable for use in study populations with conservative sexual morals, such as Saudi women. The FSFI is a multidimensional self-report instrument that measures 6 domains of FSD: desire, arousal, lubrication, orgasm, satisfaction, and pain. It has been translated into more than 20 languages. This instrument has become the gold standard in assessment of female sexual function, and an indispensable tool in FSD clinical research.¹¹ The Arabic language version of the FSFI consists of 19 questions that address the same 6 domains, with 2 questions on desire (questions 1 and 2), 4 on arousal (questions 3-6), 4 on lubrication (questions 7-10), 3 on orgasm (questions 11-13), 3 on satisfaction (questions 14-16), and 3 on pain (questions 17-19). Questions one, 2, 15, and 16 were scored on a 1-5 scale, and all other questions were scored on a 0-5 scale. The score for each domain was obtained by adding the individual items of the domain and multiplying this result by the domain factor (namely, 0.6 for desire, 0.3 for arousal and lubrication, and 0.4 for orgasm, satisfaction, and pain). The total FSFI score was calculated by taking the sum of the 6 domains. Full-scale scores ranged from 2 to the maximum possible score of 36, with higher scores reflecting better sexual functioning. Wiegand, Meston, and Rosen²⁷ cross-validated the FSFI and established a cutoff score that could be used in clinical settings.

Based on their recommendations, a total FSFI score of less than 26.55 was used as a cutoff value to identify potential sexual dysfunction.

All statistical analyses were performed using the Statistical Package for Social Sciences for Windows version 16.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics, including mean (\pm standard deviation) and range were presented for continuous variables. The mean values were compared between pregnant and non-pregnant groups using the *t* test. The one-way analysis of variance (ANOVA) and post-hoc tests (the Bonferroni test) were used to compare scores between groups of participants in their first, second, and third trimesters of pregnancy. The observed frequency of each value in each participant group was presented for categorical variables. The frequencies of categorical variables in each group were compared using the chi-square (χ^2) test. Results that yielded *p*-values of less than 0.05 were considered statistically significant. The main outcome measures were the individual domain scores and the overall score or full-scale score of the FSFI for the pregnant and non-pregnant women.

Results. Survey data were collected from 454 women: 221 sexually active pregnant women and 233 sexually active non-pregnant women. At the time of enrollment, 56 (25.3%) of the pregnant women were in the first trimester of pregnancy, 95 (43%) were in the second trimester, and 70 (31.7%) were in the third trimester. The mean age of participants was 30.2 ± 6.1 (95% confidence interval [CI]: 29.6-30.8) years, with a range of 18-45 years. Participants' mean age at first sexual contact was 22.1 ± 4.1 (95% CI: 21.4-22.2) years, with a range of 13-40 years. The mean for parity was 2.6 ± 2.1 (95% CI: 2.4-2.8), with a range of 0-12. Spontaneous vaginal delivery had occurred in the previous pregnancy for 77% of the participants. Most (89.9%) participants were educated up to the high school level or above. The pregnant and non-pregnant participants did not differ significantly in age at enrollment in the study ($p=0.228$), age at first sexual contact ($p=0.069$), parity ($p=0.081$), rate of employment ($p=0.113$), or proportion possessing higher education ($p=0.092$). No statistically significant differences were observed in the individual domain scores (desire, arousal, lubrication, orgasm, satisfaction, or pain) between the pregnant and non-pregnant participants (Table 1). Similarly, there was no significant difference in the mean full-scale score between pregnant (24.6 ± 4.7) and non-pregnant (24.6 ± 5.2) participant groups ($t=0.122$, $p=0.903$). Both, the full-scale score, and the scores on all 6 of the individual domains, differed significantly among pregnant participants in each of the

Table 1 - Comparison of mean Female Sexual Function Index (FSFI) full-scale and domain scores between pregnant and non-pregnant participants.

FSFI domain (mean ± SD)	Pregnant (cases) n = 221	Non-pregnant (controls) n = 233	Mean difference (95% confidence interval)	t, p-value	Total sample N = 454
Desire	3.4 ± 1.0	3.6 ± 1.1	0.16 (0.03-0.36)	1.7, 0.096	3.5 ± 1.1
Arousal	3.8 ± 1.0	4.0 ± 1.1	0.16 (0.04-0.36)	1.6, 0.111	3.9 ± 1.1
Lubrication	4.2 ± 1.0	4.0 ± 1.1	0.16 (0.02-0.36)	1.7, 0.087	4.1 ± 1.1
Orgasm	4.4 ± 1.1	4.2 ± 1.2	0.13 (0.08-0.34)	1.2, 0.226	4.3 ± 1.1
Satisfaction	4.9 ± 1.2	4.7 ± 1.3	0.26 (0.03-0.49)	2.3, 0.224	4.8 ± 1.2
Pain	3.9 ± 1.1	4.1 ± 1.2	0.18 (0.04-0.40)	1.6, 0.103	4.0 ± 1.2
Full-scale score	24.6 ± 4.7	24.6 ± 5.2	0.06 (0.86-0.97)	0.12, 0.903	24.6 ± 5.0

Table 2 - Comparison of mean Female Sexual Function Index (FSFI) full-scale and domain scores among pregnancy trimesters.

FSFI domain (mean ± SD)	Trimester 1 n = 56	Trimester 2 n = 95	Trimester 3 n = 70	F, p-value	Total sample N = 221
Desire	3.9 ± 0.9	3.2 ± 1.1	3.2 ± 0.9	8.311, 0.0005	3.4 ± 1.0
Arousal	4.3 ± 1.0	3.7 ± 1.7	3.7 ± 0.8	6.768, 0.001	3.8 ± 1.0
Lubrication	4.6 ± 1.1	4.2 ± 1.0	4.0 ± 0.8	6.423, 0.002	4.2 ± 1.0
Orgasm	4.8 ± 0.9	4.2 ± 1.3	4.2 ± 0.9	7.370, 0.001	4.4 ± 1.1
Satisfaction	5.4 ± 0.9	4.8 ± 1.3	4.8 ± 1.1	5.512, 0.005	4.9 ± 1.2
Pain	4.2 ± 1.0	3.9 ± 1.2	3.6 ± 1.1	5.450, 0.005	3.9 ± 1.1
Total score	27.2 ± 4.1	24.0 ± 5.2	23.5 ± 3.5	12.406, 0.0005	24.6 ± 4.7

3 trimesters of pregnancy. The mean full-scale score declined progressively from each trimester to the next (Table 2). Post-hoc tests (the Bonferroni test) showed significant differences in the full-scale score between the participants in the first and second trimester ($p=0.0005$), and those in the first and third trimester ($p=0.001$). In contrast, no significant difference was found between full-scale scores of participants in the second and third trimesters ($p=0.936$). We investigated the prevalence of sexual dysfunction among women in the pregnant and non-pregnant groups, based on the total FSFI scores, using the recommended clinical cutoff of 26.55,²⁷ as well as a more inclusive cutoff of 28.1 as recommended in a study with non-pregnant women.¹¹ More than 60% of both pregnant and non-pregnant women were categorized as potentially having sexual dysfunction using the lower threshold of 26.55 (138/221, 62.4% of pregnant women; 147/233, 63.1% of non-pregnant women; 285/454, 62.8% of all women; $\chi^2=0.02$, $df=1$, $p=0.887$). When the higher cutoff of 28.1 was used, more than 70% of women in both groups were categorized as potentially having sexual dysfunction

(frequency [f]=163, 73.8% of pregnant women, $n=221$; $f=167$, 71.7% of non-pregnant women, $n=233$; $f=330$, 72.7% of all women, $N=454$; $\chi^2=0.24$, $df=1$, $p=0.619$).

Discussion. Both sex and pregnancy are important issues in a woman's life. Sexual functioning in women has a complex etiology that is determined by physiological, psychological, cultural, and ethical factors.¹² Only a few studies have used the FSFI to evaluate sexual function in pregnant women.^{10,32-34} In 2005, a prospective study published by Aslan et al³² evaluated the sexual health of 40 women during their pregnancies and reported significant decreases in all domains of the FSFI during pregnancy, especially during the later phases of the pregnancy. Moreover, the authors noted that the average frequency of intercourse during the last 4 weeks before pregnancy was 8.6 ± 3 , as compared with 6.9 ± 2.5 during the first, 5.4 ± 2.6 during the second, and 2.5 ± 1.4 during the third trimesters of pregnancy. In 2007, Pauls et al³³ performed a longitudinal study using the FSFI questionnaire with a cohort of 107 women to evaluate the changes in sexual function throughout pregnancy

and after childbirth. Their findings were consistent with those of similar studies, showing a significant reduction in FSFI scores from the first to the third trimesters.

Similarly, in 2009, Leite et al³⁴ conducted a cohort study in which the sexual function of 271 healthy pregnant women was evaluated using the FSFI, with a cutoff score of 26. They concluded that sexual function is affected by pregnancy, finding a significant decrease in all the FSFI domains during the third trimester in both pregnant teenagers as well as adults. Rates of FSD were high during pregnancy, and reached the highest levels during the third trimester in both the age groups. Sexual dysfunction among pregnant teenagers was rated 40.8% in the first trimester, 31.2% in the second, and 63.2% in the third. For pregnant adults, the dysfunction was rated 46.6% in the first trimester, 34.2% in the second, and 73.3% in the third.

In 2010, Kerdarunsuksri et al¹⁰ conducted a cross-sectional study of 347 healthy, pregnant Thai women aged 14-42 years, who attended an antenatal clinic. The FSFI questionnaire was used to assess their sexual function. The mean total FSFI score among the study participants was 15.49, and 93.4% of them had an FSFI score of less than 26.55, indicating potential sexual dysfunction. The pregnant women showed a significant decrease in all domains of the FSFI, including full-scale scores between the first and third trimesters. The authors concluded that the low mean overall FSFI score of the participants might be a result of differences in cultural attitudes toward sex, as compared with those found in the West. Hence, they concluded that the recommended clinical cutoff score of 26.55²⁷ may be inappropriate for use in Thai women.¹⁰

In the present study, we attempted to use the FSFI with pregnant women in Saudi Arabia. We found no statistically significant differences between pregnant and non-pregnant women in desire, arousal, lubrication, orgasm, satisfaction, pain, or overall sexual function (Table 1). Our findings apparently contradict those from other published studies, which have consistently found an association between pregnancy and sexual dysfunction. However, when FSFI domain scores and total scores were compared between each trimester of pregnancy (Table 2), significant differences were found in the mean scores on all domains and the mean full-scale score, which declined from one trimester to the next. These findings are consistent with those reported in other studies.^{10,32-34}

As noted earlier (Table 1), the mean full-scale scores of pregnant and non-pregnant participants were the same (24.6). These averages for both groups of women were below the suggested cutoffs for diagnosis of sexual

dysfunction in both Western (<26.55),²⁷ and Egyptian populations (<28.1).¹¹ A diagnosis of sexual dysfunction could be made in more than 60% of participants using a cutoff score of 26.55, and could be made in more than 70% if a cutoff of 28.1 is used. This may indicate either a truly high prevalence of sexual dysfunction among Saudi women or the inappropriateness of these cutoff values (based on Western and Egyptian populations) for the Saudi population.

Prior to the present study, no other studies had determined an appropriate cutoff score to diagnose sexual dysfunction using the FSFI in Saudi women. Only one previous study had used the FSFI in Saudi Arabia; however, this study investigated the effects of female genital mutilation on sexual function, and most participants in that study were residents of neighboring countries.²⁵ Saudi women may have different cultural attitudes toward sexuality than Western women or those from other Arab nations, such as Egypt. As the present study found lower mean FSFI scores than previous studies in other populations, we recommend conducting a large-scale study including a cross-section of Saudi women to determine an appropriate cutoff score for identifying sexual dysfunction in Saudi women using the FSFI.

Although we believe this study contributes valuable information to the study of sexual function in women, it also presents several limitations. The participants consisted solely of women who attended outpatient clinics of a tertiary center. Thus, our sample may not be representative of the Saudi population, although the attendees of this teaching center represented different social classes. In addition, the Jeddah region, where this hospital is situated, comprises a mixed population from various parts of Saudi Arabia. Nevertheless, a community-based sampling approach may result in a more representative sample. However, given the sensitive nature of this topic, such a sampling method may not be feasible. Further, Saudi women are not inclined to talk about their sexual habits or behavior, and many taboos persist in this population. Therefore, we were forced to restrict our assessment of the sexual activities of women, to those who participated voluntarily in this study.

Finally, the present study did not include data on the sexual interest and function of male partners, which may have an additional adverse impact on sexual function in pregnant women.³⁵ It is recommended that future studies should avoid these deficiencies, in order to enhance the understanding of the issue of sexual dysfunction in pregnant women and achieve an accurate assessment of this problem in the Saudi population. Further, a different cutoff score may be proposed for

evaluation and diagnosis of sexual dysfunction in Saudi women using the FSFI.

In conclusion, there are no differences in indices of sexual function between pregnant and non-pregnant Saudi women. However, indices of sexual function show significant decline over time during pregnancy.

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