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Examination of the change in sexual functions and anxiety as the pregnancy progresses and the effect of nulliparity on this change

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ABSTRACT

OBJECTIVE: The objective of the study is to examine the sexual functions and anxiety levels of the same pregnant women during the three periods of pregnancy, and to observe how they change between trimesters and also the effect of nulliparity on these changes.

METHODS: This prospective clinical study was conducted between 2019 and 2021 in the University Hospital. Healthy, heterosexual pregnant women were included in this study and were consecutively interviewed regarding their anxiety levels and sexual function in the three trimesters of pregnancy. Participants in the study filled out two questionnaires, the Female Sexual Function Index (FSFI) form and the beck anxiety inventory (BAI). All data were analyzed using SPSS 21 statistical software.

RESULTS: There were a total of 35 pregnant women who met the inclusion criteria and completed the questionnaire forms in the three trimesters of pregnancy. Nineteen of the study group were nulliparous (54.3%). FSFI scores were found to be below the cutoff value required to diagnose sexual dysfunction in all three trimesters. The anxiety scores were found to be statistically significantly compatible with mild anxiety in all three periods. In the variance analysis of the survey scores over the three periods, a statistical significance was found for both the FSFI scores and the BAI scores. It was observed that nulliparity had no effect on the change between periods.

CONCLUSION: Sexual functions decrease and anxiety increases as we approach the 3rd trimester of pregnancy. There was no significant effect of the parity on the significant change in sexual functions and anxiety between trimesters.

Keywords: Anxiety; nulliparity; pregnancy; sexuality.

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Female sexual dysfunction is an age-related and widespread problem, affecting 20–50% of women [1]. Pregnancy is a process that affects the sexual life of women together with physical, hormonal, and psychological changes. This process is also recognized as the transition period to parenthood for a woman and is also acknowledged as being a period in which intense feelings of anxiety are experienced [2].

On a review of the literature, it is generally accepted that this rate increases even more during pregnancy and is report-

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ed to be as high as 50–80% [3, 4]. In Turkiye, similar epidemiological studies on pregnancy have revealed a much higher rate of sexual dysfunction of between 80% and 90% [5, 6].

A decrease in sexual function, together with the changes brought about by pregnancy [7, 8] and increased levels of anxiety, are expected and can be seen in previously proven results [9, 10]. There are factors such as discomfort during intercourse, fear of injury to the baby, loss of interest, physical incompetence, painful sexual intercourse, and a feeling that attractiveness decreases during pregnancy [9, 11–13].

Among the factors that make up the differences between the sexual functions in nulliparous women and the sexual functions of non-nulliparous women that can be counted for the 1st time, are age, uncertainty of pregnancy, and exposure to physiological change, and all of these actually lead to different results [14].

Most of the previous studies have been based on the evaluation of the changes in the sexual function scores and anxiety scores of individual participants in each of the three trimesters of pregnancy. In addition, there are studies comparing the sexual function and anxiety levels of nulliparous and non-nulliparous women, but there are no studies evaluating the effect of parity on the changes between the trimesters of pregnancy.

We aimed to examine the sexual functions and anxiety levels of the same pregnant women during the three periods of pregnancy and to observe how they change between trimesters and also the effect of nulliparity on these changes.

Highlight key points

- It is widely accepted that pregnancy has some effects on women's sexual behavior, and it is known that there tends to be a decrease in sexual activity during pregnancy.
- Sexual functions decrease and anxiety increases as we approach the 3rd trimester of pregnancy.
- There was no significant effect of the parity on the significant change in sexual functions and anxiety between trimesters.

MATERIALS AND METHODS

This prospective clinical study was conducted between 2019 and 2021 in the Obstetrics Outpatient Clinic of the Karadeniz Technical University Hospital following approval by the local Ethics Committee (217/2019). Healthy, heterosexual pregnant women who had been living with their partners during the preceding 4 weeks were included in this study and were consecutively interviewed regarding their anxiety levels and sexual function.

The present study was designed to be implemented over three terms; 1st trimester, 2nd trimester, and 3rd trimester. Participants in the study filled out two questionnaires relating to these three periods.

Participants with any fetal or maternal conditions that might complicate their pregnancy were excluded from the study (conditions such as antepartum hemorrhage, threat of miscarriage, placenta insertion and invasion anomalies, preterm labor, premature rupture of membranes, or pregnant women who were advised to avoid coitus by their physician). In addition, women over the age of 40 years, women who are smokers or diabetics, or have a history of cancer, liver, renal or hematological disease or other medical disorders or sexual pain disorders or disharmony with husbands, women with a known psychiatric disorder and/or a history of drug use, and women who became pregnant with assisted reproductive methods, were also excluded from the study.

The study protocol was explained to all participants and their informed consent was obtained. Following assurances that the confidentiality of the information they provided will be protected, all participants completed questionnaires in a separate room in the company of the same assistant health personnel.

Demographic data such as age, body mass index (BMI), obstetric history, education levels, income levels, and smoking status of the participants were recorded, as was any change in this information as the pregnancy progressed was recorded. BMI was calculated as weight (kg) divided by height squared (m^2).

In each trimester where maternal and fetal evaluations were made, the participants, who agreed to participate in the study and who met the inclusion criteria, also completed questionnaire forms at each doctor's visit.

Pregnant women who were evaluated in detail at each trimester were divided into two groups according to whether they were nulliparous or not to examine the effect of parity on the change of scores.

Questionnaires

Each pregnant woman answered a self-administered questionnaire about the sexual performance parameters according to the Female Sexual Function Index (FSFI). The FSFI form is a questionnaire consisting of 19 items in six subgroups: desire (items 1–2), arousal (items 3–6), lubrication (items 7–10), orgasm (items 11–13), satisfaction (items 14–16), and pain (items 17–19). The full FSFI

Table 1. Demographic characteristics of the study population

	Study group (n=35)
Age (years)	28±5.1 (19–40)
BMI (kg/m^2)	26±5.1 (16–38)
Gravidity	2 (1–6)
Parity	1 (0–3)
Nulliparity (%)	54.3
Abortion	0 (0–3)
Educational level (%)	
Primary	5.8
High school	31.4
University	62.8
Income level (%)	
Low	8.6
Average	14.3
High	77.1
Pregnancy week in which the first trimester forms are applied, mean	12 (10–14)
Pregnancy week in which the second trimester forms are applied, mean	22 (20–25)
Pregnancy week in which the third trimester forms are applied, mean	31 (30–35)

Data are presented as mean±SD, minimum–maximum, and %, BMI: Body mass index.

scale score, which could be 36 at the highest, was obtained by adding the six domain scores. Sexual dysfunction was defined as an FSFI score <26.55 based on previously published and validated studies [15, 16]. The value of the FSFI score is capable of predicting the extent of sexual problems [17]. It has been validated for the Turkish population and is used to assess sexual function among women [18].

The beck anxiety inventory (BAI) is an evaluation scale developed by Beck et al. [19] in 1988 which is used to measure the severity of anxiety symptoms experienced by an individual. The scale consists of 4 Likert-type questions. The answer options are "none," "mild," "moderate" and "severe." The scores obtained from the scale range from 0 to 63, and higher scores obtained from the test indicate increased levels of anxiety. According to the results obtained from the BAI; <10 points is classified as normal, 10–18 points as mild anxiety, 19–29 points as moderate anxiety, and 30–63 points as severe anxiety. The Turkish validity and reliability of the scale were undertaken by Ulusoy et al. [20] in 1998.

The study was created based on the principles set out in the Declaration of Helsinki. This article has been designed as specified in the strengthening of the reporting of observational studies in epidemiology criteria [21].

Statistical Analysis

All data were analyzed using SPSS 21 statistical software (IBM, NY). All continuous variables were defined as mean and standard deviations. Categorical variables were expressed as a percentage of the total. The repeated measures ANOVA test was used to examine whether there was a significant difference between the scores between the three periods during which the questionnaire forms were completed by the participants, and subsequently, the "p" values were calculated. A post hoc analysis of these three periods was performed with the help of the Bonferroni test. To examine the effect of nulliparity on the change of scores in trimesters, variance analysis was used for repeated measurements, taking the nulliparity covariant. Significance was set at the $p<0.05$ level.

RESULTS

There were a total of 35 pregnant women who met the inclusion criteria and completed the questionnaire forms in the three trimesters of pregnancy.

The average age of the participants was 28±5.1, while the average BMI was 26±5.1. Nineteen of the study group were nulliparous (54.3%). The demographic characteristics of the participants are shown in Table 1.

Table 2. The dispersion of the scores of the sexual dysfunction domains and anxiety score between trimesters in repeated measurements

Domain	Study group (n=35)			p*		
	1st trimester	2nd trimester	3rd trimester	p_a	p_b	p_c
Sexual desire	2.9±1.1	2.8±1.1	2.1±1.1	>0.05	<**0.05**	<**0.001**
Arousal	2.3±1.7	2.7±1.5	1.4±1.7	>0.05	>0.05	<**0.001**
Lubrication	2.9±2.3	3.4±1.9	1.5±1.9	>0.05	<**0.05**	<**0.001**
Orgasm	2.8±2.2	3.3±1.9	1.4±1.8	>0.05	<**0.05**	<**0.001**
Satisfaction	3.3±2	3.2±1.9	1.4±1.6	>0.05	<**0.001**	<**0.001**
Pain	2.9±2.3	3.5±1.9	1.5±1.9	>0.05	<**0.05**	<**0.001**
All items (FSFI)	17±10	18.9±9.1	9.3±9.1	>0.05	<**0.05**	<**0.001**
Beck anxiety score	11.9±10.5	14.3±8.9	18.3±9.2	<**0.05**	<**0.001**	<**0.001**

*: Bonferroni corrected, ANOVA in repeated measurements; FSFI: Female Sexual Function Index; pa: First trimester in comparison with second trimester; pb: First trimester in comparison with third trimester; pc: Second trimester in comparison with third trimester.

Table 3. The effect of nulliparity on comparative analysis between periods

Domain	Study group (n=35)				p
	Nulliparity (n=19)		Non-nulliparity (n=16)		
	Mean±SD	Min–Max	Mean±SD	Min–Max	
FSFI score					0.729*
1st trimester	14.8±10.7	1.2–33.8	19.7±8.8	2.4–28.6	
2nd trimester	17.5±10.1	1.2–33.9	20.6±7.8	1.2–28.6	
3rd trimester	8.2±8.9	1.2–26.3	10.7±9.4	1.2–22.9	
Beck anxiety score					0.161*
1st trimester	13.3±12.7	2–38	10.3±7.2	2–26	
2nd trimester	14.3±10.4	3–38	14.3±7.2	4–28	
3rd trimester	19.4±10	8–40	17±8.3	7–38	

*: The effect of nulliparity on repeated measurements; SD: Standard deviation; Min: Minimum; Max: Maximum; FSFI: Female Sexual Function Index.

The periodic results of the FSFI subgroup and total scores, and Beck anxiety scores and their paired comparisons between periods, are shown in Table 2. FSFI scores were found to be below the cutoff value required to diagnose sexual dysfunction in all three trimesters (17±10, 18.9±9.1, 9.3±9.1; respectively). The anxiety scores were found to be statistically significantly compatible with mild anxiety in all three periods (11.9±10.5, 14.3±8.9, 18.3±9.2, respectively).

In the Bonferroni post hoc analysis over the three periods, there was a significant difference between the second and third trimesters in terms of both anxiety and sexual function scores ($p<0.05$). Toward the third trimester, it was observed that anxiety scores increased significantly and FSFI scores decreased significantly ($p<0.05$) (Table 2).

In the statistical analysis performed to evaluate whether nulliparity had an effect on this significant difference in scores among the trimesters, there has been found that nulliparity had no effect on this significant change ($p=0.729$ for the change in FSFI, $p=0.161$ for the change in anxiety score, respectively) (Table 3 and Fig. 1).

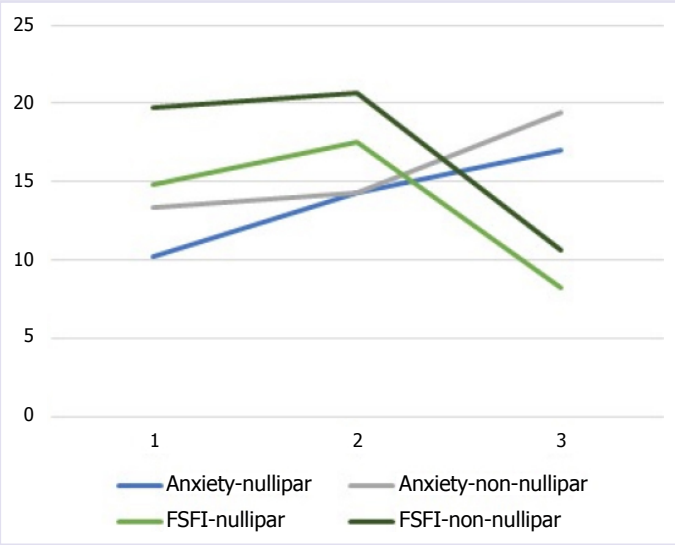

Figure 1. Schematic view of the changes in the scores of the two groups with and without nulliparity.

DISCUSSION

It is widely accepted that pregnancy has some effects on women's sexual behavior, and it is known that there tends to be a decrease in sexual activity during pregnancy [4]. In a study conducted by Yildiz et al. [7] in which FSFI scoring was used to determine sexual status in pregnant women, the authors reported that FSFI scores decreased in all three trimesters of pregnancy compared to the pre-pregnancy period. In another study by Erbil, only cases in the third trimester were evaluated, and the FSFI scores were found to decrease as the gestational week progressed in the third trimester of pregnancy [22]. In their study of Erol et al., [23] FSFI scores and androgen levels in different patients were evaluated according to the trimesters, and they found that women in the third trimester of pregnancy have lower sexual function scores compared to those in the first and two trimesters of pregnancy, although FSFI scores are not associated with androgen levels. In a study by Hanafy et al. [24] on Egyptian women, significant negative changes were found in all FSFI subgroups, especially in the first and third trimester periods. In the present study, although we did not have pre-pregnancy scores, we found that sexual function scores were found to be lower than the cut-off value of 26.55 in all trimesters. As was seen in similar studies in the literature, a slight increase in the second trimester and a significant decrease in the third trimester were observed in the current study according to FSFI scores. Significant changes in FSFI scores were observed in all periods. In addition to the total FSFI score, examination of the changes in subgroup scores between trimesters gives us an idea of the areas in which sexual function mostly changes during pregnancy. In a detailed literature review; in many studies, there has been found a gradual decrease between trimesters in all FSFI subgroups [25, 26]. However, in their study of Jamali and Mosalanejad [27] an increase was found in the orgasm subgroup in the second trimester, and a decrease was found in all other subgroups. In addition, in the study conducted by Gumusay et al. [28] in 2021, an increase was observed in all FSFI subgroups in the transition from the 1st trimester to the 2nd trimester, and all of these values decreased in the 3rd trimester. In the present study, a statistically significant decrease was observed in all sub-groups, especially in the third trimester, compared to the previous period scores. During the transition from the first trimester to the second trimester, although no statistical difference was found, there was an increasing trend in FSFI subgroups as in the arousal, lubrication, orgasm, and pain groups. When trimesters are compared, different results obtained with FSFI subgroups show that these discussions are still going on in medical literature. However, according to the common denominator and accepted opinion, there is a statistically significant decrease in sexual function in the third trimester, compared to the values at the beginning of pregnancy.

Throughout pregnancy, significant changes are observed in the symptoms of anxiety and depression. Most of the research on anxiety during pregnancy has focused on the effect of anxiety on postpartum depression and neonatal development [29, 30]. However, it has been considered that pregnancy-related anxiety creates a different condition than general anxiety and depression disorders. In the literature, it has been shown that symptoms of anxiety relating to the pregnancy increase in the first trimester, decrease in the second trimester and increase again in the third trimester [29]. However, in the present study, contrary to literature, a slight increase was found in the anxiety scores in the first and second trimesters and a significant increase in the third trimester. It can be suggested that, instead of the BAI used in this study, prospective studies can be conducted using an anxiety scale specific to pregnancy-related anxiety and can be designed to include more cases. However, it was determined that anxiety scores showed a statistically significant difference in all three periods considering that anxiety levels increase during pregnancy.

In the present study, in which the effect of nulliparity on the change in sexual function and anxiety scores was examined over the three trimesters, no statistically significant effect of nulliparity on this change was observed.

In the literature, the effect of parity on these scores was evaluated by regression analysis, and therefore, the effect-strength on total scores, rather than the effect on periodic changes was investigated. However, the assessment in the present study is its effect on change.

The fact that this effect has not been directly examined in the literature indicates that the present study is the first study to examine this effect, and this is one of the strengths of our study Another important strength of our study, is that the patient group studied was the same patient in all periods. Since the patients do not consist of different patients in different trimesters, it is obvious that the results will be interpreted more meaningfully.

The most important weakness of our study is that the study group did not have sexual function and anxiety scores before pregnancy. This made it impossible to compare preconception and gestational values. In addition, the low number of patients is another weakness. However, considering that these patients were subjected to the same evaluations 3 times during pregnancy and considering the inclusion and exclusion criteria, this patient group was deemed sufficient for the present study.

Conclusion

We observed that sexual functions decrease and anxiety increases as we approach the 3rd trimester of pregnancy. There was no significant effect of parity on the significant change in sexual functions and anxiety between trimesters. Prospective randomized controlled studies with larger patient groups are needed to confirm the results.

Ethics Committee Approval: The Karadeniz Technical University Scientific Research Ethics Committee granted approval for this study (date: 19.09.2019, number: 217).

Conflict of Interest: No conflict of interest was declared by the authors.

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Authorship Contributions: Concept – OD, HS, TA; Design – OD, HS, MAO; Supervision – OD, TA, MAO; Fundings – OD, MO, HS; Materials – OD, HS, MBA; Data collection and/or processing – MBA; Analysis and/or interpretation – OD, TA; Literature review – OD, HS; Writing – OD, HS, MAO, TA, MO; Critical review – TA, MAO.

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