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Trimester-based changes in urogenital symptoms and their impact on the quality of life in pregnant women: A preliminary report

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Abstract

Background: This study is aimed to determine the trimester-based changes in urogenital symptoms and their impact on the quality of life in pregnant women.

Materials and methods: Fifty-one pregnant women participated in this study. Self-reported symptom-based questionnaires, Urogenital Distress Inventory-Short Form (UDI-6), Incontinence Severity Index (ISI), and Incontinence Impact Questionnaire (IIQ-7) were administered to determine urogenital symptoms, incontinence severity, and the quality of life in all participants in the first, second, and third trimesters. The findings obtained were analyzed with the Friedman and Spearman tests.

Results: Irritative (urgency and frequency) and stress incontinence symptoms showed statistically significant changes ($p < 0.05$), whereas obstructive and genital pain/discomfort symptoms did not significantly change ($p > 0.05$) according to the scores of UDI-6 subscales over the trimesters. There were negative, weak-moderate correlations between stress incontinence symptoms and IIQ-7 in the first, second, and third trimester. There was a negative, moderate correlation between irritative symptoms and IIQ-7 only in the third trimester, but there were not any correlations between the other urogenital symptoms and IIQ-7 ($p > 0.05$). In the prepregnancy period, stress urinary incontinence (SUI) and urge urinary incontinence (UUI) occurred in 9.8% and 7.8% of the patients, respectively, whereas there were no women with mixed urinary incontinence (MUI) preconceptionally. The presence of SUI, UUI, and MUI were 13.7%, 7.8%, and 0% in the first, 26%, 9.8%, and 3.9% in the second, and 41.2%, 27.5%, and 13.7% in the third trimester, respectively. ISI scores showed statistically significant changes in the first, second, and third trimesters of women with SUI, UUI, and MUI ($p < 0.05$). Statistically significant differences were also found in UDI-6 and IIQ-7 scores obtained from all three trimester evaluations of pregnant women with SUI, UUI, and MUI ($p < 0.05$).

Conclusions: Urogenital symptoms associated with urinary incontinence such as frequency, urgency, and stress incontinence were found to be increased over the course of the three trimesters of the pregnancy and the quality of life was negatively affected. Special care is essential for urinary incontinence during antenatal care.

Keywords: Pregnancy; Quality of life; Stress incontinence; Urinary incontinence; Urogenital symptoms

1. Introduction

Urogenital symptoms may occur due to changes in the lower urinary tract during pregnancy.[1] Urogenital symptoms represent disturbances in the normal micturition cycle and occur during storage (frequency, urgency, urinary incontinence [UI], and overactive bladder), voiding (intermittent urination, and straining), and postmicturition symptoms (genital pain and discomfort).[2]

The most common urogenital symptoms in pregnancy are frequency, nocturia, and UI. Although most of these symptoms are not permanent, UI is usually permanent and even progressive.[3] UI is defined by the International Continence Society as a complaint of involuntary loss of urine resulting in social and hygienic problems.[4] The prevalence of UI during pregnancy varies between 32% and 64%, and especially increases toward the end of the pregnancy.[5] In a multinational study, it was reported that the highest incidence was 45.4% in Europe and North America and the lowest incidence was in Africa with 25.5%.[5] Additionally, in two separate studies in Turkey, the prevalence of UI during pregnancy was found as 27% and 38%, and the prevalence of stress urinary incontinence (SUI), urge urinary incontinence (UUI), and mixed urinary incontinence (MUI) was reported as 15.6%, 4.8%, and 16.8%, respectively.[3,6]

Although the etiology of gestational UI is not fully understood, it is thought that it is a multifactorial condition associated with mechanical and hormonal factors that occur during pregnancy.[7] Physiological changes in the lower urinary tract during pregnancy increase the sensitivity of pregnant women to UI,

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and increased progesterone levels lead to decreased bladder and urethral tone.[8] Weight gain during pregnancy and changes in the collagen tissue weaken the pelvic floor.[9,10] Other changes that affect the continence mechanism, such as reduction in functional urethral length and reduced maximum urethral closure pressure, also increase urethral mobility.[11–13]

Age, parity, urinary tract infection, and constipation history, presence of UI in mother and sister, weight gain during pregnancy, body mass index (BMI), alcohol and caffeine consumption, and smoking are risk factors for UI, and the presence of UI during pregnancy is a major risk factor for the development of UI after pregnancy.[14] UI may occur during pregnancy in nulliparous pregnant women without previous UI complaints.[15]

Health-related quality of life (HRQoL) is defined as a composition of patient's physical, mental, emotional, and social well-being at subjective and/or objective perceptual levels.[16] UI and other urogenital symptoms such as frequency and urgency have an unfavorable impact on the HRQoL.[17–20] Studies in nonpregnant women reported that UI and other urogenital symptoms are associated with a reduction in the QoL, whereas studies in pregnant women are quite inadequate.[21–24] A study involving pregnant Turkish women revealed that the HRQoL of 70.8% of the pregnant women with UI were mildly to moderately affected.[6]

In order to prevent the occurrence and progression of UI and other urogenital symptoms both during pregnancy and for the rest of the woman's life, it is very important to question urogenital symptoms including UI in the obstetric follow-up of pregnant women and to develop management strategies. The aim of this study was to determine the trimester-based changes in urogenital symptoms and their impact on the QoL in pregnant women using a self-reported symptom-based questionnaire.

2. Materials and methods

A total 76 pregnant women attending an antenatal care program at Hacettepe University were evaluated for inclusion criteria. Fifty-one pregnant women who were between 18 and 40 years of age, at the 11th–14th gestational weeks, literate, and volunteered to participate in the research were included in this study. Pregnant women with a history of gestational diabetes, severe cardiopulmonary and renal diseases, neurological disorders, symptomatic pelvic organ prolapse, or UI surgery were excluded from the study. The study protocol was approved by the Ethics Committee for Non-Interventional Clinical Investigations (GO 16/101-30). All participants provided written informed consent according to the principles stated in the Declaration of Helsinki prior to their inclusion in the study.

Age, BMI, parity, gestational age, previous birth mode, and smoking status of the pregnant women were recorded using a standard form. UI complaints of the pregnant women were determined in accordance with the International Continence Society terminology and other studies.[4,15,25,26] In pregnant women, involuntary incontinence with coughing, sneezing, and physical activity was defined as SUI, involuntary incontinence with sudden compression was defined as UUI, and the presence of both SUI and UUI was defined as MUI. The short form Urogenital Distress Inventory (UDI-6), Incontinence Severity Index (ISI), and Incontinence Impact Questionnaire (IIQ-7) were used to determine urogenital symptoms, incontinence severity, and the QoL, respectively.[27,28] All evaluations were performed in the first, second, and third trimesters.

The UDI-6 was developed to evaluate the functions of the bladder and to determine which symptoms cause the problem. It consists of 6 questions: The first 2 questions are related to irritative symptoms (urgency and frequency), the third and fourth questions are related to stress incontinence, the fifth question is related to obstruction, and the sixth question is related to genital pain/discomfort symptoms. High UDI-6 scores indicate the severity of urogenital complaints. The Turkish UDI-6 has strong internal consistency (Cronbach's α 0.74) and very strong test–retest reliability (Spearman's ρ 0.99).[27]

ISI was used to determine the severity of incontinence in pregnant women. ISI consists of 2 main questions (A and B), regarding frequency and amount of leakage, and the total score is obtained by multiplying the answers. The total score ranges from 1 to 12. The score obtained from the index classifies the severity of incontinence into 4 levels: mild 1–2, moderate 3–6, severe 8–9, and very severe 12. This index is a valid and reliable method for determining the severity of incontinence.[28]

The IIQ-7 is a disease-specific QoL questionnaire used to assess the QoL of individuals with UI. There are 7 questions about physical activity, social relations, travel, and emotional health. The total score of the questionnaire is evaluated between 0 and 100 and higher scores indicate that UI has a higher negative effect on the QoL. The IIQ-7 has strong internal consistency (Cronbach's α 0.87) and very strong test–retest reliability (Spearman's ρ 0.99).[27]

Statistical analyses were performed using the Statistical Package for the Social Sciences software, version 18 (IBM SPSS Statistics; IBM Corporation, Armonk, NY). Descriptive statistics for each parameter were presented as mean ± standard deviation, median, and number (percentage). The normality distribution of the data was checked using the Kolmogorov–Smirnov test. Friedman tests were conducted to test whether there was a significant change in the UDI-6, ISI, and IIQ-7 scores obtained in the first, second, and third trimesters. Spearman tests were conducted to test whether there were any correlations of urogenital symptoms and the QoL in individual trimesters. The Wilcoxon test was used to test the significance of pairwise differences using the Bonferroni correction to adjust for multiple comparisons.

3. Results

A total of 76 participants were screened for eligibility, of which 25 participants did not meet the inclusion criteria (insufficient literacy [$n=5$], gestational diabetes [$n=9$], renal diseases [$n=3$], and nonvolunteer to participate in this study [$n=8$]). Consequently, 51 pregnant women were included in this study.

The mean age was 31.43 ± 3.60 years, and the median BMI for the first, second, and third trimesters were 23.80, 25.30, and 28.2 kg/m^2, respectively. In the prepregnancy period, 5 (9.8%) of the 51 pregnant women had SUI, 4 (7.8%) had UUI, and none had MUI. In the first trimester of pregnancy, SUI and UUI were observed in 7 (13.7%) and 4 (7.8%) pregnant women, respectively, and MUI was not observed in any of the women. In the second trimester, SUI, UUI, and MUI were observed in 13 (26%), 5 (9.8%), and 2 (3.9%) women, respectively. In the third trimester, 21 (41.2%), 14 (27.5%), and 7 (13.7%) pregnant women had SUI, UUI, and MUI, respectively. SUI was the most frequent UI in all trimesters. Demographic and clinical characteristics of the pregnant women are presented in Table 1.

When the pregnant women were examined according to the scores obtained from the subscales of the UDI-6 in terms of urogenital symptoms during pregnancy, among 3 trimesters, irritative (urgency and frequency) and stress incontinence symptoms showed statistically significant changes ($p<0.05$),

Table 1

Demographic and clinical characteristics ($n=51$).

Items	Values
Age (years)	31.43 ± 3.60
Education level (years)	15.00 ± 4.00
Gravidity (*n*)	3.00 ± 2.00
Parity (*n*)	1.00 ± 1.00
Previous delivery modes	
Nulliparous	20 (39.2)
Vaginal	8 (15.7)
Cesarean	20 (39.2)
Vaginal and cesarean	3 (5.9)
Smoking status (yes)	6 (11.8)
Chronic cough (yes)	1 (2.0)
Pregestational incontinence	
SUI (yes)	5 (9.8)
UUI (yes)	4 (7.8)
MUI (yes)	0 (0)

Gestational period	First trimester	Second trimester	Third trimester
SUI (yes)	7 (13.7)	13 (26.0)	21 (41.2)
UUI (yes)	4 (7.8)	5 (9.8)	14 (27.5)
MUI (yes)	0 (0)	2 (3.9)	7 (13.7)
Chronic constipation (yes)	8 (15.7)	11 (21.6)	11 (21.6)
BMI (kg/m^2)	23.80–4.81	25.30–4.53	28.2–4.83

BMI = body mass index; MUI = mixed urinary incontinence; SUI = stress urinary incontinence; UUI = urge urinary incontinence.

Data are presented as mean ± standard deviation; median-interquartile range, or frequency (percentage).

whereas obstructive and genital pain/discomfort symptoms did not significantly change ($p>0.05$). There was a difference between the first and third trimesters and between the second and third trimesters in terms of irritative symptoms ($p<0.05$), but there was no difference between the first and second trimesters ($p>0.05$). In terms of stress incontinence symptoms, significant differences were found only between the first and third trimesters ($p<0.05$). The mean scores obtained from the subscales of the UDI-6 in all 3 trimesters are shown in Table 2. The scores of the ISI in pregnant women with SUI were 1.71 ± 2.13, 2.46 ± 2.25, and 2.90 ± 2.32 in the first, second, and third trimesters, respectively. The mean scores of the ISI were found to be 3.00 ± 2.58, 1.20 ± 1.30, and 2.35 ± 2.30 in pregnant women with UUI in the 3 trimesters, respectively. Although there was no pregnant woman with MUI complaints in the first trimester, the mean scores of the ISI for pregnant women with MUI increased from 1.50 ± 0.70 to 3.85 ± 2.41 from the second to the third trimester. As indicated in Table 2, ISI scores showed statistically significant changes in the first, second, and third trimesters of the pregnant women with SUI, UUI, and MUI ($p<0.05$). ISI scores increased over the course of the gestational trimesters in pregnant women with SUI.

UDI-6 scores were 26.07 ± 10.32, 28.99 ± 14.02, and 31.74 ± 17.50, respectively, in pregnant women with SUI in the 3 trimesters while these scores were 16.66 ± 10.20, 22.49 ± 22.16, and 26.78 ± 22.56, respectively, in pregnant women with UUI (Table 2). There was a statistically significant change in UDI-6 scores during the 3 trimesters ($p<0.05$).

Table 2

Trimester-based changes in urogenital symptoms according to the UDI-6 subscales.

UDI-6 subscales ($n=51$)	First trimester	Second trimester	Third trimester	*p*
Irritative (Q1–Q2)	5.39 ± 5.54	7.59 ± 6.21	11.51 ± 7.84	0.00*
Stress incontinence (Q3–Q4)	1.63 ± 4.33	3.43 ± 6.16	5.47 ± 8.43	0.00*
Obstructive micturition (Q5)	0.08 ± 0.58	0.57 ± 2.63	0.73 ± 3.08	0.32
Genital pain/discomfort (Q6)	0.40 ± 1.50	0.89 ± 2.80	1.79 ± 4.26	0.10

UDI-6 = Urogenital Distress Inventory-Short Form.

* Friedman tests were conducted and the significance level was $p<0.05$.

The mean scores of the IIQ-7, administered to determine the effect of UI on the QoL, in the 3 trimesters were 2.04 ± 5.39, 11.71 ± 14.49, and 17.70 ± 16.73 in pregnant women with SUI and 3.57 ± 4.55, 6.66 ± 12.41, and 9.52 ± 20.11 in pregnant women with UUI, respectively. In addition, IIQ-7 scores increased in pregnant women with SUI and UUI during the 3 trimesters and there was a statistically significant difference between the scores ($p<0.05$). IIQ-7 scores of the pregnant women with SUI, UUI, and MUI for the 3 trimesters are shown in Table 3.

There were negative, weak-moderate correlations between stress incontinence symptoms and IIQ-7 in the first, second and third trimesters. There was a negative, moderate correlation between irritative symptoms and IIQ-7 only in the third trimester. But there were no correlations between the other urogenital symptoms and IIQ-7 ($p>0.05$). Correlations between urogenital symptoms and the QoL according to trimesters are shown in Table 4.

4. Discussion

In this study, irritative and stress incontinence symptoms showed significant changes, whereas obstructive and genital pain/discomfort symptoms did not significantly change over the course of the pregnancy. SUI was the most common type of UI and the QoL was negatively affected in all trimesters, whereas irritative symptoms negatively affected the QoL only in the third trimester. The other symptoms (obstructive and genital pain/discomfort) had no effect on the QoL in any trimester.

Endocrine and metabolic gestational changes with fetal growth and the enlargement of utero-placental structures during pregnancy can cause various urogenital symptoms.[29] Frequency begins to be observed from the beginning of pregnancy and its prevalence increases from the first to the third trimester.[30] In this study, urogenital symptoms were evaluated with symptom-based questions by means of the subscales of the UDI-6 and it was found that symptoms such as frequency and urgency were progressively increased during pregnancy consistent with the literature.[25–27] These symptoms are associated with overactive bladder syndrome. Symptoms associated with SUI were also found to be progressively increased from the first to the third trimester. In a Dutch study, a mean value of 22.1 was obtained in the overactive bladder subscale of the UDI-6 in the first trimester (questions 1 and 2) and 26.0 in the third trimester, whereas 4.2 and 10.7 were obtained in the UI subscale (questions 3 and 4) for the first and third trimesters.[31] In this study, mean values of the irritative symptoms for the first, second, and third trimesters (questions 1 and 2) were 5.39, 7.59 and 11.51, whereas mean values were 1.63, 3.43, and 5.47 for the UI subscale, respectively (questions 3 and 4). Although the effects of irritative and UI symptoms progressed during pregnancy, the fact that the scores obtained were lower compared to the study conducted in the Netherlands suggests that the effect was less on the pregnant Turkish women. In the present study, the scores obtained from the obstructive (question 5) and genital pain/discomfort (question 6) subscales of the UDI-6 did not change during the course of the 3 trimesters. Although obstructive and genital pain/discomfort symptoms remained stable from the beginning to the end of pregnancy in this study, a progression was observed in the Dutch study.[31]

The neuromuscular function of the pelvic floor was reported to be adversely affected in the long term due to the increased load on

Table 3

Changes in UDI-6, IIQ-7, and ISI scores during pregnancy in terms of SUI, UUI, and MUI.

	First trimester	Second trimester	Third trimester	*p*
ISI				
SUI (yes)	1.71±2.13	2.46±2.25	2.90±2.32	0.00*
UUI (yes)	3.00±2.58	1.20±1.30	2.35±2.30	0.00*
MUI (yes)	–	1.50±0.70	3.85±2.41	0.03**
UDI-6				
SUI (yes)	26.07±10.32	28.99±14.02	31.74±17.50	0.00*
UUI (yes)	16.66±10.20	22.49±22.16	26.78±22.56	0.00*
MUI (yes)	–	22.40±16.30	33.32±24.76	0.03**
IIQ-7				
SUI (yes)	2.04±5.39	11.71±14.49	17.70±16.73	0.00*
UUI (yes)	3.57±4.55	6.66±12.41	9.52±20.11	0.00*
MUI (yes)	–	16.66±16.82	19.04±25.78	0.03**

IIQ-7 = Incontinence Impact Questionnaire; ISI = Incontinence Severity Index; MUI = mixed urinary incontinence; SUI = stress urinary incontinence; UUI = urge urinary incontinence; UDI-6 = Urogenital Distress Inventory-Short Form.

* Friedman tests were conducted and the significance level was $p<0.05$.

** The Wilcoxon test was used and the significance level was $p<0.05$.

Table 4

Correlations between urogenital symptoms and the QoL according to trimesters.

	First trimester IIQ-7		Second trimester IIQ-7		Third trimester IIQ-7	
UDI-6 subscales (*n*=51)	***p***	**r**	***p***	**r**	***p***	**r**
Irritative (Q1–Q2)	0.15		0.16		0.00*	−0.50
Stress incontinence (Q3–Q4)	0.00*	−0.49	0.00*	−0.62	0.01*	−0.33
Obstructive micturition (Q5)	0.77		0.63		0.42	
Genital pain/discomfort (Q6)	0.16		0.38		0.53	

IIQ-7 = Incontinence Impact Questionnaire; QoL = quality of life.

* Spearman tests were conducted and the significance level was $p<0.05$.

the pelvic floor muscles in addition to hormonal changes during pregnancy, and the prevalence of UI increases progressively during pregnancy and does not change until postpartum 8 weeks.[3] Similar to the literature, in this study, the prevalence of SUI, UUI, and MUI progressively increased. In addition, MUI was not seen prepregnancy and in the first trimester, but it started to be seen in the second trimester.

DeLancey et al.[32] reported that the prevalence of SUI in multiparous and nulliparous women were 14.7% and 4.7%, respectively, whereas the prevalence of SUI was 13.7% in the first, 26% in the second, and 41.2% in the third trimesters in this study. In a study involving pregnant Turkish women between 28 and 40 weeks, the prevalence of SUI was 15.6% and increased maternal age was associated with UI.[3] The mean age of the pregnant women in this study was higher than previous studies.

In a study including nulliparous pregnant Turkish women, the prevalence of SUI, UUI, and MUI and the associated symptoms reached the highest values in the third trimester, similar to our study.[15] However, standardized questionnaires were not used in the evaluation of UI in that study while a valid and reliable disease-specific questionnaire was used in the evaluation of UI in this study.

UI has significant effects on the QoL. Although the numbers of studies investigating the impact of UI on the QoL are limited, in a study conducted in the western part of Turkey, 87.2% of the women were mildly or moderately affected in terms of the QoL.[33] In another study investigating the effect of UI on the QoL in pregnant Turkish women, the Turkish version of the Wagner's Quality of Life Questionnaire was used and it was found that UI had a mild or moderate effect on the QoL.[6] In our study, the Turkish version of the IIQ-7 was used to evaluate the QoL and the QoL impact increased from the first to the third trimester. The low scores indicate that pregnant women most probably focus on other problems and ignore UI or have mild to moderate incontinence severity. Additionally, stress incontinence symptoms had a negative impact on the QoL in all trimesters while irritative symptoms had a negative impact on the QoL only in third trimester. Similar to our study, it was reported that UI and irritative symptoms negatively affected the QoL more than any other urogenital symptom in a nonpregnant population.[24]

Limitations of this study are the use of single-center data and the limited number of participants. In addition, urogenital symptoms of the pregnant women were not determined by objective methods, such as pad test and urodynamics. However, these objective methods may provide misleading results in determining urinary symptoms in the first trimester of pregnancy. On the other hand, the strength of our study is the three-trimester based follow-up of urogenital symptoms, UI severity, and the QoL with standardized questionnaires correlating with objective methods. We believe that there is a need for further studies investigating the management of UI and the factors that affect the progression of UI during pregnancy using objective methods for urogenital symptoms.

In conclusion, this three-trimester follow-up study provides evidence that urinary incontinence-related urogenital symptoms and incontinence severity may increase as gestational weeks progress and the QoL may be adversely affected in pregnant women. Our results will guide clinicians working in the field of obstetrics and gynecology to develop better training and management programs for pregnant women in order to prevent and treat urogenital symptoms associated with UI during pregnancy. Special care is essential for UI during antenatal care.

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Statement of ethics

The study protocol was approved by the Ethics Committee for Non-Interventional Clinical Investigations (GO 16/101-30). All participants provided written informed consent according to the principles stated in the Declaration of Helsinki prior to their inclusion in the study.

Conflict of interest statement

No conflict of interest has been declared by the author.

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Author contributions

Esra Uzelpasaci: Project development, design, data collection, analysis/interpretation, writing, literature search, critical review; Gamze Nalan Çinar: Project development, design, writing, literature search, critical review, supervision;
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Turkan Akbayrak: Project development, data collection, writing;
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