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Original Research

The effect of pregnancy-related urinary incontinence on incidence and quality of life

Urinary incontinence on incidence of pregnancy

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Abstract

Aim: In this study, we aimed to determine the incidence of urinary incontinence during pregnancy and to evaluate its effects on quality of life.

Methods: The study was designed as a cross-sectional descriptive study. The University of Michigan Incontinence Symptom Index (M-ISI) questionnaire was administered to 549 pregnant women who applied to the antenatal outpatient clinics of Prof. Dr. Cemil Taşcıoğlu City Hospital between December 2022 and January 2023. Descriptive statistical methods were used to evaluate percentages (%), means (standard deviation (SD)), and medians ((25th and 75th percentiles) (minimum and maximum)). A *P* value of < .05 was considered statistically significant.

Results: Urinary incontinence was observed in 56.1% of the 549 pregnant women included in the study. Mixed urinary incontinence was most common in the third trimester (*P* = .001). The mean BMI of pregnant women with stress urinary incontinence was higher than that of continent pregnant women (*P* < .001,001). According to the M-ISI questionnaire, the severity and bother scores of pregnant women with urinary incontinence were higher than those of the continent group (*P* < .001,001).

Conclusion: Urinary incontinence is common during pregnancy and negatively impacts the quality of life of pregnant women. Our primary outcome was that urinary incontinence was observed in 56.1% of pregnant women. Our secondary outcome was that according to the M-ISI questionnaire, the bother scores of pregnant women with urinary incontinence were higher than those of the continent group, thus negatively impacting the quality of life of incontinent pregnant women.

Keywords

urinary incontinence, pregnancy, quality life, stress incontinence

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Introduction

Urinary incontinence is one of the major problems that a woman may face throughout her life. In pregnancy, the quality of life of women is affected by the addition of urinary incontinence on top of the unique problems of pregnancy. It affects the quality of life of approximately 54.3% of pregnant women, including physical activity, travel, social relationships, and emotional status.[1]

Stress, urge and mixed components can be seen in involuntary urinary incontinence. Studies have shown that stress urinary incontinence (SUI) is the most common among pregnant women.[2] Although the true prevalence is still unknown, the prevalence of SUI varies between 18.6% and 75% in the literature.[3] Pregnancy is one of the major risk factors for SUI among young women. Weakness in pelvic floor muscles (PFM), urethral hypermobility and urethral sphincter insufficiency play a role in the pathophysiology of SUI. Changing hormonal status during pregnancy is also effective in the development of SUI. In summary, urinary incontinence may develop as a result of the effect of changing hormones during pregnancy, relaxation in the pelvic muscles and ligaments, compression of the growing uterus on the bladder in the following weeks, and engagement of the fetal head in the last trimester.

Although the prevalence of stress urinary incontinence increased from the 1st trimester to the 3rd trimester, in a study conducted, serious disturbing urge urinary incontinence (UUI) symptoms were observed in 16.9% of pregnant women.[4] Despite this, the quality of life of pregnant women was not affected much in some publications, this may be due to the fact that urge symptoms are not severe, or the fact that pregnant women consider urinary incontinence as a natural part of pregnancy.[5]

In studies, pregnant women with urinary incontinence have lower quality of life scores than those without urinary incontinence. [avaible at: https://onlinelibrary.whiley.com], and this situation becomes more severe with the progression of the gestational week. Scales specifically developed to differentiate urinary incontinence type, such as the Questionnaire for Urinary Incontinence Diagnosis (QUID), cannot evaluate quality of life scores. International Consultation on Incontinence Questionnaire (ICIQ) evaluates both quality of life and urinary incontinence type, but does not identify its severity with urinary incontinence type.[6] The Michigan Incontinence Symptom Index (M-ISI) scale, whose reliability and validity has been proven for both clinical and research use, was used in this study. We aimed to evaluate the incidence of urinary incontinence and its effects on quality of life in our clinic regarding this situation that pregnant women may encounter.

Materials and Methods

This study was conducted as a descriptive and cross-sectional study to examine the effect of urinary incontinence on quality of life according to trimesters of pregnancy. The universe of the research was comprised of pregnant women who applied to the antenatal outpatient clinic of Istanbul Prof. Dr. Cemil Taşcıoğlu City Hospital. The research was carried out between December 2022 and January 2023. The data were collected by the researcher through face-to-face interview technique in a suitable environment in the antenatal outpatient clinic. The average completion time was 15 minutes to fill out the forms. Women with a singleton pregnancy over the age of 18 were included in the study after voluntary consent and signatures were obtained. Pregnant women with active urinary tract infection, pregnant women with no fetal heartbeat during control or in utero mort fetus (IUMF), pregnant women carrying a fetus with a congenital malformation, pregnant women with severe cardiopulmonary disease, kidney disease, liver disease, cerebrovascular disease and serious comorbidities were excluded from the study. Data such as age, height, weight, gravidity, parity, gestational week of the patients were recorded in the case report forms. The Michigan Incontinence Symptom Index (M-ISI) questionnaire consisting of 10 questions was applied to pregnant women. The M-ISI is a Likert-type scale to evaluate its effects on urinary incontinence and quality of life. The scale has ten items divided into 4 parts: SUI (items 1-3), UUI (items 4-6), pad use (items 7 and 8), and irritating effect area (items 9 and 10). Responses to each item range from 0 to 4, with higher values representing more symptoms and more bother.[7]

This study investigated the difference in the prevalence of urinary incontinence among trimesters in four different groups: no incontinence, stress incontinence, urge incontinence, and mixed incontinence. The prevalence of incontinence in nulliparous and multiparous pregnant women was also investigated. The BMI (mean (SD)) and M-ISI questionnaire severity and bother scores were compared between the four previously mentioned groups. This study was approved by the Istanbul Prof. Dr. Cemil Taşcıoğlu City Hospital Clinical Research Ethics Committee on November 28, 2022 with approval number 319. In addition, written permission and informed consent were obtained from the pregnant women. The study was conducted in accordance with the Principles of the Declaration of Helsinki.

Ethical Approval

This study was approved by the Clinical Research Ethics Committee of Istanbul Prof. Dr. Cemil Taşcıoğlu City Hospital (Date: 28.11.2022, Decision No: 319)

Statistical Analysis

A priori power analysis was conducted using G*Power version 3.1.9.7 to determine the minimum sample size required to test the study hypothesis.[8] Results indicated the required sample size to achieve 80% power for detecting a medium effect, at a significance criterion of $\alpha = .05$, was $N = 159$ for.[One way ANOVA] Thus, the obtained sample size of $n = 549$ is adequate to test the study hypothesis. All analysis was performed using SPSS software (Statistical Package for the Social Sciences, version 16.0, SPSS Inc., Chicago, IL, USA). The KolmogorovSmirnov test was used to evaluate the eligibility of the data to normal distribution. Descriptive statistical methods were used to evaluate frequency, percentage, mean (standard deviation (SD)), median ((25th and 75th percentiles) (min and max)) when appropriate. The Chi-square test was used for categorical variables. Student's t-test and Mann-Whitney U test were used to compare mean values between two independent groups depending on the results of the the Kolmogorov-Smirnov test. One-Way ANOVA and Kruskal Wallis tests were used to compare means between three independent groups. A P value of $< .05$ was considered statistically significant.

Reporting Guidelines

This study was reported in accordance with the STROBE guideline.

Results

Of the 549 pregnant women included in the study, 43.9% did not have urinary incontinence; 56.1% had urinary incontinence; 9.5% of the pregnant women in the study had stress incontinence, 23.5% had urge urinary incontinence, and 23.1% had mixed type urinary incontinence.

Pregnant women were divided into four groups: no incontinence, stress incontinence, urge incontinence, and mixed incontinence.

The difference between the groups was statistically significant (P = .001). The results are summarized in Table 1.

Subgroup analysis was performed with the Bonferroni correction. Among continent pregnant women, there was statistically significant difference between the first and third trimesters (P = .001) and the second and third trimesters (P = .001). The difference between three trimesters was not statistically significant in terms of stress incontinence. There was a statistically significant difference between the first and third trimesters (P = .001) and the second and third trimesters (P = .001) regarding urge incontinence. Differences between the first and second trimesters (P = .004), first and third trimesters (P = .001) and second and third trimesters (P = .001) were significant regarding mixed incontinence.

The mean BMI (mean(sd)), was investigated in the 4 previously mentioned groups. The mean BMI of continent pregnant women was 26 (3.9). Statistical differences in BMI were significant among incontinence groups (P = .001). The mean BMI in pregnant women with stress incontinence was 28.57 (4.06), in pregnant women with urge incontinence it was 26.7 (3.8), and in pregnant women with mixed type incontinence it was 27.5 (4.3). In the subgroups analysis using the Tukey test, there was a difference in BMI between continent pregnant women and those with stress incontinence (P = .001). There was a statistically significant difference in terms of BMI between continent pregnant women and pregnant women with mixed type incontinence (P = .004). The difference in terms of BMI between pregnant women with stress and urge incontinence was also statistically significant (P = .025).

Of the 549 pregnant women included in the study, 39.2% were nulliparous (n = 215) and 60.8% were multiparous (n = 334); 54% of nulliparous pregnant women were continent and 46% of them had incontinence; 37.4% of multiparous pregnant women were continent and 52.6% of them had incontinence. There was a statistically significant difference in the frequency of incontinence between nulliparous and multiparous pregnant women (P = .001).

When looking at the bother and severity scores of pregnant women with incontinence compared to continent pregnant women, it was found that the severity scores for incontinence in pregnant women with urinary incontinence [8.51(5.88)] were higher than in the continent group [1.88(2.14)] (P = .001). When evaluating bother scores, the scores in the incontinent group [0.95(1.65)] were higher than in the continent group [0.08(0.48)] (P = .001). The results are summarized in Table 2.

There were statistically significant differences in severity scores (P = .001) and bother scores (P = .001) among the four groups. The incontinence severity and bother scores for the four groups are summarized in Table 3.

Table 1. Continence and Incontinence Rates Between Trimesters (n = 549)

Incontinence	1st Trimester *n* (%)	2nd Trimester *n* (%)	3rd Trimester *n* (%)
Continent	61 (61)	81 (54.4)	99 (33)
Stress	9 (9)	16 (10.7)	27 (9)
Urge	17 (17)	24 (16.1)	88 (29.3)
Mixed	13 (13)	28 (18.8)	86 (28.7)

Chi-squared P < .001.

Discussion

Urinary incontinence is a medical condition that poses a problem among women in society. In addition to the specific problems of pregnancy, the quality of life of pregnant women is seriously affected by the addition of involuntary urinary incontinence. The incidence of urinary incontinence in pregnancy, for which we sought an answer in our study, differs in various studies. In a study, the prevalence of urinary incontinence during pregnancy was observed to reach up to 58%, and stress urinary incontinence was observed most frequently during pregnancy.[https://www.ics.org/publications/ ici_6/Incontinence_6th_Edition_2017_eBook_v2.pdf] On the other hand, women with urinary incontinence during pregnancy seem to be at higher risk for postpartum urinary incontinence compared to continent women during pregnancy.[9] In our study, urinary incontinence was observed in 56.1% of pregnant women who applied to our antenatal outpatient clinic. Despite everything, it was observed that urinary incontinence experienced during pregnancy decreased within the first year after delivery.[10] In a meta-analysis, the prevalence of SUI during pregnancy was found to be between 18.6% and 60%. Physiological weight gain during pregnancy, the effect of the growing uterus on the pelvic floor muscles, and hypermobility of the urethra due to the engagement of the fetal head pressing on the bladder play a role in the pathophysiology of stress urinary incontinence in pregnancy.[11] During antenatal exams for women planning pregnancy, certain precautions can be taken by questioning symptoms of urinary

Table 2. Bother and Severity Scores of Pregnant Women with Continence and Incontinence

M-ISI	Incontinent	Continent	*P**
	Median (25th-75th) (min-max) (Mean ± SD)		
Severity scores	7 (5-10)(0-32) (8.51 ± 5.88)	0 (0-1)(0-8) (1.88 ± 2.14)	<.001
Bother scores	1 (04)(0-8) (0.95 ± 1.65)	0 (0-0)(0-5) (0.08 ± 0.48)	<.001

**Mann-Whitney U.*

Table 3. Comparison of the Four Groups in Terms of Severity and Bother Scores

M-ISI	Continent	Stress	Urge	Mixed	*P**
	Median (25th-75th) (min-max) (Mean ± SD)				
Severity scores	1 (1-4)(0-8) (1.88 ± 2.4)	5 (3-6)(0-12) (4.94 ± 2.89)	7 (4.5-8) (1-19) (6.44 ± 3.9)	11 (7-15) (2-32) (12.08 ± 6.92)	<.001
Bother scores	0 (0-0)(0-5) (0.08 ± 0.8)	0 (0-0)(0-8) (0.5 ± 1.37)	0 (0-0) (0-5) (0.42 ± 1)	1 (0-3) (0-8) (1.68 ± 1.98)	<.001

**Kruskall-Wallis.*

incontinence. A study conducted in 2022 discovered that the strongest predictor for experiencing incontinence during pregnancy was a history of urinary incontinence before pregnancy.[12] In another study, it was observed that a majority of nulliparous women with incontinence also had urine leakage before pregnancy and most of them ignored the symptoms of incontinence.[13] In our study, urinary incontinence before pregnancy was not questioned. In terms of preventing urinary incontinence during pregnancy, addressing modifiable risk factors can contribute positively to the process. These recommendations include quitting smoking before pregnancy, aiming for ideal weight before pregnancy, and performing low intensity exercises.[14] However, the focus should be on pelvic floor muscle training. A meta-analysis revealed that engaging in prenatal exercise, including pelvic floor muscle training, decreased the likelihood and severity of experiencing urinary incontinence (UI) both during pregnancy and after giving birth.[15] Pelvic floor muscle training (PFMT) should be regularly included in women's exercise routines.[16] In another study investigating the risk factors for urinary incontinence during pregnancy, it was found that later gestational age increased stress and urge urinary incontinence.[17] The study found that full-time work increased the occurrence of urge incontinence during pregnancy.[17] Contrary to this study, in our study there was no difference in stress incontinence between trimesters; but there was an increase in urge incontinence and mixed incontinence cases as the trimesters progressed. Other studies have supported the contribution of increased BMI to the pathogenesis of stress urinary incontinence.[18] In our study, the average BMI (mean (sd)) of pregnant women with stress incontinence was found to be higher than that of continent pregnant women (P = .001). In the studies conducted so far on "urinary incontinence and quality of life during pregnancy", the International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form (ICIQ-UI SF) was used to determine the amount of urine loss (none, small, moderate, large amount).[19] Studies have shown that in pregnant women with urinary incontinence, urine leakage occurs in small amounts (drops or just a little, more like a trickle, more than a trickle).[20] In our study, the number of pads used to protect against wetness was evaluated minimally based on the Michigan University Incontinence Symptom Index questionnaire. Based on the M-ISI questionnaire, the average number of pads used was 1.55 (SD = 1.28) when the incontinence group was taken as the base.

Urinary incontinence (UI) can significantly impact quality of life. Clearly defining and quantifying bother will assist researchers in selecting the appropriate measurement tools and interpreting the results.[21] There are publications in the literature that argue that urinary incontinence affects the quality of life either slightly or seriously. A study found that the quality of life of pregnant women was either not affected or only minimally affected by urinary incontinence.[7]

In another similar study, minor bother in the quality of life of pregnant women was found to be due to the tendency to view urinary incontinence as a natural part of pregnancy or a natural result of birth.[5] As far as we know, the University of Michigan Incontinence Symptom Index (M-ISI) questionnaire was applied to pregnant women for the first time in our study. In our study, the M-ISI questionnaire, which allows for the separate evaluation of urinary incontinence severity and bother scores, showed that the severity and bother scores of pregnant women with urinary incontinence were higher than those of the continent group (P = .001), respectively. The bother scores of pregnant women with mixed incontinence were higher than those of pregnant women with stress and urge incontinence (P = .001). There are publications available that support the negative impact of urinary incontinence on pregnant women, similar to the results of our study.[21] Larger, multicenter studies on UI during pregnancy should be conducted, evidencebased guidelines suitable for use by pregnant women should be developed, and the effects of preventive interventions (e.g. kegel exercises) before pregnancy and during pregnancy should be investigated.

Limitations

This study was limited by its single-center, cross-sectional design and reliance on self-reported data. Additionally, urinary incontinence before pregnancy was not assessed, and postpartum follow-up was not performed.

Conclusion

In our study, the primary outcome showed that urinary incontinence was detected in 56.1% of pregnant women. Urinary incontinence during pregnancy is common and affects the quality of life of pregnant women.

Declarations

Animal and Human Rights Statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent

Written informed consent was obtained from all participants.

Data Availability

The datasets used and/or analyzed during the current study are not publicly available due to patient privacy reasons but are available from the corresponding author on reasonable request.

Conflict of Interest

The authors declare that there is no conflict of interest.

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None.

Abbreviations

BMI: Body mass index
ICIQ: International consultation on incontinence questionnaire
ICIQ-UI SF: International consultation on incontinence questionnaire-urinary incontinence short form
IUMF: Intrauterine fetal mortality
M-ISI: Michigan incontinence symptom index
PFM: Pelvic floor muscles
PFMT: Pelvic floor muscle training
QUID: Questionnaire for urinary incontinence diagnosis
SD: Standard deviation
SPSS: Statistical package for the social sciences
SUI: Stress urinary incontinence
UI: Urinary incontinence
UUI: Urge urinary incontinence

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