DOI: 10.7860/JCDR/2017/25572.10333

Original Article

Obstetrics and Gynaecology Section

Gestational Urinary Incontinence in Nulliparous Pregnancy- A Pilot Study

ALP TUNA BEKSAC[1], EMINE AYDIN[2], CEREN ORHAN[3], ERGUN KARAAGAOGLU[4], TURKAN AKBAYRAK[5]

ABSTRACT

Introduction: Urinary Incontinence (UI) in pregnancy is more than a disease; it is a social problem that necessitates special care and management. The exact rationales and biological facts behind urinary incontinence during pregnancy are unclear and multivariate.

Aim: This pilot study was designed to examine the direct effect of gestational factors (e.g., physical and metabolic/hormonal) on the presence of Gestational Urinary Incontinence (GUI), in nulliparous pregnant women.

Materials and Methods: This was a questionnaire-based study comprising of 61 nulliparous pregnant woman who had not experienced any Urinary Incontinence (UI) before their pregnancies. Patients were examined during their pregnancies within the framework of the antenatal care program continued at the Division of Perinatology, Hacettepe University, Ankara, Turkey, between January 2015 and December 2016. A 'urinary incontinence questionnaire' was used three times during different periods of gestation (11–14, ~24 and ~37 gestational weeks) for each patient. Statistical analysis was performed using the SPSS software version 20.0. The Chi-Square test or Fisher's-exact test was used to compare proportions in groups.

Results: The prevalence of total urinary incontinence (stress urinary incontinence, urge urinary incontinence and mixed urinary incontinence) in nulliparous pregnant women was 4.9% (n=3), 9.8% (n=6) and 26.2% (n=16) at 11–14, ~24 and ~37 gestational weeks, respectively. Stress urinary incontinence was found to be 3.3% (n=2), 6.6% (n=4) and 16.4% (n=10) at 11–14, ~24 and ~37 gestational weeks, respectively. Urge urinary incontinence frequency was found to be 1.6% (n=1), 3.3% (n=2), 6.6% (n=4), and mixed urinary incontinence frequency was 0% (n=0), 0% (n=0), 3.3% (n=2) at 11–14, ~24 and ~37 gestational weeks, respectively. Maternal age, birth weight of the neonate and gestational age at birth had no statistically significant effect on GUI.

Conclusion: Urinary incontinence is an important issue during pregnancy and related symptoms are more common in third trimester.

Keywords: Nulliparity, Stress, Urge

INTRODUCTION

Urinary incontinence in pregnancy is a social problem that necessitates special care and management [1]. The other important point is the variation in the description of UI by pregnant women in contrast to that of non-pregnant women. Stress Urinary Incontinence (SUI) is the complaint of involuntary loss of urine on physical effort, especially while sneezing or coughing [2]. This complaint in pregnant women is not only urinary loss on effort, but also lower (sometimes upper) urinary system discomfort, and a sense of change in terms of urination. The definitions of Urgency Urinary Incontinence (UUI) and/or Mixed Urinary Incontinence (MUI) are also problematic because of the interference of gestational factors [1].

The prevalence of SUI during pregnancy is approximately 40%, and it has been reported to be 31% and 42% in nulliparous and multiparous women, respectively [1,3]. There are different publications from different societies/countries about the prevalence of UI during pregnancy, with some variations [4-8]. The incidence of urinary incontinence in pregnancy was found to be 26.3% among German population, and similarly 32% in Danish population [5,6]. However, the frequency was reported to be as high as 59% in a study which has been carried out in UK [4]. It has also been reported that the prevalence of UI increases with gestational age [9,10].

The exact rationales and biological facts behind SUI and UUI during pregnancy are unclear and multivariate; there are also society-based variations in the prevalence of UI in nulliparous and multiparous pregnant women. This pilot study was designed to examine the direct effect of gestational factors on the presence of GUI in nulliparous pregnant women. Pregnancy has a considerable influence on lower urinary tract. Urination frequency can differ due to physiological changes of the bladder during pregnancy. Frequency is defined as diurnal changes, which may be upto seven times or more of normal, and slight nocturnal changes of one or more times during the night [1]. Uterine weight is the most important factor which affects frequency during pregnancy. The uterus weight not only applies pressure to the bladder but also irritates it [2]. Other factors that may affect are nervous and hormonal changes (influence on progesterone and relaxin levels). Pregnancy can also result in SUI (influence on tensile properties reduce the structural support of Pelvic Floor Muscle (PFM), decrease in total collagen content can lead to joint looseness and stretching of pelvic ligaments) which is due to weakening of the pelvic floor [1].

MATERIALS AND METHODS

This questionnaire-based study comprised of 61 nulliparous pregnant women with no history of UI before pregnancy. All 61 patients were included in the study. This is a pilot study which included nulliparous women who came to our center in the first trimester and continued their pregnancy follow ups at our center. The same obstetrician performed all the follow ups during January 2015 to December 2016. Patients with systemic disorders, such as diabetes mellitus, obesity, hypertension and urinary system problems, were excluded from the study. Patients with history of previous pelvic floor surgery were also not included in this study. They were examined regularly during their pregnancies within the framework of the antenatal care program running at the Division of Perinatology, Hacettepe University, Ankara, Turkey. The Turkish version of Urogenital Distress Inventory (UDI-6) was used to assess the urinary symptoms [11]. We used this questionnaire three times

during different periods of gestation (11–14, ~24 and ~37 gestational weeks). We queried about complaint of involuntary loss of urine on effort or physical exertion or sneezing or coughing (SUI), strong, sudden need to urinate (UUI), and complaint of features of both SUI and UUI. We also questioned change in urination style, complaints related to the urinary system, change related to the bladder. Change in urination style may be reported as, urination more frequently than before pregnancy, discontinuous urination, difficult urination, straining for urination. Complaints related to the urinary system are pain and burning sensation which may denote urinary system infection. Changes related to the bladder, for example, feeling of fullness in the bladder, were assessed.

The results of the reliability and validity study showed that Turkish version of Urogenital Distress Inventory had psychometrically strong score for assessing symptom severity (Chronboch's alpha 0.74) [11].

We used the definitions of the International Continence Society to describe the symptoms and signs [12]. According to this definition, SUI is the complaint of involuntary leakage of urine on effort or exertion, or on sneezing or coughing, UUI is the complaint of involuntary leakage accompanied by or immediately preceded by urgency and MUI is the complaint of involuntary leakage associated with urgency and, also with exertion, effort, sneezing or coughing.

The study protocol was approved by the Hacettepe University Non-interventional Clinical Researches Ethics Board (approval no: GO 16/101-30). Informed consent was obtained from all participants according to the principles stated in the Declaration of Helsinki and they were informed about the study protocol.

STATISTICAL ANALYSIS

Statistical analysis was performed using the SPSS software version 20.0. Relationship between GUI and maternal age, birth weight of the neonate, gestational age at birth were analysed with logistic regression analyses. A p-value of less than 0.05 was considered to show a statistically significant result.

RESULTS

[Table/Fig-1] shows the data related to maternal age, gestational week(s) at delivery and birth weight of neonates. In our questionnaire-based pilot study, we demonstrated that the prevalence of total UI (SUI, UUI and MUI) in nulliparous pregnancies was 4.9% (n=3), 9.9% (n=6) and 26.3% (n=16) at 11–14, ~24 and ~37 gestational weeks, respectively. SUI was found to be 3.3% (n=2), 6.6% (n=4) and 16.4% (n=10) at 11–14, ~24 and ~37 gestational weeks, respectively [Table/Fig-2]. Urge urinary incontinence frequency was found 1.6% (n=1), 3.3% (n=2), 6.6% (n=4), and mixed urinary incontinence frequency was 0% (n=0), 0% (n=0), 3.3% (n=2) at 11–14, ~24 and ~37 gestational weeks, respectively. Increasing frequency was demonstrated in all types of urinary incontinence during the course of pregnancy. In our study, 36 women never had urinary incontinence (SUI, UUI or MUI) at any time during pregnancy (36/61, 59%). Changes related to the bladder (for example: feeling of fullness in the bladder) were observed 24.6%, 54.1%, 72.1% in first, second and third trimester respectively.

Maternal age, birth weight of the neonate and gestational age at birth had no statistically significant effect on gestational urinary incontinence.

Variables	Mean(SD)	Min-Max
Maternal age (year)	27.29 (3.73)	19-35
Gestational week	38.35 (1.90)	32-41
Birth weight of neonates (grams)	3.017(568.95)	1330-4010

[Table/Fig-1]: Demographic characterics of participants.

Symptoms of urinary incontinence	11-14th gestational week n(%)	24th gestational week n(%)	37th gestational week n(%)
SUI	2 (3.3)	4 (6.6)	10 (16.4)
UUI	1 (1.6)	2 (3.3)	4 (6.6)
MUI	-	-	2 (3.3)
Total urinary incontinence (%)	3 (4.9%)	6 (9.9%)	16 (26.3%)
Change in urination style	22 (36.1)	35 (57.4)	45 (73.8)
Any complaints related to urinary system	17 (27.9)	31 (50.8)	43 (70.5)
Change related to bladder	15 (24.6)	33 (54.1)	44 (72.1)

[Table/Fig-2]: Symptoms of urinary incontinence during pregnancy (n=61).
SUI; Stress urinary incontinence, UUI; Urgency urinary incontinence, MUI; Mixed urinary incontinence

DISCUSSION

Foetal growth and enlargement of utero-placental structures together with endocrinological/metabolic gestational changes may lead to impaired 'urinary bladder-neck' and pelvic floor interaction, and these complex relationships may be the reason for GUI [13-15]. On the other hand, the occurrence of SUI and/or UUI is a more complex medical complaint, especially during pregnancy [2,14,15]. It is not only the mechanical factors and trauma (including previous birth(s) and surgery) but also hormonal (changes in progesterone and relaxin levels), metabolic and genetic factors that are the aetiological rationales behind these urinary complaints [15-19].

Hence, it is important to know the prevalence of GUI during different periods of pregnancy. The prevalence of SUI is reported to be approximately 40% (18.6%–60%), that increases with gestational age (gestational weeks) [1,3,6-8]. In our questionnaire-based pilot study, we have demonstrated that the prevalence of total UI (SUI, UUI and MUI) in nulliparous pregnancies is 4.9%, 9.8% and 26.2% at 11–14, ~24 and ~37 gestational weeks, respectively. SUI (3.3%, 6.6% and 16.4% at 11–14, ~24 and ~37 gestational weeks, respectively) was found to be the main type of UI, as reported previously [4,10].

The goal of this pilot study was to demonstrate the direct effect of expansion of the uterus and foetal growth (together with hormonal, collagen and metabolic changes in pregnancy) on the 'pelvic floor and genital system –urinary system interaction' using a very specific group of pregnant women (those in their first pregnancies) [1,3]. In our study we couldn't demonstrate any relationship between GUI and either the birth weight of the neonate or maternal age. Some genetic/epigenetic factors seem to be important in the appearance of gestation-based pelvic problems [20].

Previous studies on urinary incontinence have been carried out in different communities in the past, some of which include only nulliparous women [1,21-24], but there is no study in this area that has previously covered only nulliparous women, in Turkey. From this point of view, we think that this pilot study can be a pioneer.

In this pilot study, we have noticed that UI complaints accompany some other types of atypical or poorly defined 'pelvic floor' and urinary 'symptoms/complaints', and these unclear situations necessitate a pregnancy-specific approach to UI problems. We believe that better tested questionnaires and well-designed prospective basic science studies are necessary for proper management of gestational GUI and its subtypes (SUI, UUI and MUI).

LIMITATION

The number of patients enrolled in the study was limited. The study participants were selected from only one department and cannot represent the whole population. Multicentre based and better designed studies are necessary to clarify the pregnancy related urinary system problems.

CONCLUSION

In conclusion, urinary incontinence is an important issue during pregnancy and related symptoms are more common in third trimester.

ACKNOWLEDGEMENTS

We are especially grateful to Prof. M. Sinan Beksaç for his support in the organization of this study.

REFERENCES

[1] Sangsawang B, Sangsawang N. Stress urinary incontinence in pregnant women: a review of prevalence, pathophysiology, and treatment. Int Urogynecol J. 2013;24(6):901-12.
[2] Haylen BT, de Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J et al. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. Neurourol Urodyn. 2010;29(1):4-20.
[3] Morkved S, Bo K. Prevalence of urinary incontinence during pregnancy and postpartum. Int Urogynecol J Pelvic Floor Dysfunct. 1999;10(6):394-98.
[4] Mason L, Glenn S, Walton I, Appleton C. The prevalence of stress incontinence during pregnancy and following delivery. Midwifery. 1999;15(2):120-28.
[5] Viktrup L, Lose G, Rolff M, Barfoed K. The symptom of stress incontinence caused by pregnancy or delivery in primiparas. Obstet Gynecol. 1992;79(6):945-49.
[6] Huebner M, Antolic A, Tunn R. The impact of pregnancy and vaginal delivery on urinary incontinence. Int J Gynaecol Obstet. 2010;110(3):249-51.
[7] Martins G, Soler ZA, Cordeiro JA, Amaro JL, Moore KN. Prevalence and risk factors for urinary incontinence in healthy pregnant Brazilian women. Int Urogynecol J. 2010;21(10):1271-77.
[8] Zhu L, Li L, Lang JH, Xu T. Prevalence and risk factors for peri- and postpartum urinary incontinence in primiparous women in China: a prospective longitudinal study. Int Urogynecol J. 2012;23(5):563-72.
[9] Liang CC, Chang SD, Lin SJ, Lin YJ. Lower urinary tract symptoms in primiparous women before and during pregnancy. Arch Gynecol Obstet. 2012;285(5):1205-10.
[10] Sharma JB, Aggarwal S, Singhal S, Kumar S, Roy KK. Prevalence of urinary incontinence and other urological problems during pregnancy: a questionnaire based study. Arch Gynecol Obstet. 2009;279(6):845-51.
[11] Cam C, Sakalli M, Ay P, Cam M, Karateke A. Validation of the short forms of the incontinence impact questionnaire (IIQ-7) and the urogenital distress inventory (UDI-6) in a Turkish population. Neurourol Urodyn. 2007;26(1):129-33.
[12] Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, Ulmsten U, et al. The standardisation of terminology of lower urinary tract function: report from the Standardisation Sub-committee of the International Continence Society. Neurourol Urodyn. 2002;21(2):167-78.
[13] Wijma J, Weis Potters AE, de Wolf BT, Tinga DJ, Aarnoudse JG. Anatomical and functional changes in the lower urinary tract during pregnancy. BJOG. 2001;108(7):726-32.
[14] Jundt K, Scheer I, Schiessl B, Karl K, Friese K, Peschers UM. Incontinence, bladder neck mobility, and sphincter ruptures in primiparous women. Eur J Med Res. 2010;15(6):246-52.
[15] Kristiansson P, Samuelsson E, von Schoultz B, Svardsudd K. Reproductive hormones and stress urinary incontinence in pregnancy. Acta Obstet Gynecol Scand. 2001;80(12):1125-30.
[16] Falconer C, Ekman G, Malmstrom A, Ulmsten U. Decreased collagen synthesis in stress-incontinent women. Obstet Gynecol. 1994;84(4):583-86.
[17] Lin G, Shindel AW, Banie L, Deng D, Wang G, Hayashi N, et al. Molecular mechanisms related to parturition-induced stress urinary incontinence. Eur Urol. 2009;55(5):1213-22.
[18] Altman D, Forsman M, Falconer C, Lichtenstein P. Genetic influence on stress urinary incontinence and pelvic organ prolapse. Eur Urol. 2008;54(4):918-22.
[19] Dietz HP, Hansell NK, Grace ME, Eldridge AM, Clarke B, Martin NG. Bladder neck mobility is a heritable trait. BJOG. 2005;112(3):334-39.
[20] McKenzie P, Rohozinski J, Badlani G. Genetic influences on stress urinary incontinence. Curr Opin Urol. 2010;20(4):291-95.
[21] Bekele A, Adefris M, Demeke S. Urinary incontinence among pregnant women, following antenatal care at University of Gondar Hospital, North West Ethiopia. BMC Pregnancy Childbirth. 2016;16(1):333.
[22] Mallah F TP, Navali N, Azadi A. Urinary incontinence during pregnancy and postpartum incidence, severity and risk factors in Alzahra and Taleqani hospitals in Tabriz, Iran, 2011-2012. International Journal Of Women's Health And Reproduction Sciences. 2014;2:178-85.
[23] Wesnes SL HS, Rortveit G. Epidemiology of urinary incontinence in pregnancy and postpartum. In Urinary incontinence. InTech. 2012.
[24] Brown SJ DS, MacArthur C, McDonald EA, Krastev AH. Urinary incontinence in nulliparous women before and during pregnancy: prevalence, incidence, and associated risk factors. International Urogynecology Journal. 2010;21(2):193-202.

PARTICULARS OF CONTRIBUTORS:
1. Research Fellow, Department of Urology, Icahn School of Medicine at Mount Sinai, New York, USA.
2. Department of Obstetrics and Gynaecology, Kayseri Education and Research Hospital, Kayseri, Turkey.
3. Physiotherapist, Department of Physiotherapy, Hacettepe University, Ankara, Turkey.
4. Professor, Department of Bioistatistics, Hacettepe University, Ankara, Turkey.
5. Professor, Department of Physiotherapy Hacettepe University, Ankara, Turkey.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Emine Aydin,
Department of Obstetrics and Gynecology, Kayseri Education and Research Hospital, Kayseri-06230, Turkey.
E-mail: eminebas kurtaydin@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Nov 22, 2016**
Date of Peer Review: **Feb 10, 2017**
Date of Acceptance: **Jul 11, 2017**
Date of Publishing: **Aug 01, 2017**