



ETIOPATHOLOGY OF PREGNANCY URINARY INCONTINENCE – A SINGLE CENTRE EXPERIENCE

Urology

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ABSTRACT

INTRODUCTION Lower urinary tract symptoms are a common problem during pregnancy. Pregnant women may experience lower urinary tract symptoms which include not only urinary incontinence, but also increased frequency and nocturia, urinary tract infection, filling and voiding disorders, pelvic organ prolapse and retention of urine. The fact that urinary incontinence is more common in women than in men indicates the contribution of factors such as pregnancy and delivery to urinary incontinence. Far less is understood about urinary incontinence in pregnancy.

AIM The aim of the study is to analyze the prevalence and risk actors of urinary incontinence in pregnancy and utilize these results, for proper management of urinary incontinence in pregnancy.

MATERIALS AND METHODS The study was a prospective study conducted from January 2016 to March 2020 in the institute of urology, madras medical college, Chennai. This was a study involving 200 pregnant women with urinary incontinence. The data included are patient's age, occupation; body mass index, gestational age, parity and type of urinary incontinence. The results were analysed statistically using appropriate methods.

RESULTS The most common type was stress urinary incontinence, affecting 58% of the women and this disorder was more common during the third trimester of pregnancy. 31% of incontinence was noticed in older women. Multiparous women (43.5%) had high incidence of urinary incontinence compared to nulliparous women (7.5%).

CONCLUSIONS Major risk factors were parity, aging, sedentary life style, obesity and gestational age. In all patients, leakage was mild to moderate that did not severely affect their everyday life. But incontinence had its effect on their physical, mental and social wellbeing.

KEYWORDS

Urinary Incontinence, Pregnancy, Urgency, Parity

INTRODUCTION

Urinary incontinence is defined as any involuntary urinary leakage by the International continence society.¹ Urinary incontinence is a common condition affecting adult women of all ages and it has a negative impact on quality of life. The prevalence of urinary incontinence in women varies from 13 to 35%.² The aetiology of urinary incontinence is multifactorial. The most important risk factors are obesity, ageing and adverse obstetric events. The fact that urinary incontinence is more common in women than in men indicates the contribution of factors such as pregnancy and delivery to urinary incontinence. Although several studies have demonstrated a direct association between urinary incontinence and vaginal delivery in short, medium and long-term, the role of childbirth on the risk of urinary incontinence remains controversial. Factors causing remission of urinary incontinence has not been well studied but would include reversible causes of incontinence i.e. urinary tract infection, urogenital atrophy, pregnancy, weight changes. Also genetic factors have been recently raised up but still there are not appropriate guidelines or measures to reduce significantly the incidence of urinary incontinence. During pregnancy the prevalence of urinary incontinence has been observed at 23% in first trimester to 67% at the end of pregnancy, and from 6% to 29% from 6 months up to 1 year post-partum.^{3,4} Many studies have consistently shown that pregnant women with urinary incontinence have significantly lower quality of life during pregnancy than those without urinary incontinence, and the quality of life worsens as gestational age increases. Many studies have estimated that 10% of women more than 18 years and 33% of women more than 40 years are affected by urinary incontinence.⁵ However, despite being such a common problem, it may not be reported and there may be long delays between onset and when women seek help for it. It has been observed that only 20% of women with urinary incontinence seek help. The main reasons are a lack of knowledge and embarrassment.

Urinary incontinence is classified as urgency urinary incontinence, stress urinary incontinence and mixed urinary incontinence. Urgency urinary incontinence is involuntary urinary leakage accompanied with or preceded by a sudden compelling desire to pass urine, which is tough to defer. Stress urinary incontinence is defined as an involuntary leakage of urine during exertion, or during episodes of coughing or sneezing. Mixed urinary incontinence contains both stress and urgency components. Stress urinary incontinence is the most common type of urinary incontinence.

It is well known that, during pregnancy, women can experience urogynaecological problems which includes not only urinary incontinence, but also urinary tract infection, filling and voiding

disorders, pelvic organ prolapse. The development of these conditions determinate physiological changes that occur in pregnancy but it can be also linked to previous pregnancies. Important factors implicated in causation of urinary incontinence in reproductive age group females are pregnancy, anatomical defects developing after delivery, changes in hormones and urethrovesical angle, increased pressure on levator muscles, connective tissue and ligaments. The other risk factors which contribute towards urinary incontinence include advanced age, multiparity, multiple pregnancy, smoking, alcohol consumption, coffee consumption, raised body mass index, diabetes and constipation.

During pregnancy, supporting structures are affected due to the foetus weight and the progressive growth of the uterus, both in weight and size. Pregnant uterus also increases the angle between the bladder neck and urethra, which can participate to urinary symptoms. Hormonal changes due to pregnancy can also cause changes in tissue, in the support and in the continence mechanism. Vaginal delivery is also a common cause of urinary incontinence. The mechanical strain during delivery may induce injuries to the muscle, connective and neural structures. Vaginal birth can be associated with relaxation or disruption of fascial and ligamentous supports of pelvic organs. Parity, instrumental delivery, prolonged labour and increased birth weights have always been considered risk factors for pelvic floor injury.

In the last years, clinicians and health researchers have extensively investigated the factors influencing prevalence of urinary incontinence in order to ameliorate the management and treatment of affected patients. However, accurate prevalence data are difficult to obtain from the literature since noteworthy differences among the studies in terms of methodologies. This study was planned to estimate the prevalence of urinary incontinence in pregnant women and to explore the associated risk factors.

METHODS

The study was a prospective study conducted from January 2016 to March 2020 in the institute of urology, madras medical college, Chennai. Prior approval was obtained from the Institutions Ethical Committee. This was a study involving 200 pregnant women with urinary incontinence. All healthy pregnant women, who agreed to be part of the study and given written informed consent, were recruited in the study. Women with a high risk pregnancy, pregnant women with urinary tract infections, pregnant women with diabetes and gestational diabetes, pregnant women with preeclampsia, pregnant women with renal diseases and those who did not agree to comply with the formalities of the consent form and questionnaire were excluded from

the study. The criterion adopted to classify a pregnant woman as incontinent was based on the International continence society definition corresponding to any person who had confirmed urinary leakage, regardless of the amount leaked.

Statistical Analysis

We enrolled total number of 200 pregnant women with urinary incontinence. The data included were patients' age, occupation; body mass index, gestational age, parity and type of incontinence. The results were analysed statistically using appropriate methods. All the data was entered systematically into Microsoft Excel 2007 software and further analysed using SPSS software version 24.0 (IBM Inc., Chicago). All the categorical variables were expressed in terms of number and percentages. As the prevalence of urinary incontinence among pregnant women varies from 25% to 70% in published literature, a conservative estimate of prevalence of 40% is used, then according to formula, $N = Z^2 P(1-P)/e^2$.

RESULTS

Pregnant women recruited were between 18 to 40 years of age. Significant association was found between the pregnancy urinary incontinence and elderly. 31% of women were above 35 years. None of the women reported performing strenuous jobs or lifting heavy weight. Most of them were housewives, and involved in daily household work. Only minority of patients were working in office jobs and as labourers. High body mass index was also a risk factor for pregnancy urinary incontinence.

Age Group(Y)	Total No of Patients(N=200)	Percentage
<20	15	7.5
20-25	34	17
25-30	42	21
30-35	47	23.5
>35	62	31

Table 1. Demographic Characteristics - Age Group

Occupation	Total No of Patients(N=200)	Percentage
Home Maker	109	54.5
Office Job	39	19.5
Labourer	52	26

Table 2. Demographic Characteristics - Occupation

Body Mass Index	Total no of Patients(N=200)	Percentage
<18	44	22
18-24.9	108	54
24.9-29.9	32	16
>30	16	08

Table 3. Demographic Characteristics - Body Mass Index

Gestational age was also one of the aetiological factors for pregnancy urinary incontinence. 49% of the women were in third trimester and only 12.5% were in first trimester. Multiparous women (43.5%) had high incidence of urinary incontinence compared to nulliparous women (7.5%).

Gestational Age	Total No of Patients(N=200)	Percentage
First trimester	25	12.5
Second trimester	77	38.5
Third trimester	98	49

Table 4. Gestational Age Analysis

Parity	Total No of Patients(N=200)	Percentage
Primi Gravida	15	7.5
Second Gravida	22	11
Third Gravida	76	38
Fourth Gravida	87	43.5

Table 5. Parity Analysis

Urinary Incontinence	Total no of Patients(N=200)	Percentage
Stress Incontinence	116	58
Urge Incontinence	54	27
Mixed Incontinence	30	15

Table 6. Urinary Incontinence During Pregnancy

Stress urinary incontinence was the most common type of urinary incontinence and it was seen in 58% of women and followed by urge incontinence in 27% and mixed incontinence in 15%. A significantly

higher rate of stress urinary incontinence during all three trimesters was found in the multiparous compared with nulliparous women; that is, being multiparous was a predictor of stress urinary incontinence during pregnancy. Urinary retention was also noticed both in first and third trimester of pregnancy. Incomplete emptying and nocturia were also significantly seen in pregnant women.

DISCUSSION

Various studies on pregnancy urinary incontinence show a wide variation in their estimation of the problem, depending upon the study design, stages of pregnancy and how urinary incontinence is defined. Inadequate antenatal care and poor patient compliance were also reasons for high prevalence of pregnancy urinary incontinence. Pregnancy has significant impact on physiology of lower urinary tract. During pregnancy, supporting structures are supposed to be overloaded due to the foetus weight and the progressive growth of the uterus, both in weight and size.^{6, 7} Expansion of the uterus and increment increase in foetal weight with gestational age, especially at the third trimester influence the incontinence mechanism. They put direct pressure on the bladder, which may lead to changing the bladder-neck position and reducing bladder capacity, contributing to bladder pressure that exceeds urethral pressure. This causes urine leakage. Uterine position is another issue that plays a significant role. The impacted retroverted gravid uterus causes fluid retention because it interferes with the obliteration of the posterior urethrovesical angle. It does not elevate the urethrovesical junction in the pelvis, nor does it elongate the urethra.

There is a significantly higher prevalence of stress urinary incontinence in pregnant women than in nonpregnant women. Pregnancy may also be associated with reduced pelvic floor muscle strength, which can cause stress urinary incontinence. Physiological weight gain during pregnancy may lead to increased pressure on the pelvic floor muscle and bladder, which may result in greater urethral mobility. Furthermore, excess maternal weight gain may impair blood flow and innervations to the bladder and urethra. The growing uterus and foetus weigh solely on pelvic floor muscle, which contributes to chronic stress on pelvic floor muscle throughout pregnancy and results in pelvic floor muscle weakness. Sphincter strength and its supportive function of pelvic floor muscles are jeopardized. However, the exact causes of pregnancy-related stress urinary incontinence remain unclear.

Hormonal changes due to pregnancy can also cause changes in tissue, in the support and in the continence mechanism. Changes in relaxin and progesterone levels during pregnancy may have a significant role in the development of urinary incontinence.¹¹ Relaxin, which plays an important role in maintaining urinary continence during pregnancy,¹² could stimulate tissue growth in the lower urinary tract and increase urethral pressure. There is a marked increase in relaxin concentration to peak at a gestational age of 10 to 14 weeks and then decrease to a stable level of approximately half the peak value at the 17 to 24 weeks of pregnancy, resulting in decreased growth of the urethral epithelium. This may lead to a decrease in urethral pressure. As pregnant women with stress urinary incontinence have lower urethral pressure than continent pregnant women, lower relaxin concentrations in late pregnancy, therefore, correlate with a higher prevalence of stress urinary incontinence at the second and third trimesters. Increased progesterone may relax smooth muscles in the urinary system, result in reduced ureter, bladder, and urethral tone.

Collagen changes included both tensile properties and number. Changes in tensile properties contribute to reduced functional support of pelvic floor muscle, and reduced total collagen content may result in joint laxity and stretching of pelvic ligaments. The aetiology of urinary incontinence in pregnant women appears to be due to both quantitative and qualitative reduction in collagen. In humans, there is a three-fold prevalence of stress urinary incontinence among first-degree relatives of female patients with stress urinary incontinence which suggests a genetic factor involved in the predisposition of connective tissue injury. Several studies showed the relationship between predisposing gene and pelvic floor disorders, including urinary incontinence, on chromosome 9q21.⁸ In a large sample of twins, it has been demonstrated a genetic component for the aetiology of stress urinary incontinence, although environmental factors equally contributed to variation liability. Further research into the genetic basis of urinary incontinence may provide a comprehensive understanding of the biological basis of the disorder.

Higher body mass index is associated with pregnancy urinary incontinence and this risk is not related to the type of delivery, vaginally or by caesarean section. Higher body mass index doubles the risk of stress urinary incontinence. Increased body mass index was not only associated with urinary incontinence but with pelvic organ prolapse also. Another important contributing factor in developing urinary incontinence after delivery is the presence of urinary leakage before pregnancy. Thus, prepregnant urinary incontinence was a significant risk factor for the development urinary incontinence during pregnancy.

In the present study, amongst all patients with urinary incontinence, maximum had stress urinary incontinence. Other studies have also found that stress urinary incontinence has the highest prevalence amongst all types of urinary incontinence in pregnancy. We found stress urinary incontinence in 58% subjects, urge urinary incontinence in 27% and mixed urinary incontinence in 15%. Literature quotes stress urinary incontinence during pregnancy with prevalence ranging from 18.6% to 75% comparable to our study. A good management of pre-pregnancy body mass index and weight gain during pregnancy, proper management especially of the second and third stage of labour, treatment of urinary tract infection, and finally a good awareness of pelvic floor and its training to strengthen those muscles may help to reduce the possibility of developing urinary incontinence after pregnancy.

Urinary incontinence remains a disabling condition and carries a significant impact on quality of life. The exact cause of pregnancy related stress urinary incontinence remains unclear. Pelvic floor muscle weakness leading to increased bladder neck and urethral mobility is attributed to cause urethral sphincter incompetence. Pelvic floor muscle exercises have been shown to be an effective treatment for prevention as well as treatment of stress urinary incontinence during pregnancy and post-partum period.^{9,10} They are a safe and simple treatment modality and can be done irrespective of time and place. We need to increase the awareness of urinary incontinence and pelvic floor muscle exercises. Women should be offered pelvic floor muscle exercises in an effort to improve the quality of life in pregnancy.

All patients should have careful assessment of the condition as it remains under reported. A limitation of this study was small volume of patients and without postpartum follow up. Further studies are necessary to explore lower urinary tract symptoms during pregnancy with more detailed measurements and follow-up for a significant period of time, which may reveal further predictors for lower urinary tract symptoms to help prevent their postpartum occurrence.

CONCLUSIONS

Lower urinary tract symptoms during pregnancy and postpartum have been associated to physiological and anatomical changes of pregnancy. The main risk factors were multiparity and pre-pregnancy lower urinary tract symptoms, constipation, pregestational maternal body mass index and family history of urinary incontinence and increasing maternal age. However, those symptoms are transient and disappear some months after delivery. Persistent stress urinary incontinence and urgency urinary incontinence three months after delivery are risk factors for long-lasting problems. The prevalence of urinary incontinence was more common in elderly pregnant women and in multiparous and was more common during the third trimester of pregnancy than during the first. The most common type was stress urinary incontinence, affecting 58% of the women. In all patients, leakage was mild to moderate that did not severely affect their everyday life but did affect their physical, mental and social wellbeing.

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