Evaluation of the Prevalence of Lower Urinary Tract Symptoms among Primigravidas in the Third Trimester of Pregnancy and Puerperium - A Prospective Study

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ABSTRACT

BACKGROUND
Pregnancy is associated with lower urinary tract symptoms which may affect the quality of life of the patients. Labour, delivery and various obstetric factors can influence these symptoms. The present study aims to evaluate the prevalence of lower urinary symptoms in pregnancy and the effect of obstetric factors on it.

METHODS
Seventy five primigravidas were followed up antenatally from 28 weeks of gestation till 6 weeks postpartum regarding urinary symptoms and quality of life using International Prostate Symptom Score. Data regarding obstetric variables like mode of delivery, birth weight of baby, duration of second stage of labour were collected.

RESULTS
The incidence of UTI was 26.6%. The symptom score showed 84% in the mild group and 16% in the moderate group. After delivery and 6 weeks postpartum, the symptoms and the quality of life score improved. There was no association between mode of delivery, duration of second stage, birth weight and episiotomy with the persistence of symptoms.

CONCLUSIONS
Most of the lower urinary tract symptoms developing during pregnancy resolve postpartum and obstetric factors are not associated with it.

KEYWORDS
Urinary Incontinence, Symptom Score, Quality of Life Score, Labour and Delivery, Lower Urinary Symptoms
BACKGROUND

Pregnancy is associated with lower urinary tract symptoms in apparently healthy women also. The symptoms most prevalent are abnormal voiding patterns and stress incontinence. Other symptoms such as urgency, urge incontinence, and symptoms of voiding difficulties have also been described. The lower urinary and reproductive tracts are intimately associated during embryologic development. Therefore the anatomical and functional changes during pregnancy are expected to affect the lower urinary tract also. In addition, the upper urinary tract also shows changes. The kidneys and ureters undergo dilatation and renal function is altered. Alteration in hormonal levels, mechanical pressure exerted by pregnant uterus and the passage of newborn infant through the birth canal may each have its effect on bladder and urethra. So during and immediately after labour, the lower urinary tract is particularly vulnerable to damage. All these may contribute to the incidence of lower urinary tract symptoms in association with pregnancy and puerperium. The upper urinary tract changes could also be due to the above effects. The severity of changes produced varies depending on parity, duration of labour, mode of delivery and the presence of pre-existing dysfunction. An assessment of these made in the course of pregnancy and puerperium would help us to identify those women who are likely to have more severe dysfunction. We could also get valuable insight into the phase of pregnancy when these changes begin and manifest most. Understanding the different aspects of this phenomenon would improve our clinical management of the condition so that a more rational approach towards bladder care can be taken especially during labour and puerperium.

METHODS

The present prospective observational study was conducted in the Department of Obstetrics & Gynaecology in a tertiary care hospital in South India. Participants represented various parts of South India and were enrolled with consecutive sampling technique. Eligible participants were approached in the labour ward and Informed consent was obtained before enrolling in the study. Seventy five primigravidas who had antenatal check-up in the Obstetrics & Gynaecology department and delivered in the same hospital were included in the study.

Inclusion Criteria

Primigravidas with no life threatening complications at the time of entry into the study, i.e., 28 weeks of gestation as per last menstrual period.

Exclusion Criteria

- Patients who have undergone any operative procedure on lower urinary tract
- Surgery on pelvic organ before or during pregnancy.
- Patient on medications known to interfere with lower urinary tract function such as anticholinergics, sympathomimetics, nonselective alpha adrenergic blocking agents etc.
- Bacteriuria with symptoms, signs or investigatory evidence of upper urinary tract involvement such as leukocytosis, fever, loin pain, casts in urine and sepsis syndrome.
- Patients with any other uncontrollable medical disorders.
- Patients on diuretic therapy.
- Patients with known neurologic disease.

The study patients were administered symptom score at entry (i.e., 28 weeks as per LMP) and every 2 weeks up to 36 weeks and weekly after 36 weeks until delivery, during their antenatal check-up. USG for renal size and hydronephrosis and serum creatinine were done at 36 weeks. Intercurrent UTI after entry were recorded and therapy noted.

The symptom score provided to the patient was International Prostate Symptom Score which contained questions regarding urinary complaints like frequency, incomplete emptying, urgency, poor urinary stream and nocturia. It also enquired about the quality of life the subject perceived to have. Further information regarding incontinence was also collected.

At delivery, the following details were noted like mode of delivery, whether vaginal or caesarean section, if CS whether elective or emergency and vaginal instrumental deliveries like forceps delivery. Other details collected were indication for operative delivery, duration of labour- 1st stage and second stage, birth weight of baby, presence or absence of episiotomy or tear, whether the patient was catheterized or not. In those undergoing caesarean section, further details like type of anaesthesia given, any bladder injury during CS, if emergency CS, cervical dilatation and station of presenting part and duration of catheterization were collected.

Following delivery symptom score was administered on the day following catheter removal in catheterized patients or 24 hours after delivery in non-catheterized patients. The patients were followed up at postnatal visit at 6 weeks into puerperium and were administered the symptom score and the score noted. Also investigations like USG for renal size and hydronephrosis were repeated and results recorded.

The study extended for a period of two years and participants were enrolled as required for the study. Data was entered into excel and doubled checked for eliminating the data entry errors. To maintain the confidentiality, data was entered anonymously using separate codes and personal identifications were avoided.

Statistical Analysis

The data collected in this study was analysed by computing the relevant sample statistics, viz., Mean, SD, etc. to infer on the population parameters. To arrive at the statistical inference, the statistical tests like ANOVA, student’s T test, (both independent and paired) were used and was
considered statistically significant if the p value was less than or equal to 0.05 (i.e., $p \leq 0.05$).

**RESULTS**

The study group of 75 patients had a mean age of 23.1 ranging from 17 to 34 years. Majority of these subjects (70.6%) were between 17 and 25 years. Of the 75 subjects the mean symptom score was found to be 7.57 before delivery which improved to 3.47 after delivery and 1.59 at 6 week postpartum (Table 2). The analysis of variance showed that the difference in the mean symptom score between the three groups -before delivery, after delivery and 6 weeks postpartum was statistically significant. On further comparing the three groups to each other using paired t test, it has been found that the decrease in the mean symptom score from before delivery to after delivery to 6 week postpartum were all statistically significant (Table 1).

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Quality of Life Score</th>
<th>Before Delivery</th>
<th>After Delivery</th>
<th>6 Weeks Postpartum</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>Unhappy</td>
<td>8%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>26%</td>
<td>Mostly dissatisfied</td>
<td>12%</td>
<td>27%</td>
<td>2%</td>
</tr>
<tr>
<td>40%</td>
<td>Mostly satisfied</td>
<td>43%</td>
<td>30%</td>
<td>15%</td>
</tr>
<tr>
<td>15%</td>
<td>Pleased</td>
<td>17%</td>
<td>15%</td>
<td>12%</td>
</tr>
<tr>
<td>3%</td>
<td>Delighted</td>
<td>5%</td>
<td>9%</td>
<td>17%</td>
</tr>
</tbody>
</table>

The quality of life score also showed a similar tendency to improve with a mean value of 3.07 before delivery, 1.83 after delivery and 1.13 at 6 week postpartum (Table 2). The mean score before delivery corresponded to a perception of mixed feelings whereas at 6 weeks postpartum it improved to a pleased state. The age wise distribution of the score also did not show much difference. On comparing the quality of life score between the three groups was found to be statistically significant as in the case of symptom score(Table 1). The following figure gives the distribution of the patients in various categories of quality of life before pregnancy, after delivery and 6 weeks postpartum. 92.3% of the patients who had a quality of life score of 5 or 6 before delivery corresponding to unhappy or terrible perception of life, improved to a score of 2 or 1 which corresponded to pleased and mostly satisfied feelings (figure 1,2,3). Figure 1, 2, 3 showing the quality of life of the study group before delivery, after delivery and at 6 weeks postpartum. There was found to be 26.6% incidence of UTI in the antenatal period in the 75 subjects studied. Of these 1 patient had recurrent UTI. The age distribution of patients with UTI showed that most were in the younger age group. On comparing the mean symptom score of the patients who did not have, there was not much difference. Another important symptom studied was the presence of urinary incontinence. It was found that 29.33% had incontinence before delivery (i.e. during pregnancy), 13.33% had incontinence soon after delivery whereas only 5.33% had urinary incontinence at 6 weeks postpartum (Table 2). Only 1 patient had urinary incontinence after delivery persisted to have it at 6 weeks postpartum. The age stratification of patients did not show any association with incontinence.

Of the 75 subjects, 20% had presence of post void residue before delivery and 8% had it at 6 weeks postpartum (Table 2). But only 5 (6.67%) of the total had a significant post void residue. The post void residue before delivery ranged from 10 ml to 119 ml whereas at postpartum 6 weeks it ranged from 10 to 90 ml. The study of kidneys and ureters of patients showed that 25.35 had normal scan findings and 74.7% had back pressure changes. At 6 weeks postpartum this had reverted back to normal in all except 1 patient (1.3%). It was also noted that right sided changes were more than left.

In the whole group, 78.7% had vaginal delivery of which 16% had forceps delivery. 21.3% of the patients underwent LSCS, 1.3% being elective LSCS. There were 76 babies including one twin. The average birth weight of the study group was 2.76. The range was from 2.01 kg to 3.78 kg. Only 3 babies were found to have a birth weight >3.5 kg. The mean duration of the first stage of labour was 4.06 hours and that of the second stage was 17.49 minutes. None of the patients had a prolonged second stage as per the definition (>2 hours in primigravida). The duration of the first stage ranged from 1 hour to 11 hours and that of second stage from 10 minutes to 90 minutes.
Before delivery 84% of patients had symptom score which belonged to mild group (0-11) and 16% had a score of moderate group (12-21). None of them had a score in the severe group (>21). The patients having milder symptoms mostly had a quality of life score showing mostly satisfied and mixed perception. After delivery all patients except one had a symptom score showing mild symptoms and most were pleased or mostly satisfied with their lives. At 6 weeks post-partum all of them had a score in mild group and most were pleased with their quality of life.

The delivery parameters were studied for the association with symptoms after delivery and at 6 weeks postpartum. Only 1 patient who had forceps delivery had moderately severe symptoms after delivery, all other 74 patients had milder symptoms whatever be the mode of delivery. Similarly at 6 weeks postpartum the symptom score of all the patients were in the mild group irrespective of the mode of delivery. The symptom scores after delivery and 6 weeks postpartum also did not show any relation to the duration of second stage of labour, birth weight of baby, presence of episiotomy, tear or anaesthesia given to the patient did not show any association with the presence of incontinence after delivery or its persistence or development at 6 weeks postpartum (Table 3).

The presence of incontinence after delivery was studied in relation to mode of delivery and found that 6 out of 53 patients who had vaginal delivery including the one with forceps delivery had incontinence whereas 4 out of 11 who underwent emergency LSCS had a similar complaint. At 6 weeks postpartum only 4 patients were found to have incontinence - the one who had forceps delivery and 3 others with normal delivery. The other delivery parameters like duration of second stage of labour, birth weight of baby, episiotomy, tear or anaesthesia given to the patient did not show any association with the presence of incontinence after delivery or its persistence or development at 6 week postpartum (Table 3).

### DISCUSSION

Lower urinary tract symptoms are very common in pregnancy. Some symptoms like incontinence develop after delivery. This may be due to various physiological and pathological changes occurring to the lower urinary tract during pregnancy and delivery. An assessment of the prevalence of symptoms and quality of life of the patient was done during the third trimester of pregnancy and puerperium in this study. The influence of the mode of delivery and other obstetric variables in development and persistence of symptoms were also noted. The relationship of symptoms with investigations and the changes occurring in these were noted. Chaliha et al4 in their review describes the physiological and pathological consequences of pregnancy and delivery on the urinary tract, and how these may be minimized.

The mean age of the study group was 23.1 years. The age wise distribution of the symptom score of the study

### Table 1. Comparison of Symptom Score and Quality of Life Score between the Three Groups by Paired t Test

<table>
<thead>
<tr>
<th>Measurement at</th>
<th>Symptom Score</th>
<th>Quality of Life Score</th>
<th>Incontinence</th>
<th>Post Void Residue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Before delivery</td>
<td>7.57</td>
<td>3.874</td>
<td>3.07</td>
<td>1.359</td>
</tr>
<tr>
<td>After delivery</td>
<td>3.47</td>
<td>3.086</td>
<td>1.83</td>
<td>0.844</td>
</tr>
<tr>
<td>Postpartum</td>
<td>1.59</td>
<td>1.443</td>
<td>1.13</td>
<td>0.622</td>
</tr>
</tbody>
</table>

**Table 2. Showing Symptom Score, Quality of Life Score, Incontinence and Post Void Residue before Delivery, after Delivery and 6 Weeks Postpartum**

<table>
<thead>
<tr>
<th>Obstetric Parameters</th>
<th>Symptom Score</th>
<th>Incontinence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>After Delivery</td>
<td>Postpartum</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>Moderate</td>
</tr>
<tr>
<td>Birth</td>
<td>&lt;3.5 kg</td>
<td>71</td>
</tr>
<tr>
<td>Weight</td>
<td>&gt;3.5 kg</td>
<td>3</td>
</tr>
<tr>
<td>2nd Stage Duration</td>
<td>&gt;1 hour</td>
<td>3</td>
</tr>
<tr>
<td>Mode of Delivery</td>
<td>Vaginal</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Forceps</td>
<td>11</td>
</tr>
<tr>
<td>Emergency LSCS</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>Elective LSCS</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

**Table 3. Association of Symptom Score and Incontinence with Obstetric Parameters**
subjects did not show any particular relation to age of the patient. The mean symptom score was found to be similar in all the age groups. Liang et al noted that lower urinary tract symptoms were more common during pregnancy and the prevalence of symptoms generally increased with gestational age. Stanton et al had studied urologic symptoms in normal pregnancy and found to have increased incidence of urinary symptoms especially frequency and nocturia which increased progressively till term. They found that the symptoms were more in multiparous women. As this study included only primigravid patients, a comparison with multiparous women was not possible. It was found in this study that there was statistically significant improvement in the mean symptom score from before delivery to after delivery and 6 weeks postpartum and also from after delivery to 6 weeks postpartum. This is in accordance with the review by Magdy and colleagues which suggested an improvement of symptoms after delivery. Stanton et al had also noted a decrease of urinary symptoms postnatally. Dilek Aslan et al had studied the urinary symptoms in pregnancy using International Prostate Symptom Score. They have found that 47.6% had a symptom score more than 7 and 48.4% had quality of life score >4 during the antenatal period. In the present study the cut off value of 11 was taken as the upper limit for milder symptoms. Only 8% had a score of more than 11 before delivery. Taking the percentage of patients with score above 7 it was found to be 45.32%, which is similar to the above quoted study. The percentage of patients who had a quality of life score >4 was about 22.68% only. This may be because of the difference in the influence of the symptoms on their quality of life, which is dependent on many other factors like socio-economic conditions, cultural factors, life style etc. The quality of life score also did not show much difference between the different age groups. This might be because most patients were between 17 years and 30 years and there were few patients in higher age groups. Similar to the symptom score, the quality of life score also showed a decrease in the mean values after delivery and 6 weeks postpartum which was statistically significant. Although there were no patients with symptom score in severe group, majority of them were unhappy with their quality of life. At 6 weeks postpartum most of the patients who were unhappy or feeling terrible about their quality of life became pleased or were mostly satisfied with their lives. Adaji et al studied lower urinary tract symptoms experienced by pregnant women and found the ICIQ-FLUTS questionnaire as a helpful tool in identifying these symptoms.

In the review of lower urinary tract dysfunction done by Magdy and colleagues, the prevalence of bacteriuria ranged from 2-8%. But in this study 26.6% of the subjects had UTI during the antenatal period and most of them were treated. There was no subject who had involvement of upper urinary tract with development of pyelonephritis. In the same review Magdy and colleagues gave an incidence of development of pyelonephritis in 30% if left untreated. They also found that the incidence of UTI increases with age and parity. In the present study, only primigravidas were studied and most belonged to younger age groups. Even then, there was a higher incidence of UTI in this study. This might be due to the socioeconomic conditions and cultural practices of the study group. In the study group the incidence of urinary incontinence was found to be 29.33% before delivery, 13.33% after delivery and 5.33% at 6 weeks postpartum. Stanton et al in the study of urologic symptoms had found that incontinence increased till term and decreased after delivery. Magdy and colleagues in their review gave an incidence of 30-50% for urinary incontinence. Cutner et al reported the incidence of incontinence to be 13-26% of all pregnant women. The present study also got a similar incidence. Chalina et al also reported a similar incidence of 5% and 19% for urge incontinence and stress incontinence respectively in the postpartum period. Viktrup et al also got a similar finding. Wilson et al and Viktrup et al found that incontinence after delivery was more associated with vaginal delivery. Rovtvert et al also gave a similar conclusion.

Viktrup et al and Persson et al found associations with maternal age at 1st delivery, duration of second stage, and birth weight of infant, forceps, vacuum delivery and episiotomy were negatively associated. Arya et al had found that incontinence was significantly higher in the forceps group. They did not find any association with age, birth weight of baby, epidural anaesthesia, presence of episiotomy or vaginal wall lacerations. Snooks et al also found a positive correlation with vaginal delivery with forceps assistance. The present study also had a conclusion similar to that of Arya et al. There was no association with age or obstetric variables like birth weight of baby, anaesthesia given, episiotomy or vaginal wall lacerations. After delivery there was no difference between the vaginal delivery and CS groups regarding incidence of incontinence. But at 6 weeks postpartum, all the 4 patients who had incontinence had vaginal delivery. Also the only patient with persistence of incontinence after delivery to 6 weeks postpartum had a forceps delivery.

In the present study, maternal nephrosonography was done in pregnancy and found that there was dilatation of renal tract in pregnant women. The incidence of renal changes was 74.7%. Both sides were affected, even though the right side was more affected. This was in accordance with the study by Cietak et al. They also got an overall incidence of hydronephrosis of about 66.6%. Tischendorf D found an incidence of 51.1% of dilatation of kidney, with right sided predominance and there was no dilatation in puerperium. In the present study also changes reverted back to normal in puerperium. Sandra Peake et al saw that a history of urinary tract problem did not affect the renal changes. A similar finding was obtained in the present study also.

In this study, 20% had post void residue before delivery but, only 8% had it postpartum. No association had been found between the presence of PVR and UTI also. The measurement of PVR was done by USG in this study also, as by Roerborn and colleagues. BT Haylen had also done PVR by USG, which was found to be an accurate method.
CONCLUSIONS

The incidence of lower urinary tract symptoms is increased in pregnancy. This study evaluated its prevalence in primigravid women. The resolution or persistence of the symptoms and its effect on quality of life after delivery and 6 week postpartum were noted and was found that patients had significant improvement in the postpartum period. Effect of pregnancy on upper urinary tract and renal function also reverted back to normal at 6 weeks postpartum. The mode of delivery and obstetric variables were also found to have no significant association with development or persistence of symptoms.

REFERENCES


