Original Studies

Urinary and Anal Incontinence in African American Teenaged Gravidas during Pregnancy and the Puerperium

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Abstract. *Study Objective:* To determine the prevalence of urinary and anal incontinence during pregnancy and immediately postpartum in a convenience sample of African American teenaged women in an urban setting and to assess for an association between this incontinence and obstetrical risk factors.

Methods: 74 African American adolescents, ages 14−19, participated in the study. During third trimester prenatal visits and at 6 weeks postpartum, participants completed the Wexner Continence Grading Scale and Urogenital Distress Inventory Short Form (UDI-6). Chart abstraction was conducted for other relevant history.

Results: Seventy-eight percent (58/74) of the adolescents were followed for the duration of the study; 22% were lost to follow-up. Incontinence was defined by a positive response on either questionnaire, irrespective of severity. In the third trimester, 44% of patients complained of urinary urge incontinence and 43% of stress incontinence; 12% complained of fecal and 41% of flatal incontinence. At six weeks postpartum, only 9% complained of urge incontinence and 5% of stress symptoms. Similarly, fecal incontinence decreased to 4% and flatal incontinence to 9%. Postpartum, the rate of flatal incontinence in the women who underwent instrumental deliveries was significantly increased when compared to those who had a spontaneous vaginal delivery or cesarean section (OR 12, $P = 0.04$).

Conclusion: Urinary and anal incontinence is present in this convenience sample of pregnant African American teenagers and should be addressed during pregnancy and the puerperium. Instrumental delivery significantly increased the risk of flatal incontinence postpartum in this population.

Key Words. Urinary incontinence—Anal incontinence—Flatal incontinence

Introduction

The pathophysiology of both urinary and anal incontinence in pregnancy and the puerperium is multifactorial. The state of pregnancy itself, hormonal changes, changes in the urethrovesical angle, post delivery anatomical defects, and dynamic forces involving the levator muscles and connective tissues have all been implicated. These stressors on the pelvic floor result not only in immediate post-partum incontinence, but also in incontinence much more removed from pregnancy.[1] For example, Viktrup and Lose[2] found that if a primiparous woman developed stress incontinence during pregnancy or the puerperium and that incontinence had not remitted by three months postpartum, her risk of symptoms five years afterward was 92%.

The prevalence of urinary incontinence during pregnancy and postpartum in older, primiparous populations of women (median ages 26−28) has been estimated to be 6% to 34%.[3] Fecal incontinence has been estimated to be up to 9% in similar populations,[4] and rates of flatal incontinence have been estimated to be up to 35% of women.[5] While pre-conception symptoms of urinary and anal incontinence have been shown to predispose women to higher rates of urinary incontinence at six weeks and six months postpartum,[6] many peripartum factors have also been found to increase the risk of post-partum urinary and anal incontinence. These include factors related to obstetrical trauma (vaginal delivery, forceps delivery, episiotomy), anesthesia utilized during labor,[7] body mass index (BMI), and smoking.[8] Cesarean delivery,

on the other hand, has been shown in some studies to be protective against urinary incontinence.[9,10]

The main risk factors for postpartum anal incontinence include operative vaginal delivery, anal sphincter injury and older maternal age.[11,12] Vaginal delivery alone is a risk factor for dual (urinary and anal) incontinence.[13] Some have advocated elective cesarean section for women with previous sphincter rupture, claiming that most excess morbidities from cesarean section (including endometritis, infection, transfusion) are temporary and treatable while anal incontinence most often times is permanent[14]; only 50−80% of women with properly repaired anal sphincter lacerations will have normal anal continence.[15] In addition, anal sphincter injuries at delivery are often inadequately diagnosed and a significant amount of women with clinically intact sphincters demonstrate abnormalities on anal ultrasound.[16]

While the impact of pregnancy on the pelvic floor in older gravidas is an active area of research, the effect of pregnancy on the pelvic floor of teenagers is unknown. Studies on pelvic organ descent in young, nulligravid women have determined that a wide range of pelvic organ mobility is observed in women aged 18 to 24 years, but no correlation has been established between mobility and symptoms of incontinence.[17] We sought to determine the prevalence of urinary and fecal incontinence in teenaged gravidas during pregnancy and the immediate postpartum.

Materials and Methods

This prospective cohort study was conducted at our tertiary-care hospital (University of Chicago Hospitals), which has over 300 teenage deliveries each year. Participants included pregnant teenagers (ages 14 to 19) who were in their third trimester, had deliveries between December 2004 and August 2005, and agreed to participate. As is representative of the patient population at our institution, all participants were African American. Eighty percent (60/74) of the adolescents were primiparous. Any adolescent who was eligible was asked to participate. The adolescents were recruited from clinics by residents during prenatal visits and were asked to complete two questionnaires at any visit between 32 and 40 weeks during the third trimester and again at their scheduled six-week post-partum visit. The study was explained to eligible patients and informed consent was obtained from patients who agreed to participate. The study was approved by the University of Chicago's Institutional Review Board.

We utilized both the Wexner Continence Grading Scale and the Urogenital Distress Inventory Short Form (UDI-6). These validated questionnaires are used to evaluate symptoms and quality of life impact of anal and urinary incontinence, respectively. While they were originally validated in an older population of women, these questionnaires were specifically chosen for their concise and understandable nature. The teenaged women were asked: (1) frequency of urinary, flatal, and fecal incontinence (2) severity of urinary, flatal, and fecal incontinence and (3) degree of bother of their symptoms during the aforementioned time periods. Because we wanted to capture symptoms of mild incontinence, any symptom was deemed pertinent; we did not stratify responses based on severity. Chart abstraction was conducted to obtain relevant history including BMI and use of tobacco, as well as obstetrical data from the index delivery including type of delivery (normal spontaneous vaginal delivery, cesarean section, forceps or vacuum-assisted vaginal delivery), use of anesthesia, length of second stage of labor, use of episiotomy and presence of third degree (extending through the muscle of anal sphincter) and fourth degree (extending through the rectal mucosa) lacerations. Inclusion criteria included age between 13 and 19, singleton, term gestation, and no significant medical illnesses.

For continuous variables, the means and associated standard deviations were reported. Student's t tests or analysis of variance (ANOVA) were used to compare the values between groups. For categorical variables, the incidences and percentages were reported. Fisher's exact test was used to compare the incidence between groups. All statistical analyses were conducted in Stata 9.0. A $P < .05$ was considered significant.

Results

We recruited 74 African American teenaged women during the period of time between December 2004 and May 2005 who were receiving prenatal care at our institution. Patients were recruited as a convenience sample from resident clinics when it was feasible. Of these 74 adolescent women, 58 (78%) were followed throughout their delivery and completed the questionnaires at 6 weeks postpartum. Sixteen (21%) were lost to follow-up in the postpartum. Of the deliveries that occurred during this time, 58% were vaginal, 24% were cesarean sections, 14% were vacuum-assisted, and 4% were forceps-assisted. Patients were assigned to one of three groups for analysis: normal spontaneous vaginal delivery, operative delivery (vacuum or forceps) and cesarean section. Maternal demographic data, as well as obstetrical data from the index deliveries, were collected from the patients' delivery case records and pre-natal charts. Maternal age, parity, tobacco use, epidural/spinal use and fetal weight did not differ among these three groups. Maternal BMI was increased in the

cesarean section group ($P = 0.004$) when compared with the other two groups (Table 1).

Episiotomy was performed in 38% of operative deliveries versus 10% of the spontaneous vaginal deliveries, which was higher ($P = 0.01$). Though not recorded in our data collection, medial episiotomies are routinely performed at our institution. Thirty-eight percent of the operative vaginal deliveries resulted in either a third degree or fourth degree laceration of the anal sphincter, while none of the spontaneous vaginal deliveries resulted in sphincter damage ($P < 0.001$) (Table 1).

During the third trimester, 40 patients (69%) experienced symptoms of stress urinary incontinence, 32 patients (55%) experienced urge incontinence. Sixteen percent of patients experienced some form of fecal incontinence (solid and/or liquid) and 50% of patients complained of flatal incontinence. Only 2% of teenaged women stated that their lifestyle was altered because of these symptoms (Table 2). At six weeks postpartum, 9% of patients experienced some form of urinary incontinence; five (9%) complained of urge incontinence, and three (5%) complained of stress incontinence. Only two patients (4%) complained of fecal incontinence; however, five patients (9%) had persistent flatal incontinence. Similarly, one patient (2%) stated that her lifestyle was altered because of this incontinence (Table 2). Of the women with postpartum urinary urge incontinence, 4/5 reported it during pregnancy; 2/3 women with postpartum stress incontinence reported it during pregnancy as well. Neither of the two women with solid fecal incontinence postpartum had this issue during pregnancy. Similarly, only one of the five women with postpartum flatal incontinence reported it during pregnancy; four of the five developed de novo flatal

Table 2. Prevalence of urinary and anal incontinence in the third trimester and 6 weeks postpartum

	Third Trimester (N=58)		Post-Partum (N= 58)	
	Frequency	Percent	Frequency	Percent
Urinary urge incontinence	32	55%	5	9%
Urinary stress incontinence	40	69%	3	5%
Fecal incontinence	9	16%	2	4%
Solid	6	10%	2	4%
Liquid	6	10%	1	2%
Flatal incontinence	29	50%	5	9%
Quality of life alteration	1	2%	1	2%

incontinence after delivery. The one woman reporting postpartum liquid stool incontinence complained of it during pregnancy as well.

Mean BMI did not differ significantly between the patient groups that did (31 ± 6.46) and did not (30.4 ± 7.25; $P = 0.71$) experience urinary stress incontinence during the third trimester. Similarly, mean BMI for those that complained of fecal incontinence (33.6 ± 7.39) did not differ from those that did not (30.4 ± 6.71; $P = 0.21$). Mean BMI was also not significantly higher in teenaged women with flatal incontinence during the antepartum (32.6 ± 6.81) compared with those who did not have flatal incontinence (29.6 ± 6.62; $P = 0.07$).

Rates of urinary stress and urge incontinence symptoms in the group of teenaged women who underwent operative vaginal delivery compared with those who had a normal spontaneous vaginal deliver did not differ. However, while the rate of fecal incontinence of both solid and liquid stool was found to be higher in the operative vaginal delivery group, only

Table 1. Maternal demographic information stratified by delivery types

		NSVD	Operative vaginal delivery	Cesarean section	P^{b}
Number (%)		41 (58)	13 (18)	17 (24)	N/A[a]
Age (y)	Mean	17.4	17.4	17.5	0.96
	SD	1.43	1.66	1.33	
	Range	15-19	14-19	15-19	
Parity	Nulliparous (%)	34 (83)	10 (77)	14 (82)	0.91
	Parity >=1 (%)	7 (17)	3 (23)	3 (18)	
BMI	Mean	29.4	28.9	35.4	0.004
	SD	5.76	7.05	7.19	
	Range	19.8-42.7	21.8-45.7	21.2-48.2	
Fetal weight (g)	Mean	3119	3271	3401	0.15
	SD	415	402	752	
	Range	2127-4130	2515-3745	945-4325	
Tobacco use (%)		2 (5)	0 (0)	0 (0)	1.00
Epidural/Spinal Use (%)		32 (78)	10 (77)	17 (100)	0.10
Episiotomy (%)		4 (10)	5 (38)	N/A[a]	0.01
Third/fourth degree tear (%)		0 (0)	5 (38)	N/A[a]	<0.001

[a]N/A: not applicable.
[b]For continuous variables, ANOVA was used; for categorical variables, Fisher's exact test was used.

the difference in the rate of flatal incontinence was found be significant when the two groups were compared ($P = 0.04$) (Table 3).

Specific delivery parameters were then analyzed to determine if they were associated with postpartum urinary and anal incontinence. Though more teenaged women with episiotomies than without complained of stool (14% versus 2%) and flatal incontinence (29% versus 6%) at 6 weeks postpartum, this was not significant. Third and fourth degree lacerations also resulted in a higher rate of anal incontinence at 6 weeks postpartum when compared to women without sphincter lacerations, however, this too was not significant.

Discussion

In this descriptive study, we have examined the rate of urinary and anal incontinence symptoms in a convenience sample of a population that has previously not been studied with respect to pelvic floor dysfunction. Though no control group was present in this study, overall, our detected prevalence patterns of urinary and anal incontinence throughout pregnancy and in the immediate postpartum are similar to those found in previously published studies in older women. In all women incontinence rates are higher during the third trimester and are either much lower or resolve completely in the immediate postpartum period.[10]

In this patient population during the antepartum period, both urinary and fecal incontinence were as common as reported in older women. Since increasing BMI is a risk factor for incontinence in women[18,19] we analyzed the BMI of our patients. Surprisingly, despite the majority of our patients being obese by World Health Organization classification (mean BMI=28.8 kg/m^2), we found no association between BMI and incontinence during pregnancy.

We defined incontinence as any positive response on either the UDI-6 or the Wexner Continence Scale in hopes of identifying any form of incontinence in this population and did not stratify our results based on severity because of the small number of participants. It is likely that this less rigid definition of incontinence contributed to our observed rates.

Conversely, our rates of urinary and anal incontinence at 6 weeks postpartum are lower than previously published reports which show urinary incontinence rates as high as 31% immediately postpartum[20] and fecal incontinence as high as 11% in women without an anal sphincter tear and 27% in women with a sphincter tear.[21,22] This may suggest that younger age may be protective of the pelvic floor in the immediate postpartum, irrespective of delivery mode and known risk factors. When individual delivery variables including episiotomy and anal sphincter lacerations were analyzed, there were no significant associations between the rates of fecal and/or flatal incontinence and those variables. A larger patient population, however, would allow for further analysis and power. While our rate of flatal incontinence in the postpartum period seems also to be lower than previously reported data,[23] it was significantly increased in the operative delivery group when compared with the group who delivered spontaneously. While it has not thus far been shown, it would be important to follow these patients for a longer duration to determine if this mild anal incontinence evolves into a more serious form as our population ages.

Studies regarding age at first delivery and subsequent need for surgery for symptomatic urinary incontinence are conflicting. While some correlate increasing age at first delivery with the need for incontinence surgery later in life,[24] others suggest younger age at first delivery to be a risk factor.[25] The existing data are therefore inconclusive as to whether young age at first delivery is protective against urinary incontinence.

Of note, only 2% of our patients noted life-style alteration during pregnancy and the post-partum period, despite the significant prevalence of incontinence symptoms. This may speak to the unique social environment of our underserved population where teenaged pregnancy is common. Our patients may not be distressed by their symptoms because they are aware from their peers that the symptoms are common in pregnancy. They may also assume these symptoms will resolve. Perhaps compared with the other body changes and life stressors associated with teenage pregnancy, mild urinary and anal incontinence

Table 3. Urinary and anal symptoms at 6 weeks postpartum after operative vaginal delivery and normal spontaneous delivery

Symptoms	Operative Vag.Delivery N=11 (%)[a]	NSVD N=33 (%)[b]	OR [95% CI]	P[c]
Urinary urge incontinence	2 (18%)	2 (6%)	3.44 [0.21-52]	0.26
Urinary stress incontinence	2 (18%)	1 (3%)	7.1 [0.32-432]	0.15
Fecal incontinence (solid + liquid)	2 (18%)	0 (0%)	N/A	0.06
Flatal incontinence	3 (27%)	1 (3%)	12 [0.78-649]	0.04

[a]Total instrumental initially 13 (2 lost to f/u).
[b]Total NSVD initially 41 (8 lost to f/u).
[c]Fisher's exact test was used to compare urinary or anal incontinence between instrumental delivery and spontaneous delivery.

may not be seen as significant worries. It is also possible that our teenagers were having largely mild symptoms and this would explain why their quality of life was minimally affected.

Our study population was all African American. Prevalence rates of urinary incontinence among African Americans have been reported to be less common when compared to Caucasian women, however, controversy remains concerning the impact of race on urinary incontinence [18,26]. It may be that the lower rates of postpartum symptoms of urinary incontinence and anal incontinence are due to the fact that our patients were all African American. However, one would expect to see lower rates of symptoms during pregnancy as well, and we did not.

There are obvious limitations in this study. First, due to our patient demographics in this urban setting, all of our patients were African American. Because of this unique population, our findings are less applicable to the general population and our comparisons to previously published studies are limited. A larger patient population, rather than a convenience sample, as well as a control group of older African American women within our institution, would allow us to even better characterize incontinence in pregnant African American teenagers and further validate our findings.

Secondly, we did not have the power to analyze many of the variables associated with urinary and anal incontinence. Again, a larger study is needed to further validate our results. With more patients from a diverse population enrolled, we would also hope to expand our findings with regards to associations between specific delivery variables including length of second stage of labor and risk of subsequent incontinence as well as the possible protective role of cesarean section.

Thirdly, it would be ideal to have better follow-up and inclusion of more patients longitudinally, however, non-compliance is inherent in our teenaged population. Lastly, the UDI-6 and Wexner Continence Scale are both validated tools, however, they have traditionally been used more to evaluate frequency of incontinence and quality of life with respect to urogynecologic symptoms. Diaries and other objective evaluations may provide better diagnosis. However, we specifically chose to use these tools for their concise and understandable nature in addressing complex symptoms since many of our teenaged population were educated below high-school level.

In conclusion, urinary and anal incontinence are present during the antepartum and immediate postpartum in this population of African American teenagers. These issues not only merit further investigation in this unique population, but should also be addressed during antepartum counseling of these patients. It is difficult to predict, from this small, descriptive study, if the seemingly protective effect of younger age on urinary and anal incontinence in the immediate postpartum period will be lasting. However, given more structurally sound connective tissue and less inherent pelvic floor muscle dysfunction, teenaged women may be protected from both urinary and anal incontinence in the immediate post-partum period.

References

1. MacLennan A, Taylor A, Wilson D, et al: The prevalence of pelvic floor disorders and their relationship to gender, age, parity and mode of delivery. Br J Obstet Gynaecol 2000; 107:1460
2. Viktrup L, Lose G: The risk of stress incontinence 5 years after first delivery. Am J Obstet Gynecol 2001; 185:52
3. Wilson PD, Hebison RM, Herbison GP: Obstetric practice and the prevalence of urinary incontinence three months after delivery. Obstet Gynecol Surv 1996; 51:464
4. MacArthur C, Glazener CM, Wilson PD, et al: Obstetric practice and faecal incontinence three months after delivery. Br J Obstet Gynaecol 2001; 108(7):678
5. Eason E, Labrecque M, Marcoux S, et al: Anal incontinence after childbirth. CMAJ 2002; 166(3):326
6. Farrell SA, Allen VM, Baskett TF: Parturition and urinary incontinence in primiparas. Obstet Gynecol 2001; 97:350
7. Rortveit G, Daltveit AK, Hannestad A: Vaginal delivery parameters and urinary incontinence: the Norweigian EPINCONT study. Am J Obstet Gynecol 2003; 189:1268
8. Burgio K, Zycznski H, Locher J, et al: Urinary incontinence in the 12 month postpartum period. Obstet Gynecol 2003; 102:1291
9. Liebling RE, Swingler R, Patel RR, et al: Pelvic floor morbidity up to one year after difficult instrumental delivery and cesarean section in the second stage of labor: a cohort study. Am J Obstet Gynecol 2004; 191:4
10. Rortveit G, Daltveit AK, Hannestand YS, et al: Urinary incontinence after vaginal or cesarean delivery. N Eng J Med 2003; 348:900
11. Fenner DE, Genberg B, Brahma P, et al: Fecal and urinary incontinence after vaginal delivery with anal sphincter disruption in an obstetrics unit in the United States. Am J Obstet Gynecol 2003; 189:1543
12. Damron DP, Capeless EL: Operative vaginal delivery: a comparison of forceps and vacuum for success rate and risk of rectal sphincter injury. Am J Obstet Gynecol 2004; 191:907
13. Lacima G, Espuna M, Pera M, et al: Clinical, urodynamic and manometric findings in women with combined fecal and urinary incontinence. Neurourol Urodynam 2002; 21:464
14. McKenna DS, Ester JB, Fischer JR: Elective cesarean delivery for women with a previous anal sphincter rupture. Am J Obstet Gynecol 2003; 189:1251
15. Sultan AH: Anal incontinence after childbirth. Curr Opin Obstet Gynecol 1997; 9:320
16. Zetterstrom J, Lopez A, Holmstrom B, et al: Obstetric sphincter tears and anal incontinence: an observational follow-up study. Acta Obstet Gynecol Scand 2003; 82:921

17. Dietz HP, Eldridge A, Grace M, et al: Pelvic organ descent in young nulligravid women. Am J Obstet Gynecol 2004; 191:95
18. Melville JL, Katon W, Delaney K, et al: Urinary incontinence in US women: a population-based study. Arch Intern Med 2005; 165:537
19. Boreham MK, Richter HE, Kenton KS, et al: Anal incontinence in women presenting for gynecologic care: prevalence, risk factors, and impact on quality of life. Am J Obstet Gynecol 2005; 192:1637
20. Mason L, Glenn S, Walton I, et al: The prevalence of stress incontinence during pregnancy and flowing delivery. Midwifery 1999; 15:120
21. Roman H, Robillard PY, Payet E, et al: Factors associated with fecal incontinence after childbirth. J Gynecol Obstet Biol Reprod 2004; 33:497
22. Borello-France D, Burgio KL, Richter HE, et al: Fecal and urinary incontinence in primiparous women. Obstet Gynecol 2006; 108:863
23. Chiarelli P, Murphy B, Cockburn J: Fecal incontinence after high-risk delivery. Obstet Gynecol 2003; 102:1299
24. Person J, Wolner-Hanssen P, Rydstroem H: Obstetric risk factors for stress urinary incontinence: a population-based study. Obstet Gynecol 2000; 96:440
25. Moalli P, Jones SI, Meyn LA, et al: Risk factors associated with pelvic floor disorders in women undergoing surgical repair. Obstet Gynecol 2003; 101:869
26. Grodstein F, Fretts R, Lifford K, et al: Association of age, race, and obstetric history with urinary symptoms among women in the Nurse's Health Study. Am J Obstet Gynecol 2003; 198:248