

Prevalence and Awareness of Pelvic Floor Disorders in Female Adolescents Seeking Gynecologic Care



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ABSTRACT

Study Objective: To determine the prevalence and awareness of pelvic floor disorder symptoms among female adolescents.

Design: Cross-sectional study via a written, anonymous survey of adolescents. The survey was composed of validated measures for determination of symptom prevalence.

Setting: Pediatric and adolescent gynecology clinic in the southeast United States.

Participants: Female adolescents ages 14-21 years.

Interventions: None.

Main Outcome Measures: We used χ^2 analyses for categorical variables and *t* test for continuous variables.

Results: Two hundred sixteen questionnaires were completed. The mean age of respondents was 17.1 (± 2.1) years and most respondents had at least heard about urinary (UI) and fecal incontinence (FI; 62.9%). The prevalence of any UI was 31.5%. Urgency UI (UUI) was reported by 15.7% and stress UI was reported by 6.9% of adolescents; 8.8% of participants experienced UUI and stress UI symptoms. FI and pelvic organ prolapse symptoms were reported by 0.9%. There were no differences in reported prevalence rates of UI (31.7% vs 27.9%), FI (1.4% vs 0%), or pelvic organ prolapse (1.4% vs 0%) between younger (14-17 years) and older (18-21 years) adolescent participants, respectively (all $P > .05$). Although UI was fairly prevalent among respondents, most stated that it had a minimal effect on daily living.

Conclusion: UI symptoms were common among female adolescents, with UUI being the most reported. Early education regarding pelvic floor disorder symptoms might lead to prevention or empowerment to seek treatment as adolescents age.

Key Words: Adolescent, Urinary incontinence, Fecal incontinence, Pelvic organ prolapse, Validated measure

Introduction

Pelvic floor disorders (PFDs) such as urinary incontinence (UI), fecal incontinence (FI), and pelvic organ prolapse (POP) are common conditions among adult women. UI, affecting 15.7%-53.4% of adult women, is the most prevalent of these symptoms.¹⁻³ The likelihood of developing PFD increases with age, body mass index, and parity.^{1,2} They create a significant economic burden,^{4,5} and negatively affect a woman's quality of life.^{6,7} Effective treatments exist, and early awareness of the existence of these disorders might help in the development of primary prevention strategies.^{8,9} Addressing the prevalence and awareness of these disorders among adolescents might help reduce the burden of these disorders among women as they age and empower women to seek early treatment.

To date, most of the studies that addressed pelvic floor symptom prevalence rates in adolescents and young women have focused on women aged 18 years or older, with prevalence rates between 3% and 12.6%.¹⁰⁻¹⁴ Studies that addressed PFD symptoms in female adolescents primarily

focused on patients at increased risk for incontinence such as those with cystic fibrosis¹⁵⁻¹⁷ and obesity.¹⁸ Adolescent female patients without comorbidities have been studied with observed prevalence rates for UI between 7% and 25%.^{16,17} These studies have been limited by low numbers and the use of nonvalidated measures.

The primary aim was to characterize the prevalence of UI, FI, and sensation of POP symptoms among female adolescents. Patient awareness of these disorders and awareness of pregnancy as a risk factor for PFD were also investigated. The effect of age on symptom prevalence and knowledge of PFD was also characterized.

Materials and Methods

This was a cross-sectional study of female adolescents aged 14-21 years who attended a pediatric and adolescent gynecology (PAG) clinic between August 2015 and June 2016. A 37-question survey was developed to assess the prevalence of PFD symptoms among adolescents. The survey incorporated questions from previously validated questionnaires including the Incontinence Symptom Index-Pediatric (ISI-P),¹⁹ the Fecal Incontinence Severity Index (FISI),²⁰ the Incontinence Severity Index-2,²¹ and the Pelvic Organ Prolapse Distress Inventory-6 (POPDI-6) subscale of the Pelvic Floor Distress Inventory-20.²² The ISI-P has been validated in respondents ages 11-17 years and is used to

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assess the prevalence of urgency UI, stress UI, insensate UI, and enuresis. The ISI-P is also used to assess the severity of disease and its effect on daily living. Additional non-validated questions in the survey addressed demographic information of respondents as well as their awareness and knowledge of PFDs. The survey had a Flesch–Kincaid grade level of 8 and was either read by the patient or read to them by a parent. Patients who were not able to provide verbal or written response were excluded from the study. Respondents younger than age 18 years required parental consent to participate in the study whereas those 18 years and older did not require parental approval.

After accrual of 78 respondents, 3 additional questions were added to the survey to assess the reason for their visit, whether they had discussed PFDs with a health care provider, and, if they would like to know more about PFDs, how they would best like to receive this information. A total of 216 surveys were completed. The University of Alabama at Birmingham institutional review board approval was obtained for this study.

To establish the presence or absence of a condition or symptom, the answers from the ISI-P, FISI, and POPDI-6 were reported dichotomously as yes or no. Answers of “never” or “rarely” were interpreted as no whereas answers of “sometimes,” “about half of the time,” and “most of the time” were interpreted as yes for the ISI-P questions. The FI severity question was similarly dichotomized with answers of “never” or “rarely” interpreted as no whereas answers of “sometimes,” “often,” and “always” were interpreted as yes. For the prolapse question from the POPDI-6, an answer of “not at all” or “somewhat” was interpreted as a no answer whereas “moderately” and “quite a bit” were interpreted as a yes answer. A patient was classified as having urgency UI if they had a yes answer to any one of 3 urgency-based questions on the ISI-P, but not other incontinence questions. Urgency UI questions were as follows: “How often have you leaked urine because you could not wait to pee?”; “How often has a sudden urge to pass urine or pee caused you to leak urine?”; “How often have you leaked urine because you could not reach a bathroom in time?” A patient was classified as having stress UI if they had a yes response to any one of 3 stress incontinence questions on the ISI-P, but not other incontinence questions. Stress UI questions were as follows: “How often have urine leaks happened when you do physical things like lifting, bending, standing up, sitting down, turning, or exercise?”; “How often has walking or light exercise (or transfers if you use a wheelchair) caused you to leak urine?”; “Do you ever have a problem with leaking urine while playing sports?”

Finally, a patient was classified as having mixed incontinence if they had a yes response to 1 or more stress UI and 1 or more urgency UI questions. The presence of FI was defined as having a yes response to the FISI question, “How often in the past month have you experienced any amount of accidental bowel leakage that consisted of liquid/solid stool?” The presence of a sensation of POP was defined as having a yes response to the POPDI-6 question “Do you usually have a bulge or something falling out that you can see or feel in your vaginal area?”

Descriptive characteristics were reported for demographic characteristics and the survey and knowledge

measures for fecal and UI and PFDs. These characteristics were compared between female adolescents aged 14–17 years and 18–21 years using a χ^2 or *t* test for categorical and continuous variables, respectively.

Results

Two hundred sixteen respondents of a potential 318 (67.9% response rate) completed the survey and the mean age of respondents was 17 (± 2.1) years. Most of the respondents were Caucasian (121/216, 56%), attended school (200/216, 92.6%), and did not participate in sports (161/216, 74.5%; [Table 1](#)). The overall prevalence of any UI was 68/216 (31.5%) ([Table 2](#)). Urgency UI was the most common type of incontinence, reported by 34/216 (15.7%) of adolescents. Stress UI was reported by 15/216 (6.9%) of adolescents and 19/216 (8.8%) of patients experienced urgency and stress UI, or mixed UI symptoms. Insensate and night-time incontinence were reported by 8/216 (3.7%) and 9/216 (4.2%) of respondents, respectively. FI symptoms and a sensation of POP were much less common among adolescents, present in 2/216 (0.9%) of respondents.

In addition to determining the prevalence of UI among adolescents, the effect of incontinence on the adolescent's daily living was also ascertained. Only 7/215 (3.3%) of respondents reported having to rarely change their daily activities because of urinary leakage, and only rarely had to do so ([Table 3](#)). Urinary leakage was not a frequent event for most respondents with only 17/213 (8%) who reported leakage 1 or more times a month and 2/213 (0.9%) who

Table 1
Demographic Characteristics of 216 Female Adolescents Aged 14–21 Years

Characteristic	Value
Reason for Visit*	
Contraception	41 (29.7)
Abnormal periods	34 (24.6)
Pelvic pain	7 (5.1)
Other	56 (40.6)
Age, years	
14	28 (13.0)
15	43 (19.9)
16	43 (19.9)
17	34 (15.7)
18	29 (13.4)
Older than 18	39 (18.1)
Mean age of respondents	17.1 (± 2.0)
Grade	
8	7 (3.2)
9	32 (14.8)
10	53 (24.5)
11	27 (12.5)
12	37 (17.1)
College	44 (20.4)
Not in school	16 (7.4)
Race	
White	121 (56.0)
Black	73 (33.8)
Hispanic/Latina	5 (2.3)
Asian	5 (2.3)
Multiple	4 (1.9)
No comment	8 (3.7)
Sport participation	
Any	55 (25.5)
None	161 (74.5)

Data are presented as n (%) or mean (\pm SD).

* The “reason for visit” was not included in the first version of the survey tool and was only asked of the last 138 respondents.

Table 2
Prevalence of Symptoms of Pelvic Floor Disorders

Symptom	n (%)
Any urinary incontinence	68 (31.5)
Urgency urinary incontinence	34 (15.7)
Stress urinary incontinence	15 (6.9)
Mixed urinary incontinence	19 (8.8)
Insensate urinary incontinence	8 (3.7)
Enuresis	9 (4.2)
Fecal incontinence	2 (0.9)
Symptom of pelvic organ prolapse	2 (0.9)

reported leakage on a daily or nightly basis. Most respondents did not require protection against urinary leakage with 32/213 (15%) reporting the need for a thin pad or tissue. When used, most respondents reported requiring 1 pad or less per day. Overall, UI was not perceived to be a problem by most of the respondents with 10/213 (4.6%) responding that it was only a very small problem.

Regarding awareness of incontinence and PFDs, most (134/213, 62.9 %) of the respondents had heard of UI or FI (Table 4). More than a third of the respondents (75/214, 35.1%) knew of UI among family members and 38/215 (17.7%) reported having talked with their family or friends about UI. Respondents were less likely to know about FI symptoms among female family members and were less likely to discuss it with family or friends (17/213, 8.1% and 11/214, 5.1%, respectively; Table 4). Only 42/215 (19.5%) of respondents had heard of POP and no respondent reported significant prolapse symptoms. Of the respondents, 17/125 (7.9%) had discussed prolapse with family or friends although only 8/215 (3.7%) were aware of prolapse symptoms among family members. Most of the respondents had

Table 3
Severity of Urinary Incontinence*

Characteristic	n (%)
Change activities because of leakage	
Never	208 (96.7)
Rarely	7 (3.3)
Frequency of urinary leakage	
Never	149 (70.0)
Less than once month	39 (18.3)
1 or more times a month	17 (8.0)
1 or more times a week	6 (2.8)
Daily/nightly	2 (0.9)
Type of protection required	
Nothing	176 (82.6)
Thin pad or tissue	32 (15.0)
Medium/regular pad	4 (1.9)
Large/maxi pad	0 (0.0)
Pullup or diaper	1 (0.5)
Amount of protection required	
None	185 (86.5)
1 or less per day, for safety	23 (10.8)
1 Per day, usually wet	1 (0.5)
2-3 Per day	4 (1.9)
4 or more per day	1 (0.5)
Urinary leakage a problem	
No problem	200 (93.9)
Very small problem	10 (4.6)
Small problem	2 (0.9)
Medium problem	1 (0.5)
Big problem	0 (0)

* Not all respondents completed every question. The totals reflect all the answers received for that particular question.

Table 4
Awareness of Pelvic Floor Disorders*

Variable	n (%)
Heard about UI or FI	
Yes	134 (62.9)
No	79 (37.1)
Know of family member(s) with urine leakage	
Yes	75 (35.1)
No/don't know	139 (64.9)
Know of family member(s) with FI	
Yes	17 (8.1)
No/don't know	194 (91.9)
Heard of POP?	
Yes	42 (19.5)
No/don't know	173 (80.5)
Know of family with POP?	
Yes	8 (3.7)
No/don't know	207 (96.3)
Talked with family/friends about urine leakage?	
Yes	38 (17.7)
No/don't remember	177 (82.3)
Talked with family/friends about FI?	
Yes	11 (5.1)
No/don't remember	203 (94.9)
Talked with family/friends about POP?	
Yes	17 (7.9)
No/don't remember	198 (92.1)
Talked in school about urine leakage?	
Yes	14 (6.5)
No/don't remember	201 (93.5)
Talked in school about FI?	
Yes	9 (4.2)
No/don't remember	205 (95.8)
Talked in school about POP?	
Yes	4 (1.9)
No/don't remember	211 (98.1)
Want to know more	
Yes	63 (29.4)
No	150 (70.1)
Has a medical professional asked you about UI or FI [†]	
Yes	46 (32.9)
No/don't know	94 (67.1)

FI, fecal incontinence; POP, pelvic organ prolapse; UI, urinary incontinence.

* Not all respondents completed every question. The totals reflect all the answers received for that particular question.

[†] This question was not included in the first version of the survey tool and was only asked of the last 138 respondents; 8 respondents left this question unanswered.

not discussed PFDs at school and less than a third of respondents had been asked about urinary or bowel symptoms by a health care provider. Approximately 63/213 (29%) of adolescents reported an interest in learning more about PFDs.

Regarding the possible effect of child-bearing on the development of PFDs, more than half of respondents (112/215, 52.1%) had heard that child-bearing could result in UI. Twenty-nine percent (62/215) and 48/215 (22.3%) of respondents had heard that child-bearing could result in flatal or FI, respectively. Only 14.9% had heard that child-bearing could affect the likelihood of developing POP (data not shown).

Adolescents were stratified into “younger” (ages 14–17 years) and “older” groups (ages 18–21 years) with mean ages of 16.0 (± 1.1) and 19.4 (± 1.5) years, respectively. There was no difference in prevalence rates or severity of UI symptoms between younger (age 14–17 years) and older (18–21 years) adolescents. Similarly, there was no significant difference in the prevalence of FI symptoms or the sensation of POP between age groups ($P > .05$; data not shown).

Although there was no difference in the proportion of younger and older adolescents being aware of POP ($P = .096$), those aged 18–21 years were more likely to have heard of women having UI or FI (75.4% vs 56.9%; $P = .009$). Respondents aged 14–17 years were more likely to know of a family member with UI (40.7% vs 23.2%; $P = .012$), but no difference was observed between age groups regarding discussions with family or in school regarding pelvic floor dysfunction (both $P > .05$). Likewise, age did not affect the degree to which adolescents identified childbearing as a risk for PFD ($P > .05$; data not shown).

Conclusions

Results from a cross-sectional survey on the prevalence of pelvic floor symptoms and baseline knowledge of these disorders among adolescents ages 14–21 years who presented for care to a PAG clinic revealed that the overall prevalence of UI among adolescents was 31.5%. Urgency UI was the most common type of incontinence reported with a prevalence of 15.7%. A similar finding was reported in an Italian cohort in which urgency UI was the most common form of incontinence among women younger than 30 years.²³ FI and symptoms of POP were uncommon with a prevalence rate of less than 1%. Prevalence rates were not different between younger (14–17 years) and older (18–21 years) adolescent respondents.

The observed prevalence rate for overall UI among adolescents is higher than that reported for young adult women. This is likely in part because of the high degree of variability in the way incontinence is defined, differences in the populations studied, use of different questionnaires, and variability in reporting among patients between studies.^{5,10–14,23,24} The younger age of the patients in this study (mean age, 17 years) relative to those who participated in other studies (mean ages of >20 years) might also explain the difference in prevalence rates. Support for a higher prevalence rate of incontinence among younger female adolescents was reported in a recent study of high school students (mean age, 14 years) in which almost half of respondents reported leakage of urine at least sometimes.²⁴ We noted urgency UI to be the most common subtype of UI in our adolescents, suggesting that modifiable behaviors (eg, delayed emptying, degree of fluid intake, caffeine usage), might be more common in adolescents, and we attribute the to the prevalence observed in our study. The current survey was only distributed to patients in attendance of a PAG clinic, who might have a higher likelihood of incontinence and might not be representative of a broader group of adolescents. Although UI was not the primary complaint for being seen in the PAG clinic for any respondent, patients who presented with a gynecologic complaint might be at increased risk for UI, resulting in an overestimation of the prevalence rate of UI. Distribution of these survey tools within a broader context will help determine the prevalence in the general adolescent population.

Although incontinence was reported by almost a third of respondents, it had a minimal effect on respondent daily living, with no adolescent reporting a need to routinely change their activities because of urinary leakage. The small

effect of UI on daily living might in part be related to the low frequency with which patients experience leakage and the minimal requirement for protection. Although adolescents did not perceive their UI to be a large problem in their life, affected adolescents might be at risk for the development of more bothersome symptoms as they age.

In addition to establishing the prevalence of PFD symptoms in the current population, a novel component was added to assess the subjects' knowledge of PFDs and whether they discussed them with their families, at school, or with health care providers. Although they had similar UI, FI, and POP symptom prevalence rates, older adolescents were more likely to be aware of UI and FI. The reason for this increased awareness is unclear because they did not show an increased awareness of these disorders among family members and were not more likely to have discussed them with family members or to have had formal education on them. In fact, it was noted that younger adolescents were more likely to be aware of UI among family members. This latter observation might be related to the nature of survey administration because younger adolescents required a parent present for the consent process and might have been more likely to have been influenced by a parent during the completion of the survey.

Our study has a number of limitations. This was a single-site study, and, as such, the results might not be generalizable to other adolescent populations. In addition, the respondents were a convenience sample derived from a PAG clinic population and might therefore have different prevalence rates than female adolescents without an identified gynecologic need. Finally, we did not collect medical histories from respondents and were not able to determine the effect of potential risk factors such as obesity, parity, or the presence of a chronic lung disease on the prevalence rates. Obesity, defined as a body mass index of 30 or more, is prevalent in the state of Alabama, affecting 20.7% of individuals between the ages of 18 and 25 years.²⁴ Obesity similarly affected our adolescent patient population, with approximately 23% of patients between the ages of 14 and 21 years having a body mass index in the obese range. Because obesity might be a risk factor for adolescent UI, the prevalence rate observed in our study might not be applicable to populations with a lower prevalence of obesity. Strengths include a relatively robust sample size and the use of validated measures to assess pelvic floor symptoms. In addition, the primary measure used to determine the prevalence of PFDs (ISI-P) has previously been validated in the adolescent population.

Although most of the respondents had at least heard of UI or FI, most adolescents were unaware that childbirth was a risk factor for FI and POP. This might be related to the overall low baseline understanding of the female pelvic anatomy and function among female adolescents.²⁵ Almost a third of respondents were interested in learning more regarding these disorders, underscoring the need and opportunity for education of female adolescents with regard to pelvic floor dysfunction. Improved education of adolescents with regard to PFDs and relevant risk factors might bolster primary prevention strategies and ultimately decrease disease burden as they get older.

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