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Lower Urinary Tract Dysfunction in Elementary School Children: Results of a Cross-Sectional Teacher Survey

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Abstract

Purpose—Lower urinary tract dysfunction in school-aged children is common and yet data are lacking on current teacher practice regarding bathroom use and daytime incontinence during classroom hours. We determined the prevalence of elementary school teachers who promote lower urinary tract health and identified predictors for and against such behavioral promotion.

Materials and Methods—We performed an electronic cross-sectional survey among self-identified teachers using targeted social media advertisement during a 1-week period in July 2014. The empirical survey tool consisted of 27 questions and collected data on 5 principal domains, including 1) teacher demographics, 2) rules and regulations on water intake and bathroom use during classroom hours, 3) characteristics of school bathrooms in terms of safety, supervision and suitability for use, 4) experience with and management of students with daytime incontinence and 5) training on the topic of lower urinary tract health. Predictors for promoting lower urinary tract health were identified by multivariable logistic regression.

Results—Of the 4,166 teachers who completed the survey 88% indicated that they encourage students to hold urine. Despite strict bathroom protocols 81% of teachers allowed children unlimited access to water. Of the teachers 82% reported never having undergone any professional development on bathroom regulations for children. Overall only 24% of surveyed teachers met criteria for promoting lower urinary tract health. The odds of promoting lower urinary tract health decreased with ascending grade level (OR 0.80, 95% CI 0.76–0.84). Conversely it increased if teaching experience was greater than 5 years (OR 1.66, 95% CI 1.39–1.98) or professional development on the subject had been received (OR 1.42, 95% CI 1.18–1.70).

Conclusions—Of elementary school teachers 76% are not promoting lower urinary tract health in school-aged children. Professional development training on the topics of lower urinary tract dysfunction and/or lower urinary tract health may be beneficial, particularly for educators who teach higher grades and those with less teaching experience.

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The corresponding author certifies that, when applicable, a statement(s) has been included in the manuscript documenting institutional review board, ethics committee or ethical review board study approval; principles of Helsinki Declaration were followed in lieu of formal ethics committee approval; institutional animal care and use committee approval; all human subjects provided written informed consent with guarantees of confidentiality; IRB approved protocol number; animal approved project number.

Keywords

urinary bladder; urinary incontinence; health education; faculty; schools

Lower urinary tract dysfunction is used in this study as a broad term that encompasses an array of heterogeneous storage and voiding symptoms. LUT dysfunction in school-aged children is a common issue that often manifests as urinary urgency, frequency and incontinence. Indeed, studies worldwide document the prevalence of these symptoms to be 5% to 17%.^{1,2} Varied definitions of LUT dysfunction in prior studies preclude exact reporting of changes in prevalence with time of this all-encompassing entity. However, daytime urinary incontinence has been noted to be more common in primary school students than previously known at a rate of 19.2% with only 16% of affected children seeking medical attention.³ Studies have shown that the age at which toilet training begins is occurring later in most countries. This further highlights the importance of promoting LUT health in a school setting considering that students spend an average of 943 hours per year in the classroom⁴⁻⁶.

Symptoms of LUT dysfunction can lead to major distress and negatively affect the quality of life of school-aged children.⁷ Learned unhealthy voiding habits such as holding can promote or exacerbate LUT dysfunction. Prior research has shown that teachers have the opportunity to mitigate unhealthy voiding habits and decrease symptoms of LUT dysfunction.⁸ However, data on teacher practice regarding bathroom use during classroom hours are lacking. The goals of the current study were to assess the extent to which teachers promote LUT health in school-aged children and identify predictors for and against such behavioral promotion.

Materials and Methods

Study Design

After receiving institutional review board approval data were collected during a 1-week period in July 2014 using SurveyMonkey®. Targeted Facebook® advertisements were developed to reach self-identified, kindergarten to fifth grade teachers 20 to 60 years old in the United States. Potential participants were provided with a link to an informational page about the survey. They could progress to the survey only after providing electronic consent. No personally identifying information was collected. The survey software declined repeat survey entries from a single internet protocol address to decrease the likelihood of repeat participants.

Survey Instrument

The survey tool consisted of 27 questions and required approximately 15 minutes to complete (supplementary Appendix, <http://jurology.com/>). In addition to collecting teacher demographic information, the survey inquired whether participants designated bathroom breaks, whether and how they encouraged children to hold urine during classroom hours, and what access the children had to water. The survey also ascertained the state of school bathrooms, specifically the degree of adult supervision and the negative student behaviors that occurred in bathrooms. The survey queried the frequency with which teachers observed

incontinence of urine and what actions they took in case of daytime incontinence in school. Finally, teachers were asked whether they had ever received professional development training on LUT health and whether they would be interested in receiving such training. The rationale of teachers who were not interested was characterized.

The survey was piloted via SurveyMonkey to 30 New York City elementary school teachers, and 10 physicians at Harvard Medical School and University of California-San Francisco.

Definition of Promoting LUT Health

Previous studies have suggested that teachers have the capacity to mitigate unhealthy voiding habits.⁸ Children should be able to use the restroom as often as they deem necessary and normal children typically urinate 5 or 6 times daily with frequency inversely related to age.^{9,10} It is well supported that children should not hold urine as this can promote voiding dysfunction and urinary tract infections.^{11,12} Accordingly teachers who answered all 4 selected survey questions in a certain manner were designated as promoters of LUT health (supplementary Appendix, <http://jurology.com/>). 1) A child is permitted to use the restroom as many times as needed during classroom hours (question 6). 2) A child is “never” or “seldom” encouraged to wait if he/she requests to use the restroom during undesignated restroom time (question 9). 3) The teacher does not have a program or protocol in place to encourage children not to use the restroom during class time (question 10). 4) When the teacher witnesses urinary accidents, the parent and/or the school nurse/administrator is informed (question 16).

Statistical Analyses

Summary statistics were performed using frequencies and proportions for categorical variables. Unadjusted associations were tested between predictor variables with school factors and classroom protocols (defined a priori) and the outcome variable (promotion of LUT health) using the chi-square test (tables 1 and 2). We performed multivariate logistic regression including all covariates hypothesized to have clinical significance regardless of p values on unadjusted analysis to identify predictors of the promotion of LUT health. Analyses were performed with SPSS®, version 21 and Stata®, version 13. All analyses used 2-sided tests with significance considered at $\alpha = 0.05$.

Results

Of 5,071 individuals who clicked on the survey link 4,929 (97.2%) electronically consented to the survey. Of respondents who consented 383 failed to answer any survey question and were excluded from analysis. An additional 380 respondents with incomplete surveys were also excluded. The final number of respondents was 4,166, representing 84.5% of all who consented.

Sample

Study participants were self-identified kindergarten to fifth grade teachers between ages 20 and 60 years who used Facebook in the United States (table 3). They were divided approximately evenly among grade levels. The majority of respondents had taught at public

schools for more than 5 years as the only teacher in the classroom. Fewer than 20% of respondents had ever received professional development regarding LUT health. Further, greater than a quarter of respondents witnessed urinary incontinence more than once in a 6-month period. In contrast, fewer than 45% of respondents reported ever having had experience with bowel incontinence and almost 60% of teachers who had witnessed stool incontinence did so once or less per school year. Consequently 67% of respondents skipped survey questions related to bowel dysfunction in the school setting.

Teacher Protocol for Bathroom Use

Of the teachers 80.5% allowed students unrestricted access to water, permitting unlimited trips to the water fountain or allowing a water bottle at the student desk (table 1). Despite this most teachers designated specific times of day for restroom use and greater than 85% encouraged students to hold urine outside those times. With regard to teacher actions after witnessing urinary incontinence 64% of teachers informed parents, 64% informed the school nurse, 41% sent students to the office and 77% had students change clothes.

State of Elementary School Bathrooms

Of teachers 82% noted that bullying or other misbehaviors occurred in the school restrooms (table 1). About half of the school restrooms had adult supervision less than half of the time. Lack of bathroom proximity to classroom, poorly maintained or dirty restrooms and lack of privacy were identified as problems in school restrooms by a third of respondents.

Promotion of LUT Health

Only 23.8% of teachers promoted LUT health. On multivariate logistic regression the grade taught, years of teaching experience and professional development were associated with LUT health promotion (table 2 and see figure). Using kindergarten as the referent the odds of promoting LUT health decreased by 20% for each grade until the fifth grade. Teachers were more likely to promote LUT health if they had greater than 5 years of teaching experience compared to 5 years or less (OR 1.66, 95% CI 1.39–1.98), and if they had received professional development on how to regulate bathroom use and manage urinary incontinence (OR 1.42, 95% CI 1.18–1.70). Teachers who were not interested in professional development because they viewed LUT health as a health issue and not a teacher issue were less likely to promote LUT health (OR 0.70, 95% CI 0.59–0.85).

Discussion

There have been limited studies assessing the role of teachers in promoting LUT health in children. We investigated factors associated with the promotion of LUT health among elementary school teachers via an electronic survey on Facebook. We found several subpopulations of teachers who were more likely to promote LUT health, including those who had more teaching experience (greater than 5 years), those who had received professional development on bathroom regulation and those who taught younger students. The majority of teachers did not promote LUT health. About 4 of 5 teachers allowed students an unlimited amount of water throughout the school day and yet most teachers encouraged students to hold urine by implementing reward and consequence based systems.

Pediatric LUT dysfunction, which is often a learned behavior resulting from prolonged delay of micturition, frequently develops upon school entry or can be exacerbated by school attendance.¹³ Failure to urinate when a child feels the urge whether due to hesitancy of the student or teacher discouragement can promote poor coordination of the bladder and sphincter necessary for normal voiding and lead to LUT dysfunction. Moreover, LUT dysfunction is associated with other urological conditions such as incontinence, infection and vesicoureteral reflux^{14–17}.

In 2003 Cooper et al surveyed Iowa elementary school teachers and found that few teachers had received training regarding management of voiding in students and many teachers encouraged children to wait to use the restroom.¹⁸ We noted a significantly higher percent of teachers who encouraged holding urine in the current study vs the prior study (88% vs 31%). This may be due to more honest reporting, given the anonymity of an online survey.

The results of our study demonstrated decreased odds of promoting LUT health with each ascending grade through the fifth grade. Toilet training is a developmental milestone that is commonly achieved between ages 3 and 5 years.¹⁹ Nonetheless Rogers reported that between 5% and 20% of all children have an ongoing wetting or soiling problem by age 5 years²⁰ and Blum et al reported that toilet training now occurs at older ages than in previous generations.²¹ It is plausible that kindergarten teachers demonstrated significantly more LUT health promoting behaviors because their students are closer in age to the widely accepted average toilet training age. As student age increases teachers may become less mindful of the need for children to continue practicing healthy urinary habits. In a study by Wiener et al the median age of a daytime wetting population was 8.2 years.²² This indicates the potential value for teachers of all elementary school grades to undergo training on promoting healthy bathroom behaviors.

There is evidence that a majority of teachers are unaware of the potential health problems accompanying LUT dysfunction.²³ Results of the current study indicate that many teachers believe that LUT health is an issue that does not require teacher participation. However, previous research demonstrated that individualized health plans in school with teacher support that specifically incorporate frequent bathroom times for children with LUT dysfunction can improve urinary continence.⁸ Moreover, our study shows that teachers who received training on managing bathroom use and incontinence were also more likely to promote LUT health among their students. Teachers who are simultaneously made aware of the potential medical complications of LUT dysfunction and the positive impact that they can make on improving LUT health may be more amenable to receiving relevant training.

Given the inextricable neurological relationship between LUT and bowel dysfunction, questions concerning teacher experience with bowel incontinence at school were included in our survey.^{24,25} However, only a small percent of respondents reported having had experience with bowel incontinence. We theorize that because bowel dysfunction presents as constipation in up to 30% of the pediatric population, it is not as easily recognized in the school setting other than through its manifestation as urinary symptoms²⁶.

Finally, our survey investigated bathroom conditions. Greater than 15% of respondents reported issues of privacy and poor maintenance, and 20% noted lack of bathroom proximity from the classroom. Also, 80% of respondents surveyed reported that bullying and other misbehaviors occurred in school restrooms and 50% reported that adult supervision was available less than half the time. Children commonly avoid bathroom use due to lack of privacy and a feeling of vulnerability.²⁷ Furthermore, it was found that bullying occurs in many school environments, including the bathroom. Perkins et al reported that almost 25% of students had skipped recess, lunch or bathroom use to avoid bullies²⁸.

Given this information, it is paramount to discuss the significant role of teachers in ensuring that bathrooms provide safety and privacy to students. This principle was perhaps best exemplified by Zhao²⁹ and Ching³⁰ et al, who found significant associations between bullying and the prevalence of pediatric LUT symptoms. Improved bathroom conditions may discourage students from holding urine, which can have downstream positive health implications. Until a more coordinated effort can be exerted by teachers to examine current policies on bathroom use, the state of school bathrooms and the corresponding impact on LUT health in school-aged children, families should participate in the promotion of pediatric LUT health by encouraging bathroom use at home before school, communicating proactively with teachers to establish consistent urinary habits for students at home and at school, and requesting documentation from pediatric providers to enhance bathroom privileges as medically indicated.

Due to the nature of this electronic survey we were unable to investigate elementary school teachers who do not use Facebook and could not provide an accurate response rate typical of a survey study. According to the Pew Research Center about 71% of online American adults are Facebook users, of whom 50% log on to their account at least once per day. Therefore, this survey method allowed us to reach a large nationwide sample of teachers in a short amount of time. The survey completion rate was high at 84.5% of those who provided consent. While acknowledging that the generalizability of our study result is not perfect, we believe that many generations of teachers were represented by including a nationwide cohort of teachers 20 to 60 years old.

It is possible that social desirability bias led respondents to select what they deemed to be ideal answers rather than their actual classroom practice. However, we found a significantly higher percent of teachers who encouraged holding urine in the current study vs prior studies (88% vs 31%). We believe that the anonymity provided by our online survey might have actually yielded responses that more closely reflect reality.

In the future we hope that this study can foster increased awareness and communication among pediatric providers, teachers and parents to improve LUT health in school-aged children. We believe that as the next step these various groups should join forces and create an evidence-based educational document with guidelines on how to maximize LUT health in schools. This document could subsequently be disseminated through regional or national associations of teachers.

Conclusions

To our knowledge this is the first large-scale survey of elementary school teachers across the United States on their policies regarding bathroom use. We found that only a minority of elementary school teachers met criteria as promoters of LUT health. Such promoters were more prevalent among experienced teachers, teachers of lower grades and those with professional development on bathroom use and urinary incontinence. This highlights an important opportunity for targeted intervention of educators with an aim of decreasing urological complications and improving quality of life in school-aged children.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Abbreviations and Acronyms

LUT lower urinary tract

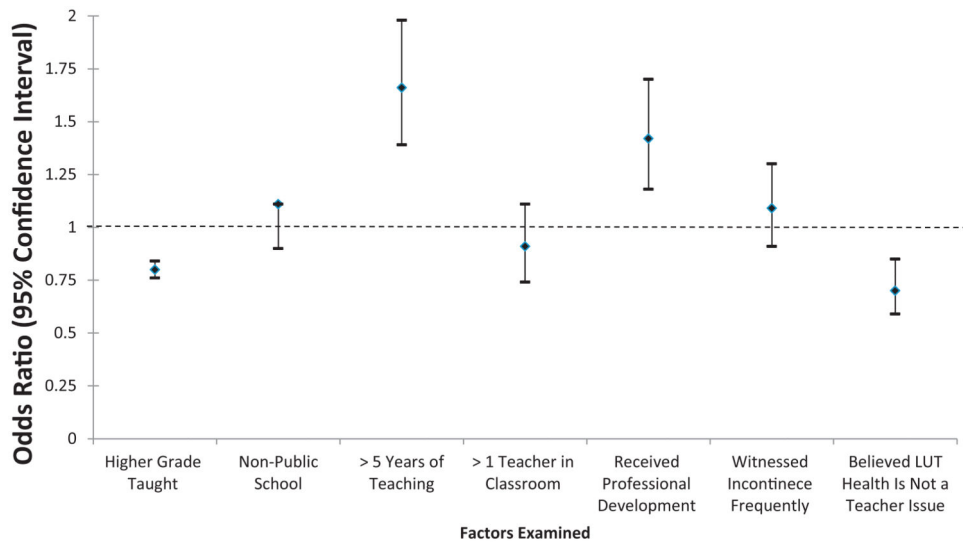


Figure 1. Factors affecting odds of teachers promoting LUT health

Table 1
Survey questions on teacher bathroom and water protocol, and school bathrooms

Survey Question	No. Respondents (%)
<i>Teacher bathroom and water protocol</i>	
Do children have unlimited access to water?	
Yes	3,355 (81)
No	307 (7)
Other	505 (12)
Are there designated times of day for restroom use?	
Yes	2,691 (65)
No	1,476 (35)
If child requests to use restroom during undesignated restroom time, do you ever encourage him to wait?	
Yes	3,663 (88)
No	504 (12)
Do you have protocol in place to encourage students not to use bathroom during class time?	
Yes	1,502 (36)
No	2,665 (64)
Your program/protocol to encourage children to avoid restroom use during class time is:	
Reward based	339 (23)
Consequence based	184 (12)
Combination of reward and consequence based	493 (33)
Other	492 (33)
<i>School bathroom characteristics</i>	
Do bullying, misbehavior, vandalizing or other neg behaviors occur in school restrooms?	
Yes	3,432 (82)
No	734 (18)
Is there adult supervision in restrooms?	
More than half time	672 (16)
Half time	301 (9)
Less than half time	2,143 (53)
Only during designated bathroom breaks	1,050 (25)
Which of following problems exists in school restrooms? Check all that apply:	
Lack of bathroom proximity from classroom	834 (20)
Poorly maintained/dirty restrooms	498 (12)
Lack of privacy	193 (5)
None of above	2,916 (70)

Table 2
Factors associated with teacher promotion of LUT health

	Teachers Promote LUT Health Rate	Univariate p Value	Adjusted OR (95% CI)	Multivariate p Value
Grade taught:				
Kindergarten	0.38	<0.001	Referent	<0.001
1	0.27		0.80 (0.76–0.84)	
2	0.21			
3	0.21			
4	0.14			
5	0.16			
School type:				
Public	0.23	0.363	Referent	0.31
Nonpublic	0.24		1.11 (0.90–1.11)	
Teaching yrs:				
5 or Less	0.19	<0.001	Referent	<0.001
Greater than 5	0.26		1.66 (1.39–1.98)	
No. teachers/classroom:				
1	0.23	0.007	0.91 (0.74–1.11)	0.35
Greater than 1	0.28			
LUT health professional development/training:				
No	0.23	<0.001	Referent	<0.001
Yes	0.29		1.42 (1.18–1.70)	
Frequency of witnessing urinary incontinence:				
Less than 1/6 mos	0.21	<0.001	Referent	0.35
Greater than 1/6 mos	0.31		1.09 (0.91–1.30)	
LUT health is health issue + not teacher issue:				
Disagree	0.24	<0.001	Referent	<0.001
Agree	0.19		0.70 (0.59–0.85)	

Table 3
Characteristics of 4,166 survey respondents

	No. Respondents (%)
Grade taught:	
Kindergarten	913 (21.9)
1	660 (15.8)
2	700 (16.8)
3	609 (14.6)
4	507 (12.2)
5	777 (18.7)
School type:	
Public	3,510 (84.3)
Private	377 (9.0)
Charter	229 (5.5)
Other	50 (1.2)
Teaching yrs:	
5 or Less	1,175 (28.7)
Greater than 5	2,921 (71.3)
No. teachers in classroom:	
1	3,513 (84.3)
2	563 (13.5)
3	55 (1.3)
Greater than 3	35 (0.8)
LUT health professional development:	
No	3,462 (81.9)
Yes	764 (18.1)
Frequency of witnessing urinary incontinence:	
Less than 1/6 mos	3,037 (73)
Greater than 1/6 mos	1,129 (27)