RESEARCH PAPER

Enuresis, Lower Urinary Tract Dysfunction and Teachers' Perceptions: A School-based Survey

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Objective: To determine the prevalence of enuresis and lower urinary tract dysfunction among Indian schoolchildren, and describe teachers' perceptions regarding toilet requests. **Methods**: Anonymous survey of students of a secondary school in Visakhapatnam, India by a modified version of the Dysfunctional voiding and incontinence scoring system (DVISS) in 2518 parents. Two questionnaires – the Bathroom behaviour scale and Teachers' hassle scale for toilet requests were designed, validated and administered to 138 teachers. **Results**: We received 1911 (75.9%) modified DVISS questionnaires with response; 1790 (93.7%) were valid. History was compatible with enuresis in 85 (4.7%), non-monosymptomatic enuresis in 38 (2.1%), overactive bladder in 46 children (2.6%), dysfunctional voiding syndrome in 14 children (0.8%) and both overactive bladder as well as dysfunctional voiding syndrome in 4 (0.2%). Responses of 43 (31.2%) teachers indicated refusal of toilet requests; medical cause underlying frequent toilet requests was understood by 82 (59.4%) teachers. At least one aspect of toilet requests was a frequent or intense hassle in 43 (39.8%) and 29 (28.7%) teachers, respectively. **Conclusion**: Toilet requests are misunderstood by and present a stressor to a sizeable minority of teachers.

Keywords: *Habits, Incontinence, School Children, Toilet break.*

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Enuresis is a common childhood problem. However, it can cause significant distress to the affected individuals and is also associated with sleep disturbances and behavior problems [1-3], thus hampering the overall quality of life. The term 'lower urinary tract dysfunction (LUTD)' refers to conditions where children have symptoms related to voiding in the absence of any overt uropathy or neuropathy [4,5], and is a part of the group of conditions known as bladder-bowel dysfunction (BBD) [4]. LUTD is associated with psychological comorbidity, urinary tract infection (UTI), vesicoureteral reflux (VUR) and constipation. The exact prevalence of LUTD in the population is not known but is estimated to be between 2% and 21.8% [6].

Teachers' awareness of the voiding habits of normal children and decision-making when faced with toilet requests have significant implications in both the evolution and management of LUTD [7,8]. Toilet requests should ideally be honored by teachers [7] but can be a stressor because of interference with teaching schedules and administrative expectations. However, there is very little data on awareness and stress amongst teachers related to this aspect of childcare.

We planned this study to estimate the prevalence of LUTD and enuresis among student in a single school, and to assess the knowledge of teachers regarding voiding habits of children, record perceptions of teachers regarding toilet use, and measure stress experienced by teachers due to toilet requests.

METHODS

This observational descriptive study was conducted in a secondary school in Visakhapatnam, India after clearance by Institutional ethics committee of the affiliated hospital of the authors, as well as permission from school authorities. The parents of the students in the school have stable employment with the Central Government but are relocated frequently. The school has adequate number of clean toilets. The participants of the study were students aged 5 to 17 years, and all teachers of the school.

Enuresis was defined as passage of urine while sleeping. Non-monosymptomatic enuresis was defined as enuresis and any one of the following (*i*) passage of urine in the clothes while awake (*ii*) and any of the following symptoms: straining while passing urine, pain while passing urine, interrupted stream of urine, need to

return to pass urine a second time immediately after passing urine, urgency, holding manoeuvres or passing urine in clothes before reaching the toilet. Overactive bladder was defined as presence of any two of the following symptoms: urgency, holding manoeuvres or passing urine in clothes while awake. Dysfunctional voiding syndrome was defined in the presence of any of the following (*i*) any two of the following symptoms; straining while passing urine, pain while passing urine, interrupted stream of urine and need to return to pass urine a second time immediately after passing urine (*ii*) passage of urine in clothes while awake and any one of the following symptoms: straining while passing urine, pain while passing urine, interrupted stream of urine, and need to return to pass urine a second time immediately after passing urine.

To assess the prevalence of LUTD, the Dysfunctional voiding and incontinence symptom score (DVISS) [9] was used as a community-based screening tool, after suitable adaptation with permission of the author. The modified questionnaire was translated into Hindi by forward and reverse translation by five healthcare professionals each of whom were fluent in Hindi and English, with final reconciliation by the authors. Face validation was performed by a team consisting of a psychologist, a pediatrician and a community medicine specialist. With an estimated prevalence of 9% for LUTD, as well as enuresis [10,11], the minimum number of participants was estimated to be 1721 at 1% absolute error of margin with a finite correction and 99% confidence interval.

To assess the knowledge of teachers regarding voiding habits of children and their perceptions regarding toilet use, a questionnaire known as Bathroom behavior scale (BBS) was prepared. To evaluate the stress experienced by teachers due by toilet requests in terms of frequency as well as intensity, a second questionnaire, *i.e*. the Teachers' hassle scale for toilet requests (THSTR) was prepared. Both questionnaires were prepared after inputs from 10 teachers from different schools. With an assumed prevalence of 20% regarding awareness of LUTD among teachers, the minimum number of participants required for assessing knowledge of teachers regarding voiding habits was estimated at 136 at 1% absolute error of margin with two finite correction and 99% CI.

Face-validity of the BBS as well as the THSTR was assessed by the expert opinion of three pediatricians and another ten teachers from other schools, with separate feedback forms. Content validity was assessed using feedback forms distributed to these experts.

Data collection for the study was performed in February - March, 2019.

Both Hindi and English versions of the modified DVISS were sent to parents of all students in grade 1-9 and grade 11, along with a letter of consent explaining the purpose of the survey and clarifying that response to the questionnaire was purely voluntary. Data regarding name, age, sex and class were not collected to ensure anonymity. In case the parents did not return the questionnaire within three days of distribution, a single reminder was sent to them by the teachers to allow collection up to seven days after distribution of the questionnaire. The BBS and THSTR were administered to all teachers of the school.

After collection, the filled modified DVISS questionnaires were interpreted question-wise to elicit history suggestive of enuresis, non-monosymptomatic enuresis, dysfunctional voiding syndrome and overactive bladder. Forms with incomplete information and conflicting responses were rejected.

Statistical analysis: Reliability scores of the Frequency and Intensity subscales of the THSTR were calculated by Cronbach alpha. All statistical analysis was performed using Microsoft Excel 2016.

RESULTS

Of 2518 questionnaires of the modified DVISS distributed to parents, 1911 (75.9%) were returned. On scrutiny, 1790 (93.7%) were valid. The prevalence of individual symptoms is shown in ***Table* I**. Symptomatology compatible with enuresis was noted in 85 children (4.7%, 95% CI 3.7-5.8%), non-monosymptomatic enuresis in 38 children (2.1%, 95% CI 2.0-3.6%,), overactive bladder alone in 46 children (2.6%, 95% CI 1.8-3.3%), dysfunctional voiding syndrome alone in 14 children (0.8%, 95% CI 0.4-1.2%), Thus, a total of 64 children (3.6%, 95% CI 2.7-4.5%) had at least one form of LUTD, *i.e*. overactive bladder or dysfunctional voiding syndrome.

A total of 138 questionnaires of the BBS and THSTR were distributed to teachers and all were returned. Sixty-eight teachers (49.3%) were unaware of the correct amount of water requirement of a child, 34 (24.6%) were unaware of the number of times that a child voids in a day 43 (31.2%) believed that toilet requests in the middle of a class should be denied, and 93 teachers (67.4%), believed that such requests lead to more requests from other children. A medical cause for frequent toilet requests by a child was considered a likely possibility by 82 teachers (59.4%).

Table I Prevalence of Symptoms

Symptom	*Prevalence*
Daytime incontinence	34, 1.9 (1.3-2.5)
Damp underwear	19, 55.9 (53.5-58.2)
Damp pants	10, 29.4 (27.3-31.6)
Pants soaking wet	5, 14.7 (13.0-16.4)
Bedwetting	85, 4.7 (3.7-5.8)
Damp bedsheets	52, 61.2 (58.9-63.5)
Bedsheets soaking wet	33, 38.8 (36.5-41.1)
Urine passed > 7 times/d	325, 18.2 (16.3-20.0)
Straining during micturition	35,2.0 (1.3-2.6)
Pain during micturition	16, 0.9, (0.5-1.3)
Interrupted stream	26, 1.5 (0.9-2.0)
Need to return to void a second time	27, 1.5 (0.9-2.1)
Urgency	98, 5.5 (4.4-6.6)
Holding manuvres	106, 5.9 (4.8-7.0)
Passing urine in pants on the way to the toilet	19, 1.1 (0.6-1.6)
Stools passed less than daily	222,12.4 (10.8-14.0)%

**Values in number, % (95% confidence interval).*

Reliability of the Frequency and Intensity subscales of the THSTR were 0.80 and 0.85, respectively. Of 138 questionnaires of the THSTR that were returned, 108 (78.3%) and 101 (73.2%) were valid on the frequency and intensity subscales, respectively. The results of the responses to the THSTR are shown in ***Web Table* I**. At least one aspect of toilet requests was a frequent hassle in 43/108 (39.8%) and an intense hassle for 29/101 (28.7%) teachers with valid responses. Significant overall stress due to toilet requests in terms of frequency and intensity was noted in six teachers (5.6%) and one teacher (0.7%), respectively.

DISCUSSION

In this study, we report prevalence of enuresis in 4.7%, non-monosymptomatic enuresis in 2.1%, overactive bladder in 2.6% and dysfunctional voiding syndrome in 0.8% children, respectively. We also report that a significant minority of teachers are unaware of the physiological basis of the toileting behaviour of children and that a significant proportion of teachers feel that at least one aspect of toilet requests constitutes a stressor.

There is a wide variation in the estimated prevalence of enuresis in developing countries, Indian studies report values between 7-12%. [3,12,13]. A Nigerian study reported figures as high as 37.0% [1]. The estimated prevalence of enuresis in our study, is lower than these studies. This may be due to absence of traditionally reported risk factors such as crowded families, low educational level of parents, jobless father, working mother and single parent [14], as well as inclusion of older children in our cohort, in whom enuresis has a tendency to resolve [15].

The exact prevalence of non-monosymptomatic enuresis and LUTD in the general population is not known, probably because of a lack of population-based studies. Hellström, *et al*. [16] in a survey of 7-year old Swedish school entrants reported a prevalence of 2.3% and 2.0% of non-monosymptomatic enuresis among boys and girls, respectively as compared to 2.1% overall prevalence in the present study. They also reported daytime incontinence in 6.0% girls and 3.8% boys as compared to overall prevalence of 1.9% in the present study [16]. Sampaio, *et al*. [11], in a population-based study based in Brazil, reported a 9.1% prevalence of LUTD as compared to 3.6% overall prevalence in the present study [11]. Lower prevalence in the present study may again have been due to inclusion of older children, a high representation of middle-class families with access to free medical care by the majority.

In our study, a sizeable proportion of teachers were unaware of fluid requirements and toilet requirements of children. Lack of awareness regarding elimination habits of children has been reported previously among schoolteachers [17], and among school nurses [18]. Resistance or conflicting rules regarding toilet requests have been reported as an area of concern for children and adolescents with bladder problems in qualitative studies by in Sweden [19] as well as in the UK [20]. In our study, we report that toilet requests are a stressor for a significant minority of teachers. Instructions to teachers regarding the toilet habits of children may help in mitigating these concerns. Healthcare providers and parents should also be encouraged to involve the school authorities while planning and prescribing urotherapy because individualized health plans with involvement of teachers are reported to improve continence [8].

Anonymous response from parents did not allow analysis of the age-or gender-wise distribution of symptoms. The study was conducted in a population from the middle- and upper-middle class with access to free medical care and its generalizability is therefore limited to such populations. We did not collect data related to presence of uropathies or urinary tract infection. We also did not collect data related to comorbidities of enuresis and LUTD such as screen-time, obesity, scholastic performance, sleep disturbances and behavior disorders.

To conclude, we report the prevalence of enuresis and LUTD in a sub-group of Indian schoolchildren from a

single center, and provide data on teachers' perceptions about toilet requests of school children. Incorporating information on these aspects during teacher-training may address related stress among teachers.

Ethical clearance: IEC of INHS Kalyani.
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Contributors: RWT: conceptualized the students' aspect of the study, designed the study, modified the DVISS questionnaire, analyzed data, and prepared the manuscript; NT: conceptualized the teachers' aspect of the study, prepared and performed validation of the BBS and THSTI questionnaires, analyzed questionnaires and was involved in preparing ,the manuscript; SKS: revised the study design, calculated sample size, conducted the survey, analysed the DVISS questionnaires, conducted, biostatistical analysis, revised the manuscript.
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Web Table I Findings of the Survey Using Teachers' Hassles Due to Toilet Requests (THSTR)

Item	*Problem area (frequency) (n=108)*			*Problem area (Intensity) (n=101)*		
	No.	*%*	*95% CI*	*No.*	*%*	*95% CI*
My class gets interrupted due to toilet requests	5	4.6	3.6-5.6	4	4.0	3.0-4.9
My chain of thoughts get interrupted due to these requests	11	10.2	8.8-11.6	7	6.9	5.7-8.1
If I allow one child, it will trigger more requests from other children	27	25.0	23.0-27.0	10	9.9	8.5-11.3
My lesson plan for the day gets interrupted due to these requests	2	1.9	1.2-2.5	3	3.0	2.2-3.8
Children misuse the permission to go to the toilet by distracting the class	7	6.5	5.3-7.6	4	4.0	3.0-4.9
Children misuse the permission to go to the toilet by absenting themselves from the class	3	2.8	2.0-3.6	3	3.0	2.2-3.8
I feel conflicted when I have to allow a child to go to the toilet	2	1.9	1.2-2.5	5	5.0	3.9-6.0
I worry that if I don't allow a child to go to the toilet, he will wet/soil in the class.	17	15.7	14.0-17.5	6	6.0	4.8-7.1
I am held responsible for absenteeism of my student from the class even for a toilet request	10	9.3	7.9-10.6	12	11.9	10.4-13.4
When I deny a toilet request, there is a complaint from the parent	4	3.7	2.8-4.6	5	5.0	3.9-6.0
Parents do not understand the reasons behind my refusal for toilet request	8	7.4	6.2-8.6	2	2.0	1.3-2.6
In my teaching experience, toilet request is a source of stress for me	0			3	3.0	2.2-3.8