

Prevalence of Urinary Incontinence in School Going Children: A Cross-sectional Study

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ABSTRACT

Background: Urinary incontinence is a highly prevalent condition that affects both gender across the age span and has significant social and psychological impact. The objective of this study was to determine the prevalence of urinary incontinence in school going children and assess the association of Incontinence Symptom Index-Pediatrics with age and gender.

Methods: A cross-sectional study was carried among 305 children aged 11-16 years using convenient sampling in a school of Dhulikhel municipality. Data were analysed using descriptive analysis and spearman's correlation coefficient.

Results: Prevalence of stress, urge and nocturnal enuresis were 22.95%, 19.34% and 3.93% respectively. Gender was significant with stress ($p>0.001$) and urge ($p>0.039$) incontinence whereas age was significant with nocturnal enuresis.

Conclusion: The episode of Urinary incontinence is common in school going children. It's important that children, parents, teachers and medical practitioners be aware of these phenomena.

Keywords: Children; prevalence; urinary incontinence

INTRODUCTION

Urinary incontinence (UI) may have a significant social and psychological impact leading to major distress to the affected children and their parents.¹⁻⁴ Normal daytime control of bladder function matures between 2 and 3 years of age and nighttime control between 3 and 7 years of age.⁵ The prevalence of UI reported in literature range from 1.8% to 20%.^{6,7} The daytime UI prevalence was 8%-15.9% at 4 to 17 years.⁷⁻¹⁰ Nocturnal enuresis was reported 5.55%-18.6% in different countries.¹¹⁻¹⁴ Worldwide variation in prevalence of UI may be explained by different definitions of UI, age distribution, cultural context, parental education, lifestyle and studies performed using different designs.^{6,7,9,15,16} Considering the importance of UI, cross-cultural differences and limited literature on the current prevalence states the need of the study. Therefore, the prevalence of UI in school going children was determined and association between ISI-P and variables of prevalence with age and gender was assessed.

METHODS

A descriptive cross-sectional study was used to determine the prevalence of UI in school going children and the association of ISI-P was assessed with age and gender. The ethical approval was obtained from Institutional Review Committee of Kathmandu University School of Medical Sciences (KUSMS), Dhulikhel, Nepal (IRC-KUSMS: 64/18). The study was conducted at Kathmandu university high school (KUHS) located at Dhulikhel municipality which is the suburban area. KUHS is a University school, all students from different geographical region, socioeconomic background can get admitted to it. All the children were interviewed separately for the screening of inclusion and exclusion criteria. Inclusion criteria for this study consisted of children studying in grade 5 or above, aged 11-16 years and students able to understand and speak English. Exclusion criteria included any congenital or acquired neurological condition and children who had undergone urological surgeries. Eligible participants were provided a written informed

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consent and explained about the objectives along with procedures for filling out the questionnaire were also explained by the researchers. Data were collected using self-administered Likert questionnaire Incontinence Symptom Index - Pediatrics (ISI-P) which is an established, concise tool and has demonstrated excellent reliability and validity for pediatrics comprising 11-item and has two domains:symptom severity (item 1 to 9) and impairment (item 10 and 11). The original questionnaire language was modified to bring it to a 5th grade reading level.¹⁷ During the Pretesting phase, the questionnaire was administered to 15 children of different age group, children were given to fill the questionnaire followed by face to face interview were conducted to assure the understanding of the questionnaire. The understanding of the questionnaire was scored in a 5-point Likert scale. Participants reported that they could easily understand the questionnaire. Privacy was ensured while collecting the data and researcher assisted the students if they had queries to assure all the questions were understood. The obtained information was used only for the purpose of the study. Sociodemographic data and prevalence were analyzed using descriptive statistics whereas association of ISI-P with age and gender was analyzed using spearman's correlation coefficient. The Statistical Package for Social Sciences (SPSS) version 16 was used to analyze the data.

RESULTS

A total of 305 children (186 males and 119 females) were enrolled with median age being 13 years. The mean voids per day was 4.79 (SD± 2.47) and mean voids per night 1.35 (SD± 0.93) (Table 1).The Cronbach's alpha of ISI-P for these children were 0.73 and was 0.67 to 0.72 if any item were deleted from the scale.

Prevalence of Stress UI was found to be 22.95% which was the most common form of UI followed by urge UI (19.34%) and nocturnal enuresis (3.93%). All children reported never or none which is 0 score for insensate incontinence and pad use. The magnitude of symptom severity and impairment associated with UI was 3.61% and 12.46% respectively.

Stress UI had a high prevalence in female 21.01% than in male 18.28%. Urge UI and Nocturnal enuresis was prevalent in male i.e. 21.51% and 3.76% respectively. The magnitude of symptom severity was high in female 18.29% and impairment in male 13.45% (Table 2).

Considering the age, Children aged 11 years showed higher prevalence of UI. The magnitude of symptom

severity andimpairment varies from 1.29% to 9.09% and 9.76% to 15.91% respectively (Table 3).

Aspearman's rank-order correlation was run to determine the association between domain and subdomain of ISI-P with age and gender. There was a strong correlation between symptom severity domain with stress UI ($\rho = 0.710$; $P < 0.01$), urge UI ($\rho = 0.853$; $P < 0.01$) and nocturnal enuresis ($\rho = 0.483$; $P < 0.01$) was statistically significant. Impairment domain showed moderate correlation with stress UI ($\rho = 0.401$; $P < 0.01$) and urge UI ($\rho = 0.414$; $P < 0.01$). There was weak correlation of impairment with nocturnal enuresis ($\rho = 0.309$; $P < 0.01$) was statistically significant (Table 4).

Gender was statistically significant with stress UI ($P < 0.01$),urge UI ($P < 0.03$) and symptom severity ($P < 0.009$) but it was not significance with nocturnal enuresis($P < 0.55$) and impairment($P < 0.35$) (Table 4).

Age had a significant association with nocturnal enuresis ($\rho < 0.003$) but was had weak statistical significant with stress UI ($P < 0.49$), urge UI ($P < 0.77$), nocturnal enuresis($P < 0.96$), symptom severity ($P < 0.78$) and impairment ($P < 0.21$) (Table 4).

Table 1. Demographic characteristics of the participants (N =305).

Variables	Frequency (%) / Median / Mean (SD)
Age (Years)	13
Gender	Male 186 (60.98%) Female 119 (39.02%)
Number of voids per day	4.79 (SD ± 2.47)
Number of voids per Night	1.35 (SD ± 0.93)
<i>SD = Standard deviation</i>	

Table 2. Prevalence of UI based on gender.

ISI-P	Total Percent	Male	Female
Symptom Severity	3.61%	18.28%	9.24%
Stress UI	22.95%	18.28%	21.01%
Urge UI	19.34%	21.51%	18.49%
Insensate incontinence	0%	0%	0%
Nocturnal enuresis	3.93%	3.76%	3.36%
Pad use	0%	0%	0%
Impairment	12.46%	11.83%	13.45%
<i>ISI-P = Incontinence Symptom Index - Pediatrics, UI = Urinary Incontinence</i>			

Table 3. Prevalence of UI based on age.

ISI-P	11 Years	12 Years	13 Years	14 Years	15 Years	16 Years
Symptom Severity	9.09%	2.78%	1.29%	6.35%	0	0
Stress UI	31.81%	23.61%	19.48%	19.05%	24.39%	25%
Urge UI	25%	20.83%	15.58%	23.81%	9.76%	25%
Insensate UI	-	-	-	-	-	-
Nocturnal enuresis	25%	19.44%	14.29%	23.81%	17.07%	50%
Pad use	-	-	-	-	-	-
Impairment	15.91%	12.5%	12.99%	11.11%	9.76%	12.5%
N (%)	44 (14.42%)	72(23.60%)	77(25.24%)	63(20.65%)	41(13.44%)	8(2.62%)

N = Number of participants, UI = Urinary incontinence

Table 4. Association between domain and subdomain of ISI-P with age and gender.

Variables	Gender	Age	Symptom severity	Impairment	Stress UI	Urge UI	Nocturnal Enuresis
Gender							
P - Value		0.331	0.009	0.349	0.001	0.039	0.555
ρ	1.000	0.056	-0.150	-0.054	-0.188	-0.119	0.034
Age							
P - Value	0.331		0.783	0.210	0.491	0.773	0.963
ρ	0.056	1.000	-0.016	-0.072	-0.040	-0.017	0.003
Symptom severity							
P - Value	0.009	0.783		0.000	0.000	0.000	0.000
ρ	-0.150	-0.016	1.000	0.493	0.710	0.853	0.483
Impairment							
P - Value	0.349	0.210	0.000		0.000	0.000	0.000
ρ	-0.054	-0.072	0.493	1.000	0.401	0.414	0.309
Stress UI							
P - Value	0.001	-0.040	0.000	0.000		0.000	0.000
ρ	-0.188	0.491	0.710	0.401	1.000	0.340	0.242
Urge UI							
P - Value	0.039	0.773	0.000	0.000	0.000		0.000
ρ	-0.119	-0.17	0.853	0.414	0.340	1.000	0.311
Nocturnal Enuresis							
P - Value	0.555	0.963	0.000	0.000	0.000	0.000	
ρ	0.34	0.003	0.483	0.309	0.242	0.311	1.000

p-value < 0.05 indicates significant (2-tailed), ρ : Correlation coefficient, UI: Urinary incontinence.

DISCUSSION

Estimates of the prevalence of incontinence depends on the definition used and the population studied. Our definition of incontinence was based on the episode of incontinence in past month and the score in ISI-P. Score of ≥ 2 for stress UI which indicated sometimes (total of item 1 and 2), ≥ 3 for urge UI which indicated less than once a week (total of item 3,4 and 5) and ≥ 1 for nocturnal enuresis which indicated less than once a week (total of item 6 and 7). Internal consistency of ISI-P with this specific sample and if any item was deleted from the

scale was shown to be high. This result indicated that all the items of ISI-P were to be included in the scale in our population.

Our study showed stress UI had the highest prevalence among other UI. Bolat D et al. conducted a study in Turkey reported 26% of children with day time UI (DUI) had stress urinary incontinence.¹⁰ Swithinbank et al conducted study in Britain reported children aged 11 to 12 years had daytime wetting caused by coughing, sneezing, light or strenuous physical activities.⁸ Our results showed higher prevalence of stress UI than in

study conducted in Britain but lower than study in Turkey. This could be on the account that our questionnaire for identifying children with stress UI had urine leak on lifting, bending, standing, turning, walking or light exercise during the past month. This could also be due to socioeconomic status of people in Nepal, strenuous and physical activities like lifting weights, transferring starts from early years of life.

Bolat D et al. reported that more than 58% of children with DUI had urge incontinence.¹⁰ Urge UI is due to detrusor overactivity. The overall prevalence range of DUI in different European counties was reported to be 4.4% to 19.2% and in Asian countries it ranged from 2.1% to 6.3%.^{12,18,19} Prevalence range of urge UI in our study is higher than others studies conducted. According to Bolat D et al. Age, maternal educational level, family history of daytime wetting, settlement, history of constipation, urinary tract infection and urgency are the risk factors.² These risk factors could also be applied in Nepal as it shares similar influences.

Nocturnal enuresis was reported to be 18.6% in India, 9.2% in Korea, 8% in Malaysia, 5.55% in Taiwan and 5.9% in Japan.^{11-14,20} Mohammad et al conducted a study in Iran and reported the prevalence of 6.8% in age 5 -18 years.¹⁶ Our study had lower prevalence rate than in the study conducted in these counties. This might be related to the ISI-P questionnaire, if the child experienced the episode of UI less than once a week during the past month, which is more rigid definition than other studies. Additionally, the fact that the prevalence of nocturnal enuresis is achieved by 7 years of age,⁵ in this study we focused on children ≥ 11 years of age.

There was no prevalence reported for insensate incontinence and pad use. This could be due to the exclusion of the children with a medical history that could influence urinary continence negatively.

Linde et al conducted a similar study which showed stress UI was prevalent in female which was similar to our study.²¹

Various studies showed decrease in prevalence rate of UI as the age increase.^{8,22} This study did not show the decrease in UI with increase in age. This may be due to small and variable amount of sample size between different age group in this study.

The limitation of the study is that the data was only based on questionnaire and there was no confirmed qualitative diagnosis. Though the questionnaire is a self-reported questionnaire the researchers was involved

as assessor for children who needed assistance with questions. The major limitation is the research couldn't be generalized for all the Nepalese school going children. So, we recommend the further studies to consider a heterogenous population and larger school-based screening to determine the prevalence and increase the awareness of pediatric urinary incontinence.

CONCLUSIONS

The prevalence of UI is common in school going children. Since UI has direct effect on the health-related quality of life and there are modifiable risk factors to improve the continence in children. It is important that children, parents, teachers and medical practitioners be aware of these phenomena and alert to the associated symptoms.

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COMPETING INTERESTS

The authors declare that they have no competing interests

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