

Schools' Toilets Quality and Its Relation to Urinary Tract Problems in Pupils of Primary Schools in Hilla City

Russul Hamed Jawad, Abdul Razzaq Als Salman¹

Department of Family and Community Medicine, ¹Department of Urology, College of Medicine, University of Babylon, Hilla, Iraq

Abstract

Background: Avoiding school toilets might cause irregular or infrequent voiding, which can lead to a variety of urinary issues. In this study, primary school-aged children's bathroom habits, contributing factors, and relationships to lower urinary tract symptoms were examined. **Objectives:** The objectives of the study were: (1) to evaluate factors that affect students going to school toilets including toilet facilities and toilet hygiene in children of primary schools; (2) to evaluate urinary symptoms in those children; (3) to differentiate between private school children and public school children; and (4) to evaluate pupils-to-toilets ratio among primary school children. **Materials and Methods:** A cross-sectional study was conducted at Hilla city primary schools, and the time of this study was from February 15 to June 15, 2022. This study was conducted on 500 pupils by selecting 10 primary schools in Hilla city randomly (five of them were private schools and other five were public schools). **Results:** Public school students reported that toilets are significantly more dirty (72.2%) compared with private schools. Similar significant differences were reported regarding the presence of stool/urine on the floor, smell of toilet, lighting of toilet, and availability of soap. The presence of urinary tract infection symptoms (at least one symptom) was found to be significantly higher among public sector schools (53.1%) compared with private sector schools (46.9%), with *P* value of 0.031. Public schools had significantly higher number of children per toilet ($108.0\% \pm 68.5\%$) compared with private schools ($26.8\% \pm 7.6\%$), with *P* value of 0.030. **Conclusions:** Toileting habits and urinary tract symptoms were both significantly correlated. Many children influenced by negative perceptions of school toilets have adopted unhealthy toilet habits during school time. Public school students reported that toilets are significantly more dirty compared with private schools.

Keywords: Cleanliness, students, toilet use

INTRODUCTION

The access to the use of clean and safe toilets is considered critical for public health by the World Health Organization.^[1] To date, public health initiatives to enhance toilet access and use have mostly concentrated on the prevention of a range of infectious diseases, with little emphasis on the importance of toilet access for bladder health and lower urinary tract symptoms (LUTS) prevention.^[1]

The capacity to approach or enter toilets for toileting has been recognized as a possible protective factor for bladder health.^[2] Bladder health is “a comprehensive condition of physical, mental, and social well-being related to bladder function, not just the absence of lower urinary tract symptoms,” according to a broad definition (lower urinary tract infection).^[3]

It is well established that children's irregular or infrequent voiding as a result of avoiding school restrooms is linked to a variety of issues.^[4] Bladder difficulties that start in childhood can anticipate adulthood problems such as overactive bladder, urinary tract infections (UTIs), and inadequate bladder emptying.^[5] Inadequate privacy, a lack of peace and quiet, as well as filthy environments might cause the impulse to void to be neglected, resulting in infrequent voiding or poor fluid intake. Their findings revealed that the voluntary acts of urination, which

Address for correspondence: Dr. Russul Hamed Jawad,
Department of Family and Community Medicine,
College of Medicine, University of Babylon, Hilla, Iraq.
E-mail: hamrussul@gmail.com

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include details such as voiding place, time, position, and style, are connected to the physiological event of bladder emptying.^[6]

In a survey of school children in wealthy countries, it was discovered that schools lacked proper bathroom facilities and that students were reluctant to use them. Healthy hygiene practices should be instilled in children from an early age. Traditional didactic health education, on the other hand, has been shown in previous studies to be a poor predictor of behavioral change. The cause of this issue could be that ordinary people's hygiene behaviors, particularly children's, for health-related reasons rarely evaluated.^[7]

The advantages of expanding the number of latrines in schools in terms of health and education are still unknown. To our knowledge, no trial has been conducted to evaluate the benefits of adding latrines to schools alone. This is probably because sanitation without hygiene is not regarded as a best practice and may not be relevant to policy.^[8] In addition, compared with children in intervention arms with identical demographic characteristics but no latrine provisions, pupils attending schools in an arm that received latrine supplies experienced minimal benefit, and substantially more student hand pollution was linked to latrine provisions.^[9] UTIs are among the most frequent infections in clinical practice. They comprise a wide variety of infections ranging from simple cystitis to uroseptic shock and require a considerable amount of antibiotics for their management.^[10]

Urine urgency, frequency, infrequent voiding, and urinary incontinence all refer to lower urinary tract dysfunction in children. In this population, the prevalence of UTI, insufficient bladder emptying, and vesicoureteric reflux, as well as constipation, fecal incontinence, and various LUT dysfunctions are strongly linked.^[11] Urine leaking could cause embarrassment and social isolation for the child.^[12] Children need extra time to take care of their own hygiene needs in the bathroom because of their developing motor skills. As hands come into touch with urine and feces while doing perianal hygiene, hand cleanliness is critical because the urethra and the anus opening are close together. Cleaning for female children must be done from front to back. Hands should be cleansed thoroughly after conducting this treatment.^[13] In children, it is likely to prevent infection of urinary tract and protect the child from the potential risks of the disease by improvement of health behaviors.^[14]

MATERIALS AND METHODS

This is a cross-sectional study, which was conducted at Hilla city primary schools. This study was conducted on 500 pupils by selecting 10 primary schools in Hilla city randomly; then we selected 50 pupils from each school by systematic random.

Primary schools were divided as follows: five of them were private schools and other five were public schools. Data were collected by using a predesigned questionnaire by which the pupils were interviewed. A total of 500 samples were collected from pupils of 9–11 years of age in primary schools of Hilla city. The questionnaire contains 25 questions divided into five categories (toilet facilities, toilet hygiene, hygiene practice, frequency of voiding and defecation, and symptoms of UTI); the answer to each question was in the form of five options, and the question of urinary symptoms was presented in the form of true/false. Also the gathered information included age, gender, and grade of pupils. A pilot study was planned before starting the collection of data for 2 weeks. The pilot study was done in primary schools from February 1, 2022, to test the questionnaire for any modification required, any other difficulties, and the time needed for data collection. The pilot sample included 50 pupils who were excluded from the study sample. This pilot study was done to eliminate some variables to reduce time of interview, to estimate the time needed, to find potential difficulties and assess whether the research protocol is realistic and workable.

Statistical Analysis

Data analysis using SPSS software (version 23.0 for Linux operating system) was used to perform statistical analysis for this study. Continuous variables were represented as means $\pm$ standard deviation, whereas categorical variables were represented as frequencies and percentages. Student's t-test was used to compare means between two groups, whereas chi-square test was used to assess the relationship between categorical variables. Pearson's product-moment correlation coefficient was calculated to assess the correlation between two continuous variables. *P* value of ≤ 0.05 was considered statistically significant.

Ethical approval

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. It was carried out with patients verbal and analytical approval before sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee according to the document No. 600 on 1 Mar 2022. The study protocol was approved by committee in Babylon University College of Medicine.

Pupils' verbal consent was obtained prior to interview after explaining the study to them. Official agreement was obtained from Babylon Health Directorate.

RESULTS

This study included a primary school children; mean age of participants was 11.13 ± 0.93 years with a median age of 11 years [Figure 1]. Table 1 shows that significant differences were found regarding how far is the toilet

and regarding criticism by teacher about going to toilet (P value = 0.009). Table 2 shows public school students reported that toilets are significantly more dirty (72.2%) compared with private schools. Similar significant differences were reported regarding the presence of stool/urine on the floor, smell of toilet, lighting of toilet, and

availability of soap. Table 3 shows that times of voiding in school toilets were significantly higher among private school students (79.2%) compared with public school students. About defecation, 65.6% of children in public schools and private schools did not use the toilet to defecate. Table 4 shows the presence of UTI symptoms (at least one symptom) was found to be significantly higher among public sector schools (53.1%) compared with private sector schools (46.9%), with P value of 0.031. Table 5 shows that no significant difference was observed regarding the presence of UTI symptoms between male students and female students. Table 6 shows that public schools had significantly higher number of children per toilet ($108.0\% \pm 68.5\%$) compared with private schools ($26.8\% \pm 7.6\%$), with P value of 0.030.

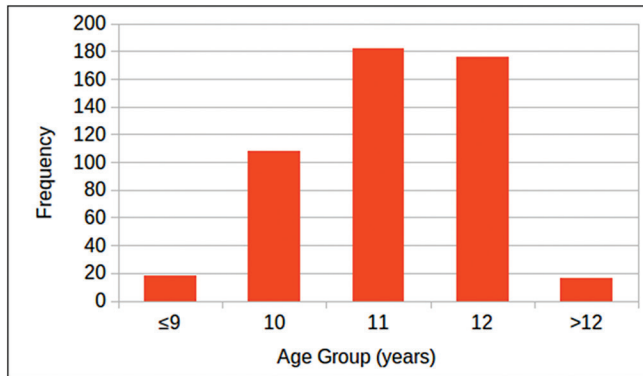


Figure 1: Age group distribution among study participants (n = 500)

DISCUSSION

Mean age of participants was 11.13 ± 0.93 years with a median age of 11 years. School grades are 23.8% of the fourth grade, 33.6% of the fifth grade, and 42.6% of the sixth grade, which are in agreement with other studies.^[15]

Table 1: Answers to questions about toilet facilities (n = 500)

Questions	Public schools	Private schools	Total (n = 500)	P value
1. Is the toilet far away?				
Not far away	138 (56.8%)	105 (43.2%)	243 (48.6%)	0.001*
A little far	75 (49.0%)	78 (51.0%)	153 (30.6%)	
Far	16 (30.2%)	37 (69.8%)	53 (10.6%)	
Very far	7 (26.9%)	19 (73.1%)	26 (5.2%)	
Not noticed	14 (56.0%)	11 (44.0%)	25 (5.0%)	
2. Is the time enough to use the toilet at break?				
Enough	102 (51.8%)	95 (48.2%)	197 (39.4%)	0.377
A little enough	56 (47.1%)	63 (52.9%)	119 (23.8%)	
Not enough	47 (46.1%)	55 (53.9%)	102 (20.4%)	
Inadequate	28 (62.2%)	17 (37.8%)	45 (9.0%)	
Not noticed	17 (45.9%)	20 (54.1%)	37 (7.4%)	
3. Is the toilet crowded?				
Never crowded	89 (50.9%)	86 (49.1%)	175 (35.0%)	0.133
Crowded sometimes	121 (54.0%)	103 (46.0%)	224 (44.8%)	
Crowded always	14 (33.3%)	28 (66.7%)	42 (8.4%)	
Crowded every time	2 (50.0%)	2 (50.0%)	4 (0.8%)	
Not noticed	24 (43.6%)	31 (56.4%)	55 (11.0%)	
4. Are you late for class due to using toilet at break?				
Never	116 (53.2%)	102 (46.8%)	218 (43.6%)	0.181
Sometimes	84 (46.7%)	96 (53.3%)	180 (36.0%)	
Always	13 (35.1%)	24 (64.9%)	37 (7.4%)	
Every time	10 (58.8%)	7 (41.2%)	17 (3.4%)	
Not noticed	27 (56.3%)	21 (43.8%)	48 (9.6%)	
5. Are you criticized by teacher because of using toilet?				
Never	163 (55.6%)	130 (44.4%)	293 (58.6%)	0.009*
Sometimes	45 (37.5%)	75 (62.5%)	120 (24.0%)	
Always	11 (44.0%)	14 (56.0%)	25 (5.0%)	
Every time	6 (35.3%)	11 (64.7%)	17 (3.4%)	
Not noticed	25 (55.6%)	20 (44.4%)	45 (9.0%)	

*Significant at $P \leq 0.05$

Table 2: Answers to questions about toilet hygiene (n = 500)

Questions	Public schools	Private schools	Total (n = 500)	P value
1. Is the toilet usually clean?				
Very clean	13 (17.6%)	61 (82.4%)	74 (14.8%)	<0.001*
Clean	52 (46.4%)	60 (53.6%)	112 (22.4%)	
A little dirty	66 (47.1%)	74 (52.9%)	140 (28.0%)	
Very dirty	96 (72.2%)	37 (27.8%)	133 (26.6%)	
Not noticed	23 (56.1%)	18 (43.9%)	41 (8.2%)	
2. Is there any stool or urine on the toilet floor?				
Never existed	47 (35.9%)	84 (64.1%)	131 (26.2%)	<0.001*
Existed sometimes	86 (49.1%)	89 (50.9%)	175 (35.0%)	
Existed always	60 (61.2%)	38 (38.8%)	98 (19.6%)	
Existed every time	23 (67.6%)	11 (32.4%)	34 (6.8%)	
Not noticed	34 (54.8%)	28 (45.2%)	62 (12.4%)	
3. Is there water available in the toilet?				
Never existed	18 (36.7%)	31 (63.3%)	49 (9.8%)	0.169
Existed sometimes	84 (50.0%)	84 (50.0%)	168 (33.6%)	
Existed always	80 (49.7%)	81 (50.3%)	161 (32.2%)	
Existed every time	33 (50.8%)	32 (49.2%)	65 (13.0%)	
Not noticed	35 (61.4%)	22 (38.6%)	57 (11.4%)	
4. Is the toilet smell well?				
Never	135 (57.4%)	100 (42.6%)	235 (47.0%)	0.004*
Sometimes	61 (47.3%)	68 (52.7%)	129 (25.8%)	
Always	20 (32.3%)	42 (67.7%)	62 (12.4%)	
Every time	10 (37.0%)	17 (63.0%)	27 (5.4%)	
Not noticed	24 (51.1%)	23 (48.9%)	47 (9.4%)	
5. Is there usually privacy in the toilet?				
Never	65 (50.0%)	65 (50.0%)	130 (26.0%)	0.193
Sometimes	60 (44.4%)	75 (55.6%)	135 (27.0%)	
Always	63 (54.8%)	52 (45.2%)	115 (23.0%)	
Every time	17 (40.5%)	25 (59.5%)	42 (8.4%)	
Not noticed	45 (57.7%)	33 (42.3%)	78 (15.6%)	
6. How is the toilet lighting?				
Very bright	30 (25.9%)	86 (74.1%)	116 (23.2%)	<0.001*
Bright	105 (47.7%)	115 (52.3%)	220 (44.0%)	
Somewhat dark	57 (75.0%)	19 (25.0%)	76 (15.2%)	
Dark	19 (90.5%)	2 (9.5%)	21 (4.2%)	
Not noticed	39 (58.2%)	28 (41.8%)	67 (13.4%)	
7. Is there soap available in the toilet?				
Never existed	93 (75.6%)	30 (24.4%)	123 (24.6%)	<0.001*
Existed sometimes	92 (57.5%)	68 (42.5%)	160 (32.0%)	
Existed always	33 (24.3%)	103 (75.7%)	136 (27.2%)	
Existed every time	11 (23.9%)	35 (76.1%)	46 (9.2%)	
Not noticed	21 (60.0%)	14 (40.0%)	35 (7.0%)	
8. Is there toilet paper available?				
Never existed	205 (51.0%)	197 (49.0%)	402 (80.4%)	0.599
Existed sometimes	11 (50.0%)	11 (50.0%)	22 (4.4%)	
Existed always	5 (31.3%)	11 (68.8%)	16 (3.2%)	
Existed every time	1 (33.3%)	2 (66.7%)	3 (0.6%)	
Not noticed	28 (49.1%)	29 (50.9%)	57 (11.4%)	

*Significant at $P \leq 0.05$

In our study, in comparisons between public sector schools and private sector schools regarding answers to toilet facilities questions, significant differences

were found regarding questions about how far is the toilet ($P = 0.001$). This is in agreement with the study by Shao *et al.*^[7]

Table 3: Answers about frequency of voiding and defecation (n = 500)

Questions	Public schools	Private schools	Total (n = 500)	P value
1. How often did you defecate in school toilets?				
Always	21 (52.5%)	19 (47.5%)	40 (8.0%)	0.914
Sometimes	67 (50.8%)	65 (49.2%)	132 (26.4%)	
Never	162 (49.4%)	166 (50.6%)	328 (65.6%)	
2. How many times did you void in school toilets per day?				
5–6 times per day	11 (20.8%)	42 (79.2%)	53 (10.6%)	<0.001*
3–4 times per day	11 (25.6%)	32 (74.4%)	43 (8.6%)	
1–2 times per day	82 (54.7%)	68 (45.3%)	150 (30.0%)	
Less than one time	52 (49.5%)	53 (50.5%)	105 (21.0%)	
Never	94 (63.1%)	55 (36.9%)	149 (29.8%)	

*P < 0.05 is consider significant

Table 4: Presence of symptoms by school category

Symptoms present	School		Total	P value
	Public	Private		
Yes	187 (53.1%)	165 (46.9%)	352 (100%)	0.031*
No	63 (42.6%)	85 (57.4%)	148 (100%)	
Total	250 (50.0%)	250 (50.0%)	500 (100%)	

Odds ratio = 1.53 (95% CI = 1.04–2.25)

*P < 0.05 is consider significant

Table 5: Presence of symptoms by gender

Symptoms present	Gender		Total	P value
	Male	Female		
Yes	205 (58.2%)	147 (41.8%)	352 (100%)	0.500
No	91 (61.5%)	57 (38.5%)	148 (100%)	
Total	296 (59.2%)	204 (40.8%)	500 (100%)	

Table 6: Student's t-test

Group	N	Children-to-toilets ratio			P value
		Mean	SD	Range	
Public schools	5	108.0	68.5	57.5–225.0	0.030*
Private schools	5	26.8	7.6	18.8–37.5	
Total	10	67.4	62.8	18.8–225.0	

*Significant at P < 0.05

Significant differences were found regarding questions about criticism by teacher about going to toilet ($P = 0.009$): 58.6% of students reported no criticism by teacher about going to toilet, which is in agreement with the study by Shao *et al.*^[7]

Regarding question about the cleanliness of the toilet, public schools students reported that toilets are significantly more dirty compared with private schools ($P < 0.001$). According to earlier research on the benefits of cleanliness and students using school restrooms, cleanliness was the main factor influencing students' decision to use the restroom on campus.^[16] A meaningful significant association was found between toilet cleanliness and toilet use for both boys and girls.^[17] Additionally, a

clean toilet could significantly reduce the possibility of children being exposed to pathogens.^[18] Previous studies described the dirty state of school toilets.^[19]

Public schools students reported the presence of stool/urine on the floor of toilets, which is significantly more compared with private schools ($P < 0.001$). Poor toilet conditions, including the presence of feces, urine, blood, vomit, flies, and smell, led to poor visual and olfactory experience that prevented students from using school toilets.^[20]

Public school students reported that smell of toilets is significantly more bad compared with private schools ($P = 0.004$). In other studies, children have a number of deterrents to toilet use, including the smell of toilets.^[17]

Regarding the availability of soap, there were significant differences. Regarding the answers about the frequency of voiding and defecation, times of voiding in school toilets were significantly higher among private school students compared with public school students, with $P < 0.001$. About defecation, 65.6% of children in public school and private school did not use toilet to defecation. The result showed that the times of students using school toilets were affected by the cleanliness of the toilets.^[7]

Not utilizing school restrooms can be attributed to a number of factors, including a lack of hygiene-related supplies and the facilities being dirty. Furthermore, prolonged retention of urine and feces can result in a number of medical issues, including UTIs, vesicourethral reflux, and urinary and/or fecal incontinence.^[13]

Regarding the symptoms of improper bladder emptying are variable. However, signs of the emptying phase frequently coexist with signs of the storing phase.^[21] However, signs of the emptying phase frequently coexist with signs of the storing phase.^[21] The presence of UTI symptoms (at least one symptom) was found to be significantly higher among public sector schools compared with private sector schools, with P value of 0.031 [Tables 4–7]. Odds ratio for public school students to have UTI symptoms was 1.53 (95% CI = 1.04–2.25); students in public schools were 1.53 times more likely to have UTI symptoms compared with students in private sector schools. Significant correlations between LUTS and toileting behavior have been found in several research. This is a fascinating discovery that may have significant clinical ramifications. The most prevalent behaviors were related to site preferences (i.e., avoiding restrooms) and various methods of postponing voiding. Although the majority of research participants were concerned about the cleanliness of public restrooms at, for example, shopping centers, gas stations, restaurants, or pubs, most were either students or employed and could avoid using them.^[6]

In our study, no significant difference was observed regarding the presence of UTI symptoms between male students and female students ($P = 0.500$). This, in disagreement with other studies, which revealed a higher incidence of UTI symptoms in girls, which was diagnosed as 53% in girls and 17% in boys.^[12] because of difference in gender distribution by school grade.

In our study, there was correlation between children-to-toilets ratio and proportion of students with urinary symptom. Comparison between public sector schools and private sector schools regarding children-to-toilets ratio had revealed that public schools had significantly higher number of children per toilet ($108.0\% \pm 68.5\%$) compared with private schools ($26.8\% \pm 7.6\%$), in agreement with other studies, that the importance of lower pupils to toilet ratios, and quantify the need of toilets. The benefits of following guidelines such as those set by the World Health

Organization (25:1 for girls and 50:1 + one urinal for boys) (Water, Sanitation and Hygiene Standards for Schools, WHO) and the Kenyan government (25:1 for girls and 30:1 for boys).^[1] In contrast to traditional pits, we also noticed increased use of urinals, which provides more evidence in favor of the current WHO recommendations to provide a urinal for boys.^[22] The schools that easily exceeded these recommendations (e.g., 15:1) had the most improvements in toilet use. However, we demonstrate that the schools with the weakest ratios are most likely to benefit from the addition of even a small number of toilets in terms of increased toilet usage^[22] and this finding was compatible with recommendations of other studies.^[15]

CONCLUSIONS

Toileting behaviors and factor analysis (such as toilets hygiene and toilets facilities) were significantly related to urinary tract symptoms. Many children influenced by negative perceptions of school toilets have adopted unhealthy toilet habits during school time. Public school students reported that toilets are significantly more dirty compared with private schools. The presence of UTI symptoms was found to be significantly higher among public sector schools compared with private sector schools. Public schools had significantly higher number of children per toilet (108 pupils to one toilet) compared with private schools (27 pupils to one toilet).

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Conflicts of interest

There are no conflicts of interest.

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