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Citation:

Lee J. Winchester, Alison L. Hooper & Cailin J. Kerch (2022) Ease of restroom access influences fluid consumption habits and health in classroom teachers, International Journal of Occupational Safety and Ergonomics, DOI: 10.1080/10803548.2022.2053346

Ease of Restroom Access Influences Fluid Consumption Habits and Health in Classroom Teachers

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Abstract

Background and Purpose: There are rising concerns about the health of classroom teachers in the United States, including stress, hypertension, and frequent urinary tract infections. Teacher working conditions are likely a contributor to their health concerns. Many teachers report that they cannot easily take a restroom break at work, and therefore, they consume minimal water or other fluids. This study investigated the relationship between restroom access and fluid consumption and the prevalence of renal and cardiovascular health complications in classroom teachers. ***Methods:*** The responses of 844 teachers (92% women, 8% men, age: 65.1% between 26 - 45 years) to an online survey about restroom accessibility, fluid consumption, and health were analyzed using descriptive statistics, χ^2 analyses, and logistic regression. ***Results:*** 59.0% of teachers could not easily take a restroom break, and 54.7% consumed less than 2 cups of water per workday. Furthermore, 44.8% reported being pre-hypertensive, and 4.9% reported being hypertensive. Teachers with insufficient restroom access were significantly more likely to report frequent urinary tract infections. ***Conclusions:*** This study demonstrates a relationship between restroom access, fluid consumption, and renal/cardiovascular health in classroom teachers. Future research should directly investigate how teacher work environment impacts renal and cardiovascular health.

Keywords: Teacher wellness, renal health, fluid intake, cardiovascular health, restroom access

1.0 Introduction

Undoubtedly, teachers are a critical part of our society as they educate youth from early childhood through adulthood. According to the National Center for Education Statistics (nces.ed.gov), more than 4 million full and part-time public or private school teachers work in the United States. With such a substantial number of individuals serving as professional educators, school policies must be optimized to ensure health and productivity within the teaching profession, since better health is directly linked to greater job performance. Although data are fairly scarce regarding teacher health in the United States, the available literature on teacher health suggests that obesity, hypertension, and plasma glucose abnormalities are common health issues that affect this population of workers [1-3]. In fact, 26.5% of a sample of public school teachers exhibited high resting heart rate, while almost 43% were classified as hypertensive. These are major risk factors for cardiovascular disease [2]. Furthermore, a review of early childhood teachers, who experience many of the same working conditions as elementary teachers, suggests that greater than 10% of teachers presented with diagnosed diabetes mellitus compared to just 7.8% of individuals in a similar national sample [3]. Many teachers suffer from elevated psychological distress with increasing years of service in the profession [4], which is commonly thought to be a primary cause of the increased prevalence of cardiovascular and metabolic disease associated with teaching. Although there are clear correlations between chronic stress and cardiovascular disease, it is also a common complaint among classroom teachers that they cannot use the restroom during the workday because of student supervisions responsibilities. Despite a lack of published literature on the topic, public surveys from the Classroom Teacher Association suggested that 47% of a sample of >500 teachers verified that they were required to spend greater than 3 hours continuously supervising children. The majority of these teachers reported avoiding drinking water, and 20% reported medical issues due to not using the restroom. Although this is a public survey and the results are unpublished, this suggests an alarming trend that could severely reduce teachers' health.

The United States Department of Labor (US DOL) Occupational Health and Safety Administration (OSHA) require employers to provide prompt access as needed to restrooms. However, according to a recent survey conducted by the American Federation of Teachers, approximately one in two teachers reported inadequate access to bathrooms or no bathroom access [5]. Realities of teachers' working condition, including the need to ensure that students are continually supervised, often means that teachers cannot use the restroom as needed. The National Education Assocation, a large labor union representing public school teachers and other education personnel in the United States, has been pursuing legislation to support better working environments for teachers. However, there is little progress to date. Additionally, the lack of literature examining the effects of infrequent bathroom breaks on student health and related policy is concerning.

Supporting the public survey data from the Clasroom Teacher Association and from the American Federation of Teachers, other research implies that 16% of elementary school teachers experience urinary tract infections [6], which commonly arise as a result of poor fluid intake and lack of access to restrooms. It is suggested that approximately 3.7 liters of water per day for men, and 2.7 liters for women, on average, is required to maintain adequate hydration, which equates to about 15.6 cups and 11.4 cups, respectively [7]. With teachers actively avoiding water and other fluid intake to mitigate restroom use, this could lead to significant health complications. A 2019 study on the California Teachers Cohort found that 1,762 teachers out of 88,481 sampled (2.0%) were identified to have age-related macular degeneration (AMD) [8]. This can be compared to a survey suggesting that AMD is observed in < 0.5% of the population [9]. Interestingly, AMD is 3 times more prominent in individuals with moderate renal disease [10], suggesting that renal distress may be promoting the ocular issues observed in teachers, particularly since it is strongly driven by hypertension [11]. This becomes an increasingly alarming issue for elementary school teachers who report a lack of fluid intake and restroom use since dehydration-induced hyperosmolarity exacerbates hypertension and chronic kidney disease [12,13]. This is a logical connection since dehydration-associated hyperosmolarity promotes posterior pituitary secretion of anti-diuretic hormone and products of the renin-angiotensin-aldosterone system, both of which serve to retain blood volume and increase blood pressure [14]. Chronic stimulation of these pathways results in hypertension

and renal impairment. Thus, it is very plausible that the prevalence of hypertension and other job-related health conditions associated with teaching is caused, at least in part, by a lack of dietary fluid intake, which seems to be propagated by a lack of restroom access. Therefore, it is critical to evaluate how the frequency of fluid consumption and access to restrooms in the elementary school setting can affect teacher well-being. Research involving these aspects of the teaching profession does not appear to have been previously explored. This study aims to determine the impact of teacher classroom policies on teacher renal and cardiovascular health.

2.0 Methods

2.1 Participants

Participants included Pre-K-12 lead teachers who completed an online survey distributed through social media. A total of 1135 respondents completed the survey, and 844 met the inclusion criteria. Inclusion criteria included: 1) currently teaching in a Pre-K through twelfth-grade school setting, 2) in a lead teacher role, such as general education classroom teacher, special subjects teacher, or special educator, and 3) working in the United States. Participants represented 49 states. All had at least a bachelor's degree, and a majority were White, non-Hispanic, female, and had a graduate degree. Over half, 57.1%, reported teaching K-6th grade. Participant demographic characteristics are shown in Table 1.

2.2 Procedures

The research team created the survey described below and obtained Institutional Review Board approval to conduct the study. The survey was first piloted with local teachers who were not part of the full sample who provided feedback on the questions. After editing the survey for clarity, teachers were recruited using social media, sharing the survey through our networks and posting it in education groups. The survey was anonymous and conducted using Qualtrics. The survey was active for approximately 2 weeks before sufficient responses had been obtained for analysis. Informed consent was integrated into the initial part of the survey and required participant acknowledgement in or to proceed.

2.3 Measures

The survey consisted of researcher-created questions about teacher demographics, teacher bathroom breaks, daily fluid intake, and health. Question items in this study were inspired by public data from the Classroom Teacher Association survey, and are designed to help delineate why the outlined complaints may be occurring.

2.4 *Teacher Demographics*

Respondents were asked to report general demographic information, including grade level taught, age, race and ethnicity, sex, and highest level of education. They also responded to demographic questions about their school, such as whether it was public or private, whether it was designated as a Title I school, and the number of formal breaks teachers received daily, defined as times when they were not responsible for supervising students.

2.5 Restroom Breaks

Teachers' frequency of bathroom breaks and perceptions of their ability to take breaks was measured through eight questions. Teachers reported the following: how many times they typically used the bathroom during the workday, how many of those times were while teaching, if they could leave the room whenever they needed to use the bathroom, whether they could leave to use the bathroom if another adult was present, if they perceived that they had enough time to take bathroom breaks, and the steps they took when they needed to take a bathroom break while teaching.

2.6 Fluid Intake

Self-reported daily fluid intake was measured through three questions. Teachers reported how many cups (8 ounces) of water they typically drink during the workday, from 0 cups to 7 or more, how many cups of other fluids they drink, and the types of other fluids they typically drink. For this question, they could select from eight types of fluids or enter another type in a text box.

2.7 Health

Teachers provided self-report health measures, including their typical blood pressure, whether they had been diagnosed with high blood pressure, whether they took medication for high blood pressure, if they experienced frequent urinary tract infections (UTIs), and if they had been diagnosed with kidney disease.

2.8 Statistical Analyses

Missing data were present for 0-3.1% of demographic variables, 0-2.8% of bathroom break questions, 2.8% of fluid intake questions, and 3.0% of health questions. Missing data were handled using listwise deletion. Descriptive statistics were used to document teachers' self-reported ability to take bathroom breaks. χ^2 tests were conducted to examine teacher and school characteristics differences between those who reported they could easily take bathroom breaks and those who could not.

Finally, logistic regression models were conducted with frequent UTIs, pre-hypertension or hypertension (reported BP over more than 120/80), and kidney disease as outcome variables. Three separate models were analyzed, one for each outcome variable. Participants who reported that they did not know their blood pressure were excluded from the hypertension model, leaving a sample of 695 valid responses. Whether or not teachers could use the bathroom when needed was included as a predictor with two categories: 1) yes and 2) sometimes or no. Water intake during the workday was coded here as low (less than 3 cups), moderate (3-6 cups), and high (7 or more cups) and included as another predictor variable. Gender, race/ethnicity, and age were included as covariates. Nagelkerke Pseudo R^2 was used to examine the percentage of variation in the outcome explained by the predictors and covariates.

3.0 Results

3.1 Frequency of Bathroom Breaks

Teachers reported their frequency and ability to take restroom breaks through a series of survey questions. Only 7.4% of respondents reported that they could leave the classroom whenever they needed to use the restroom (*figure 1.a*). The remaining teachers said they could sometimes leave (33.7%) or could not leave (59.0%). Responses were not significantly different between elementary and middle/high school teachers (χ^2 = 3.736, df = 2, p = 0.154). Most teachers reported using the restroom 1-2 times during a typical workday (64.3%) and 0 times while they had teaching responsibilities (59.6%).

Respondents were also asked whether they believed they had enough time for restroom breaks. The majority, 60.9%, said no, 29.8% said sometimes, and 9.4% said yes. Again, responses did not differ significantly between elementary and middle/high school (χ^2 = 3.488, df = 2, p = 0.175).

3.2 Fluid Intake

Teachers also reported their fluid intake during the school day. Most commonly, teachers reported drinking 1-2 cups of water per day (42.0%), followed by 3-4 cups (23.4%), 0 cups (12.7%), 5-6 cups (12.3%), and 7 or more cups (9.6%) (*figure 1.b*). Separately from water intake, they were asked how many cups of other fluids they drank during the school day. Again, 1-2 cups was the most common response (58.5%). This was followed by 0 cups (19.8%), 3-4 cups (14.9%), 5-6 cups (3.9%), and 7 or more cups (2.9%). Other beverages teachers reported drinking during the school day included coffee (53.7%), soft drinks (17.7%) and diet soft drinks (17.2%), flavored water (17.1%), seltzer water (13.5%), hot tea (12.4%), other caffeinated beverages (11.0%), and juices (5.2%).

3.3 Blood Pressure

It was found that 35.5% of respondents reported blood pressure less than 120/80 mmHg (normotensive); 44.8% reported blood pressure between 120/80 and 139/89 mmHg (prehypertensive), 4.9% had blood pressure greater than 140/90 mmHg (hypertensive), and 14.8% did not know their blood pressure.

When stratifying by age and excluding those who did not know their blood pressure, 58.7% of respondents under 35 were prehypertensive or higher (*figure 1.c*). In comparison, 56.9% of individuals between the ages of 36-55 years old and 70.0% of individuals over 55 reported pre-hypertension or greater. Rates of pre-hypertension and hypertension did not differ significantly by age, with younger teachers showing similar prevalence to older teachers ($\chi^2 = 3.639$, df = 4, p = 0.457).

3.4 Bathroom Breaks, Health Status, and Fluid Intake

Table 2 shows descriptive statistics and χ^2 analyses for health status and fluid intake variables by teachers' bathroom access. Bathroom break access was related to frequent UTIs and water intake. Teachers who reported that they could not use the bathroom were more likely to report frequent UTIs and drank significantly less water than other teachers.

3.5 Predictors of Health Outcomes

Logistic regression was used to examine whether access to bathroom breaks and fluid intake predicted three health outcomes: frequent UTIs, hypertension, and kidney disease. Results are shown in Table 3. Being able to take bathroom breaks negatively predicted both UTIs and hypertension. The odds of having frequent UTIs are about 70% lower, and the odds of hypertension are about 45% lower if teachers report having the ability to take bathroom breaks whenever needed. Although bathroom access did not significantly predict kidney disease in our model, this may be due to the sample's low prevalence of kidney disease.

Water intake emerged as a marginally significant predictor of UTIs and hypertension, with medium water intake compared to low associated with marginally decreased odds in UTIs and high water intake compared to low associated with marginally decreased odds in hypertension.

Together, these results suggest that after controlling for age, race/ethnicity, and gender, the ability to take bathroom breaks is related to UTIs and hypertension.

4.0 Discussion

Our data suggest that only 7.4% of lead classroom teachers can use the restroom *ad libitum*, while 59.0% report being unable to leave the classroom when a restroom break is needed. Moreover, it was found that 60.9% of teachers do not receive adequate time to use the restroom. As a result of this limited bathroom access, it appears that teachers were reluctant to consume water throughout the day, with 42.0% of teachers reporting that they drink less than 1-2 cups per day and 12.7% reporting that they consume no water. Regarding other beverages, 58.5% of teachers consumed 1-2 cups of other beverages, and 19.8% consumed no other beverages. Most other beverages were caffeinated, such as coffee or soft drinks (88.6% total). This aligns with the Classroom Teacher Association survey that reported a majority of teachers avoiding water consumption to prevent restroom use.

It was found that 64.3% of teachers report that they only use the restroom 1-2 times per workday. This appears to be a result of work responsibility, since 59.6% of respondents state that they go to the restroom 0 times during periods of teaching responsibility. This is disconcerting since it is documented that the average female adult voids their bladder between 6.2 and 7.0 times per day (95% CI) during woke hours [15]. Assuming that the average adult is awake for 16 hours per day, this suggests that an individual should urinate approximately every 2.4 woke hours. Based on our survey data, it appears that teachers are only using the restroom every 4-8 hours, based on a standard 8-hour workday. However, it has been determined that the average teacher actually spends 10 hours and 40 minutes per day working [16], suggesting that teachers may realistically only urinate approximately every 5.3 hours or less during woke hours. Infrequent urination allows for bacterial proliferation within the urethra [17], elevating the risk of urinary tract infection. Indeed, this agrees

with our findings that restroom accessibility and water intake are both inverse predictors of UTI frequency, with lower restroom accessibility and lower water intake corresponding to greater frequency of UTIs.

It was found that 49.7% of teachers have a self-reported blood pressure that would be categorized as prehypertensive or hypertensive, with only 35.5% reporting a normotensive blood pressure. Interestingly, 58.7% of respondents under 35 were considered prehypertensive or hypertensive, with this prevalence slightly, but not significantly, increasing with age. This is surprising since most individuals under 35, especially women, do not experience pre-hypertension or hypertension. A report on 3560 male and female participants suggests that only 18% of the study participants displayed pre-hypertension before the age of 35, and the majority of those with pre-hypertension were male [18]. With 92.1% of the respondents for this current study being female, the prominence of pre-hypertension and hypertension in these young teachers is substantially higher than what is observed in the general population. These findings agree with previous research that demonstrated that 105 out of 245 (42.8%) teachers had high blood pressure [2]. Although the blood pressure reported in this current study is self-reported, the option of "I don't know" was provided to prevent participants from feeling forced to choose a blood pressure category if they were unsure. This seems to be effective since 14.8% of respondents chose this response choice.

Although the prominence of hypertension could also be related to job-associated stressors, it was found that access to restroom breaks negatively predicted both frequency of UTIs and hypertension. Teachers who reported being able to take a restroom break whenever needed had a 45% lower incidence rate of hypertension and a 70% lower risk of UTIs. This is likely due to dehydration and inadequate water consumption since low water intake was associated with greater frequency of both UTIs and hypertension. This makes sense since infrequent flushing of the urethra promotes UTIs [15], while hyperosmolality of the blood results in hormone release that elicits vascular constriction, raising blood pressure [13]. During periods of dehydration, angiotensin II, a product of the renin-angiotensin-aldosterone system, promotes renal sodium and water retention, thereby retaining blood fluid volume [19]. Angiotensin II production, along with low blood volume, stimulates the production of arginine vasopressin to enhance water volume retention in the blood [19]. However, both

angiotensin II and arginine vasopressin are potent stimulators of arterial vascular constriction. Chronic stimulation of these factors can promote endothelial dysfunction and hypertension. Thus, it is plausible that the low fluid intake associated with the teaching profession could be exacerbating the incidence of hypertension observed among teachers. Though alterations to these health measures were not directly evaluated in this research study, it is clear that there are underlying issues with teacher classroom structure that are reducing teacher health and wellness.

This research was designed as an initial exploratory study, and more research to understand these connections is needed. However, the regression analysis results suggest that increasing access to restroom breaks and resultant fluid consumption may be a possible mechanism for improving health outcomes in teachers. Although not measured in this study, increasing access to breaks may also help teacher retention and stress reduction. Overall, this exploratory study highlights concerns related to teacher physical health that increasing daily access to restroom breaks and water intake through policies and practice may ameliorate and draws attention to the importance of regular restroom breaks for teachers.

4.1 Conclusions

In conclusion, results from this study demonstrate that current policies and procedures implemented in our school systems is preventing teachers from being able to use the restroom when needed. As a result, teachers are consuming far less than the recommended intake of water and other fluids. It appears that this is causing, at least in part, increased blood pressure and greater frequency of urinary tract infections among those teachers who experience a difficult time taking a restroom break. Although this data is self-reported and as such, is likely less accurate than manually tested data, it provides clear evidence that additional research is needed to directly assess the impact of school policy and practice on teacher renal and cardiovascular health. Future studies involving on-site visits to determine a direct relationship between how restroom accessibility and fluid consumption affect teacher health would be of great value. Additionally, future inteventions that provide

classroom assistants and recommended water intake may be warranted to determine the true impact of restroom inaccessibility.

Disclosure Statement: The authors of this manuscript have no financial interests, benefits, or conflicts of interest to disclose.

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Tables and Figures

Table 1

Descriptive Statistics for Demographic Characteristics of Survey Respondents

Variable	Frequency
Grade Level	
Early Childhood (Preschool or Pre-K)	2.3%
Elementary (K-5)	57.1%
Middle School (6-8)	18.6%
High School (9-12)	20.1%
Multiple Levels	1.9%
Classroom Arrangement	
Stay in one classroom with one group of students	44.5%
Stay in one classroom; different students come to the room throughout the day	45.9%
Rotate to different rooms	9.6%
School Type	
Public	94.1%
Private	5.9%
Title I School	
Yes	56.7%
No	39.3%
Not Applicable	4.0%
Highest level of education	
Bachelor's degree	24.6%
Some graduate credits	12.9%
Graduate degree	62.4%
Age	
25 years or younger	10.4%
26-35 years	35.4%
36-45 years	31.6%
46-55 years	18.7%
56 or older	3.9%
Gender	
Female	92.1%
Male	7.7%
Race and ethnicity	
White, non-Hispanic	92.1%
Black or African American, non-Hispanic	1.7%
Hispanic or Latino	3.5%
Other race or multiracial	2.7%

Note: $N = 844$

Table 2

Differences in Access to Bathroom Breaks by Health Status and Fluid Intake

	Yes	Sometimes	No	χ^2
Health Status				
Blood pressure higher than 120/80	45.3%	60.4%	58.8%	4.170
Diagnosed with high blood pressure	19.4%	13.5%	18.3%	3.267
Blood pressure medication	12.9%	10.9%	14.3%	1.819
Frequent UTIs	4.8%	12.7%	17.9%	9.167*
Kidney disease	0%	4.4%	3.1%	3.140
Fluid Intake				
Cups of water				22.921**
0 cups	3.2%	12.4%	13.9%	
1-2 cups	33.9%[a, b]	35.6%[a]	46.7%[b]	
3-4 cups	30.6%	29.6%	20.5%	
5-6 cups	16.1%	13.5%	11.2%	
7 or more cups	16.1%	11.6%	7.7%	
Cups of other fluids				11.665
0 cups	12.9%[a, b]	15.6%[b]	23.0%[a]	
1-2 cups	61.3%	60.0%	57.5%	
3-4 cups	14.5%	17.1%	13.5%	
5-6 cups	4.8%	4.4%	3.5%	
7 or more cups	6.5%	2.9%	2.5%	

* $p < 0.05$, ** $p < 0.01$

Note: Matching superscripts indicate pairs of variables that differed significantly from one another ($p < 0.05$) based on post hoc testing using Bonferroni *p*-value corrections.

Note: UTI is an abbreviation for urinary tract infection

Table 3
Regression Analysis Summary for Variables Predicting Health Outcomes

	UTIs			Hypertension			Kidney Disease		
Variable	*b*	SE	OR [95% CI]	*b*	SE	OR [95% CI]	*b*	SE	OR [95% CI]
Bathroom break ability	-1.259*	0.604	0.284 [0.087, 0.928]	-0.598*	0.293	0.550 [0.310, 0.977]	-0.711	1.034	0.491 [0.065, 3.725]
Cups of water									
Medium (3-5 cups)	-0.387+	0.223	0.679 [0.438, 1.052]	-0.019	0.170	0.982 [0.704, 1.369]	-0.053	0.430	0.949 [0.409, 2.203]
High (7+ cups)	-0.120	0.335	0.887 [0.442, 1.779]	-0.482	0.268+	0.618 [0.365, 1.044]	-0.255	0.766	0.798 [0.178, 3.585]
Male	-2.520*	1.014	0.080 [0.011, 0.587]	0.865	0.325**	2.375 [1.255, 4.493]	-0.805	1.031	0.447 [0.059, 3.370]
Non-White	-0.281	1.014	0.755 [0.346, 1.646]	0.472	0.312	1.602 [0.869, 2.954]	-0.828	1.032	0.437 [0.058, 3.303]
Age									
36 to 55 years	0.140	0.206	1.151 [0.768, 1.723]	-0.088	0.161	0.915 [0.668, 1.255]	0.615	0.441	1.850 [0.779, 4.390]
56 or older	0.841+	0.431	2.318 [0.996, 5.395]	0.522	0.422	1.686 [0.738, 3.852]	1.555*	0.712	4.733 [1.172, 19.119]
N	814			695			814		
Pseudo-R^2	6.3%			3.6%			3.5%		

*$p < 0.05$, **$p < 0.01$, +$p < 0.10$
Note: UTI is an abbreviation for urinary tract infection

Figure 1

Rate of Bathroom Breaks, Fluid Intake, and Prehypertension in Surveyed Teachers