

CONSUMPTION OF DRINKING WATER BY SLUM-DWELLING PRE-PRIMARY AND PRIMARY SCHOOL CHILDREN

Medical Science

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ABSTRACT

This cross-sectional, interview-based descriptive study was conducted among 130 slum-dwelling pre-primary and primary school children (62 girls; 47.67% and 68 boys; 52.30%) to determine their patterns of consumption of drinking water. The average age of girls and boys was 5.27 $\pm$ 1.30 years and 5.00 $\pm$ 1.33 years, respectively. The consumption of drinking water by girls and boys was 547.98 $\pm$ 141.73 mL per school-day and 572.79 $\pm$ 147.35 mL per school-day, respectively, without significant gender difference ($Z=0.974$; $p=0.329$). The water consumption reported by most students was adequate for the typical five-hour school-day, but the water consumption reported by some girls was less than adequate, which needs urgent intervention. Efforts must be made to increase access of school children to drinking water in schools, to educate staff, parents and students about the importance of drinking plain water and to shift preferences of school children from sugar-sweetened beverages to water.

KEYWORDS

Drinking water, Pre-primary school, Primary school, School children, Slum

INTRODUCTION

Water, which comprises about two-thirds of the human body, helps to control body temperature, carries nutrients to the cells and helps to remove wastes. [1] Pre-primary and primary school children should consume about 500-600 millilitres (mL) of water per school-day, which is about five hours. This recommended amount of water does not include other beverages (such as, milk, juice, etc) that the children may consume in a day. Extra water would be needed on hot days and during moderate or vigorous activity, such as, sports. Water is lost from the body through sweating, breathing and urination. Inadequate water intake can cause reduced physical and mental performance and dehydration (manifested as headache, fatigue, mental irritability and poor concentration). [2-4]

Schools in the United Kingdom followed one of the three policies for water drinking – “prohibited access” (water was prohibited in classroom); “limited access” (water was allowed in classroom but not on the desk); and “free access” (water bottle was encouraged on the desk). Though the “Water is Cool in School” campaign promoted improved drinking water access in schools in the United Kingdom, a study conducted on children in prohibited access, limited access and free access settings found that most children had inadequate fluid intake in school and that free access to drinking water was associated with improved total fluid intake. [5] Children’s water consumption can be promoted by giving them free access to water during school hours. [6] Some studies [7, 8] have reported that students do not consume water from drinking water outlets provided by the school due to the inadequate number, inconvenient location, and poor maintenance of these drinking water outlets. Some schools have policies that may discourage water consumption. [1] It is necessary to improve access to drinking water in outdoor play areas since children experience increased water loss when they are active outside. [1] Interventions for improving drinking water access should be accompanied by concurrent education of school staff, students, and parents about the importance of drinking more water. [9-11]

Drinking plain water instead of sugar-sweetened beverages may help prevent obesity and its associated morbidities [10, 13-15] by reducing the energy intake by up to 235 kilocalories per day. [16] In most developed countries, consumption of water directly from the tap provides a safe and low-cost beverage option. However, in recent years, the consumption of packaged drinking water has increased owing to marketing and increasing consumer apprehension regarding water quality and safety, taste preferences and portability of packaged water. [17, 18] Moreover, intake of bottled water is expensive [19] and bottled-water containers also adversely affect the environment. [17,

20]

The objective of the present study was to determine the patterns of consumption of drinking water among slum-dwelling pre-primary and primary school children.

MATERIALS AND METHODS

This cross-sectional, interview-based descriptive study was conducted among slum-dwelling pre-primary and primary school children in a metropolitan city in Western India. The purpose of the study was explained to stake holders in the community and parents of the pre-primary and primary school children. Mothers of participating children, who had given written informed consent, were interviewed in presence of the participating children. A semi-structured pre-tested pre-validated questionnaire was used as data collecting instrument. The data were entered in Microsoft Excel spreadsheet (Microsoft Corporation, Redmond, WA, USA) and analyzed using SPSS statistical software Windows Version 25.0 (IBM Corporation, Armonk, NY, USA). The percentage of responses and the standard error of difference between two sample proportions were calculated. For continuous data, the standard error of difference between two means was calculated. 95% Confidence interval (CI) was stated as: [Mean-(1.96)*Standard Error] - [Mean+(1.96)* Standard Error]. The statistical significance was determined at $p<0.05$.

RESULTS AND DISCUSSION

Age distribution: There were a total of 130 participants (62 girls; 47.67% and 68 boys; 52.30%). The average age of girls was 5.27 $\pm$ 1.30 years (95% CI: 4.94–5.59 years), while that for boys was 5.00 $\pm$ 1.33 years (95% CI: 4.69–5.31 years). The gender differences in average age were not significant ($Z=1.169$; $p=0.242$). The third quartile, median, first quartile and minimum of the age distribution were identical for girls and boys, but the maximum age was higher for boys (Fig-1).

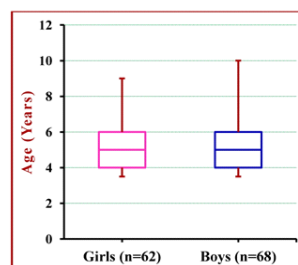


Fig-1: Box plot of age distribution

Gender distribution: The difference in gender distribution was significant in Junior KG ($Z=2.633$; $p=0.008$) and First to Third standards ($Z=2.244$; $p=0.025$). In Junior KG class, boys outnumbered girls, while the girls were in a majority from the first to the third standards (Table-1).

Table-1: Gender-wise distribution of students in classes

Class	Girls (n=62)	Boys (n=68)	Z value	'p' value
Nursery	18 (25.03%)	14 (20.59%)	1.116	0.262
Junior KG	17 (27.42%)	34 (50.00%)	2.633	0.008 *
Senior KG	14 (22.58%)	15 (22.06%)	0.071	0.944
First to Third Standard	13 (20.96%)	05 (07.35%)	2.244	0.025 *

Z=Standard error of difference between two proportions; *Significant

History suggestive of urinary problems: 12 (9.35%) girls and 07 (10.29%) boys had burning micturition, which was without significant gender difference ($Z=1.460$; $p=0.144$). 05 (08.06%) girls and 05 (07.35%) boys complained of difficulty in micturition, which also did not exhibit significant gender difference ($Z=0.152$; $p=0.880$). However, 15 (24.19%) girls and 06 (08.82%) boys had a history of fever/chills/rigors, exhibiting significant gender difference ($Z=2.378$; $p=0.017$).

Consumption of water: In many studies, children's water consumption was measured in number of servings per day or as a dichotomous event (consumed water or not) and for comparability, the water intake should be expressed in litres or millilitres per day. [6] In the present study, water consumption was measured in millilitres (mL) per school-day. All the students brought drinking water from their homes in water bottles. The average quantity of drinking water consumed by girls and boys at school was 547.98 $\pm$ 141.73 mL per school day (95% CI: 512.69–583.28 mL per school day) and 572.79 $\pm$ 147.35 mL per school day (95% CI: 538.04–607.55 mL per school day), respectively. Though the gender difference in average consumption of drinking water was not significant ($Z=0.974$; $p=0.329$), the minimum quantity, first quartile, median, third quartile and maximum quantity of water consumption at school was lower for girls, as compared to that for boys (Fig-2).

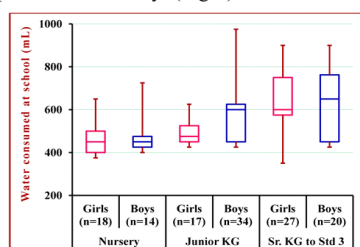


Fig-2: Gender difference in quantity of water consumed per school-day

The water consumption reported by most students was adequate, considering that the pre-primary and primary schools operate for less than five hours per working day, but the consumption reported by some girls was less than adequate, which needs urgent intervention.

Frequency of urination: The average frequency of urination for girls and boys was 1.94 $\pm$ 0.94 episodes (95% CI: 1.70–2.17 episodes) and 1.87 $\pm$ 0.93 episodes (95% CI: 1.65–2.09 episodes), respectively. The gender difference in average frequency of urination was not significant ($Z=0.426$; $p=0.669$). The increasing frequency of urinary tract infection in children, especially girls, may be attributed to reduced intake of water because the girls tend to avoid using "unclean" washrooms at school. Also, many schools do not allow the children to use washrooms frequently. [1] A study [5] from United Kingdom reported that 34.6% of children did not use the toilets at all during the school day.

CONCLUSION

The self-reported water consumption for both boys and girls was adequate, considering that the pre-primary and primary schools operate for less than five hours per working day. However, efforts must be made to increase access of school children to drinking water access in all schools. It is necessary to educate school staff, parents and school

students about the importance of drinking plain water for the human bodily functions. Attempts should also be made to shift preferences of school children from sugar-sweetened beverages to water.

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