

# Free access to drinking water in schools: Development of a survey tool

Michelle Deguara, Charmaine Gauci

## Abstract

**Introduction:** Water is important for many physiological functions in the human body and contains no calories, making it the ideal source of hydration and an imperative alternative to Sugar Sweetened Beverages (SSBs). The consumption of SSBs is identified as a risk factor for weight problems in children (overweight and obesity) and is also linked to the development of type 2 diabetes.<sup>1</sup> Targeting schools to increase consumption of water can have an effect on the consumption of SSBs.<sup>2</sup>

**Method:** A literature search was done in Google Scholar, PubMed and HyDi database for a survey tool which assesses the provision of drinking water that was already validated and piloted. Three studies were found relevant for this purpose. A draft tool was produced and was then validated using face validation and also piloted in four schools to produce the final survey tool which is quantitative in nature.

**Conclusion:** The survey tool that was developed and piloted in this study can be used to assess the provision of drinking water across Maltese schools.

## Keywords

Drinking water, Sugar sweetened beverages, Schools, Survey tool

## Introduction

Water is an essential nutrient important for many physiological and cognitive functions of the human body (Table 1).<sup>1,3-5</sup> Children lose water at a faster rate when compared to adults and dehydration sets in faster in children who are exposed to warm temperatures especially in summer and during physical activity. The thirst response is less well-developed in children therefore they might not feel the need to drink when they start to get dehydrated.<sup>3</sup> If children are not reminded to drink adequate volumes of water frequently (Table 2), they might spend hours during the day without consuming any water.<sup>4</sup> When children feel thirsty, their cognitive functions and level of concentration would have already diminished by 10 per cent, and these functions continue to deteriorate with increasing levels of dehydration. Some of the signs and symptoms of dehydration may include: lethargy, thirst, headache, light-headedness, irritability, lack of concentration, concentrated urine, constipation and bed wetting.<sup>3</sup>

In the current global epidemic of childhood obesity water offers multiple benefits and contains no calories, making it the ideal source of hydration and an imperative alternative to SSBs. The consumption of SSBs is identified as a risk factor of weight problems in children (overweight and obesity) and is also linked to the development of Type 2 diabetes.<sup>1</sup> In Malta, soft drinks and other SSBs are prohibited beverages in schools and students are also not allowed to bring such beverages from home.<sup>6-7</sup> Decreasing the availability of SSBs and keeping well hydrated with water decreases the consumption of SSBs and in turn decreases a number of health problems in children.<sup>2</sup> Literature suggests that increasing daily water intake to approximately 1 litre, no consumption of SSBs and engaging in daily low to moderate intensity physical activity are key factors in weight management especially of overweight and obese children.<sup>8</sup>

**Michelle Deguara** (M.D.) \*  
Public Health Basic Specialist Trainee  
michelle.c.bugeja@gmail.com

**Charmaine Gauci** (M.D., M.Sc., Ph.D., FRSPH, FFPH)  
Superintendent of Public Health

\*Corresponding Author

**Table 1:** A list of the benefits of drinking an adequate daily volume of water

<p>The benefits of drinking water:</p> <ul style="list-style-type: none"> <li>• Maintenance of renal function</li> <li>• Maintenance of blood volume</li> <li>• Helps in keeping a healthy weight</li> <li>• Weight reduction for overweight or obese children</li> <li>• Protection of health and well-being</li> <li>• Regulation and maintenance of body temperature</li> <li>• Improvement in cognition and ability to learn</li> <li>• Improvement in the level of concentration during lessons</li> <li>• Enablement of good behaviour and a decrease of restlessness in the classroom</li> <li>• Improvement in performance during sports</li> <li>• Improvement in strength and endurance during physical activity</li> <li>• Decrease in dental carries</li> </ul>
---

**Table 2:** Recommended Daily Intake of Water (The British Dietetic Association, 2013)

Age	Adequate water intake (ml/day)
1-2 years	880-960
2-3 years	1040
4-8 years	1280
9-13 years	Boys 1680 Girls 1520
Children over 14 years	Boys 2000 Girls 1600

Children spend most of their waking hours in school, making schools the ideal environment to promote healthy lifestyle choices, one of which is the drinking of water instead of SSBs. Schools can also target health promotion messages to children of different ethnicities and socioeconomic backgrounds.<sup>5,9</sup> To increase the level of water consumption, teachers should encourage children to

carry water bottles with them during physical activity, to drink water before, during and after exercises and there should also be regular drinking reminders during the lessons.<sup>3</sup> Health promotion campaigns against childhood obesity should take a holistic approach by focusing the campaign on schools while also addressing other important environments such as the family and the community

the child is living in.<sup>5,9</sup>

In a study conducted by Loughridge and Barrat, the researchers compared the effectiveness of two different programs aimed at increasing the consumption of water in British Secondary schools. One program improved the access to water only, while the other program improved the access to drinking water coupled with promotional activities. The latter program resulted in increased water consumption and better outcomes.<sup>10</sup> Similar results were also found in two other studies by Patel *et al* and Muckelbauer *et al*.<sup>11,12</sup>

Recent research suggests that when SSBs are available in schools, consumption of these beverages increases which in turn leads to an increase in the daily calorie intake and hence obesity<sup>5</sup>. Actions that can help in reducing SSBs' consumption in children include:

- Limiting the marketing and publicity of SSBs which targets children;
- Reducing the availability and access to SSBs in school
- Introducing taxation on SSBs<sup>1</sup>

In Malta, the 'Whole School Approach to a Healthy Lifestyle: Healthy Eating and Physical Activity' policy (2015), outlined that all schools should have an adequate number of water outlets and should also have free access to clean drinking water which is sited strictly outside toilet areas.<sup>6</sup> In 2011, the National Audit Office audited the provision of water in schools. 80 Head of Schools from the 121 Heads that answered to this audit claimed that the school needed to have better provision of free drinking water.<sup>13</sup>

In order to plan for the provision of free access to water in schools, the current situation needs to be mapped out. The aim of this study was to create a validated survey tool which can be used to assess the provision of drinking water in Maltese schools hence providing baseline information which can be used during the development of a plan for the supply of water in all schools.

## Methodology

A literature search was done for a similar tool which was validated and piloted, in Google Scholar, PubMed and HyDi database. Three studies (Center For Disease Control (CDC), 2011; Education and Resources for Improving Childhood Continence, 2006; National Audit Office, 2011) were found to

be relevant for this purpose. The main tool that was chosen was the one used in a performance audit, 'Achieving a Healthier Nutrition Environment in Schools', conducted by the National Audit Office (NAO) in 2011. This tool was found to be the most appropriate tool to collect the information needed and it was already validated, piloted and used for the local population.

Stem questions and stem options that were thought to be irrelevant were removed from the original tool, while other questions were added to the NAO tool from the other two studies mentioned above. This produced a survey tool in the form of a quantitative questionnaire which was validated using a face validation method. The tool was discussed with the Director of Health Promotion and Disease Prevention within the Ministry of Health, with the Head Project Team Education and with the Director of School Resources Management within the Ministry of Education and Employment. Questions were assessed whether they were clear, comprehensible and if they were an adequate measure to collect specific information. The suggestions that came up during these discussions were used to further amend the tool.

The tool was then piloted in four schools (Primary A, Primary B, Middle School and a Secondary School). The questionnaire was sent to the Heads of School via email and when it was answered it was sent back also by email. Each Head of School was then contacted to obtain feedback on the construct of the tool, any ambiguous questions and any information that should have been added to the tool. The tool was adapted to include this feedback and the final version of the tool was produced.

## Discussion and Implementation

The level of water consumption among children and adolescents in schools depends on different variables including the number of water outlets available, the location of these outlets and how much these outlets attract the interest of students.<sup>4</sup> It is important to have a written policy on the implementation of free access to water in the school. For such policies to be effective, the policy should include ways of increasing access to water and also methods to educate and promote the consumption of water among students, staff and parents.<sup>5</sup>

In water programs where children are

expected to fill their personal water bottles, the bottles must be transparent so that their contents can be viewed and storage for the labelled water bottles is to be provided by the school.<sup>12</sup> In studies where storage for the water bottles was not provided, some of the children either lost their bottles or left them at home. Therefore when storage is not available, paper cups or replacement bottles should be supplied for those that forget their filling vessel.<sup>10,11</sup> Another important factor that should be kept in mind is frequent toilet breaks for children and the provision of a clean toilet environment. Children who have restricted access to toilets will not increase their consumption of water in order to avoid frequent visits to the toilet.<sup>4</sup>

Steps to be considered when implementing a Water Access Program (adapted from Grummon *et al*<sup>14</sup> and Centre for Disease Control<sup>15</sup>)

#### **I. *Build your team and gather support***

Important stakeholders should be identified and involved in regular meetings to make the program successful. Teachers should act as role models by promoting consumption of water and drinking fresh water themselves while parents should help in maintaining the healthy beverage choices at home too.<sup>14</sup>

#### **II. *Assess the school environment***

Schools need to be assessed for current practices regarding the provision of free access to water. This can be done by using the validated tool developed through this study, which can gather the relevant information and highlight areas which need improvement during the implementation process.<sup>14</sup>

#### **III. *Secure the provision of safe and appealing water***

The locations where water outlets are to be sited and the water delivery method should be decided at the beginning of the program as these decisions will influence future structural decisions, maintenance and funding of the program. The water program should also include methods of how water quality from these outlets is to be tested and how frequently.<sup>14,15</sup>

#### **IV. *Strengthen and Sustain the Water Program***

The Water Program should be outlined clearly and ideally written as a school policy so that it remains sustainable despite any changes in the Head

of school or any other members of staff.<sup>14</sup> As already mentioned increasing or improving access to free water is strengthened and made more effective when it is combined with educational and promotional activities.<sup>14,15</sup> Promotion of the benefits of water should be placed close to water outlets to make them more attractive and promotional messages should be included in lesson plans in the form of interactive activities (videos, acting, drawing competitions) and also sent to parents (e.g. in a newsletter).<sup>15</sup>

#### **V. *Monitor and Evaluate the Program***

Every program should have a plan on how to evaluate different stages of the implementation and success of the program. A needs assessment should be done at the beginning of the implementation to outline the gaps between the current program, if in place, and the desired endpoint for the new program. Process evaluation helps in finding any pitfalls in the current program which can be worked upon to improve its effectiveness. After the program has been implemented and running for some time outcome evaluation should occur to analyse whether the objectives of the program have been met or not. Important objectives of implementing free access to water for students are: increase in the daily consumption of water, decrease in the daily consumption of SSBs, changes in the knowledge and attitudes on the health benefits of consuming water. Outcome evaluation can generate results which are then used to highlight the improvements in knowledge, attitudes and practices and also to secure funding.<sup>14,15</sup>

#### **Conclusion**

This study highlights the importance of increasing the consumption of water in schools in order to gain the full benefits of drinking water. This information is to be used when discussing the need of implementing free access to water in schools with the relevant stakeholders. When implementing a free water access program, a feasibility study which assesses the environment in schools must be conducted. The validated survey tool that was developed through this study can be used to assess the provision of drinking water in all public, private and church schools to obtain a better picture of what is happening across the Maltese educational system; an important step in the implementation process.

## References

1. Lavery AA, Magee L, Monteiro CA, Saxena S, Millett C. Sugar and artificially sweetened beverage consumption and adiposity changes: National longitudinal study. *Int J Behav Nutr Phys Act* [Internet]. *International Journal of Behavioral Nutrition and Physical Activity*; 2015;12:137. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4624385&tool=pmcentrez&rendertype=abstract>.
2. Malik V, Popkin B, Bray G, Despres J-P, Hu F. Sugar Sweetened Beverages, Obesity, Type 2 Diabetes and Cardiovascular Disease risk. *Circulation*. 2010;121(11):1356–64.
3. Education and Resources for Improving Childhood Continence. Water is cool in school. 2006;(1002424):17. Available from: [http://www.educationscotland.gov.uk/Images/Water\\_is\\_cool\\_in\\_school\\_tcm4-663301.pdf](http://www.educationscotland.gov.uk/Images/Water_is_cool_in_school_tcm4-663301.pdf).
4. Brander N. Drinking water in schools. *Nurs Times* [Internet]. 2003;99(1):50–1. Available from: 12593288.
5. Patel AI, Hampton KE. Encouraging consumption of water in school and child care settings: Access, challenges, and strategies for improvement. *Am J Public Health*. 2011;101(8):1370–9.
6. Ministry for Education and Employment. A Whole School Approach to a Healthy Lifestyle: Healthy Eating and Physical Activity Policy [Internet]. 2015. Available from: <https://education.gov.mt/en/resources/News/Documents/Healthy Eating and Physical Activity Policy.pdf>.
7. Education Division Malta. Healthy Eating Lifestyle Plan [Internet]. 2007. Available from: <http://education.gov.mt/en/resources/documents/teachers resources/help.pdf>.
8. Stookey J. Negative, Null and Beneficial Effects of Drinking Water on Energy Intake, Energy Expenditure, Fat Oxidation and Weight Change in Randomized Trials: A Qualitative Review. *Nutrients* [Internet]. 2016;8(1):19. Available from: <http://www.mdpi.com/2072-6643/8/1/19>.
9. van de Gaar VM, Jansen W, van Grieken A, Borsboom GJJM, Kremers S, Raat H. Effects of an intervention aimed at reducing the intake of sugar-sweetened beverages in primary school children: a controlled trial. *Int J Behav Nutr Phys Act* [Internet]. 2014;11:98. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4222660&tool=pmcentrez&rendertype=abstract>.
10. Loughridge JL, Barratt J. Does the provision of cooled filtered water in secondary school cafeterias increase water drinking and decrease the purchase of soft drinks? *J Hum Nutr Diet*. 2005;18(4):281–6.
11. Patel A, Bogart L, Elliott M, Lamb S, Uyeda K, Hawes-Dawson J, et al. Increasing the availability and consumption of drinking water in middle schools: a pilot study. *Prev Chronic Dis* [Internet]. 2011;8(3):A60. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3103565/pdf/PCD83A60.pdf>.
12. Muckelbauer R, Libuda L, Clausen K, Toschke AM, Reinehr T, Kersting M. Promotion and provision of drinking water in schools for overweight prevention: randomized, controlled cluster trial. *Pediatrics*. 2009;123(4):e661–7.
13. National Audit Office. Performance Audit - Achieving a Healthier Nutrition Environment in Schools. 2011; Available from: [www.nao.gov.mt](http://www.nao.gov.mt).
14. Grummon A, Hampton K, Oliva A, Brindis C, Patel A. A Guide to Improving Water Access and Consumption in Schools to Improve Health and Support Learning [Internet]. 2014. Available from: <http://waterinschools.org/pdfs/WaterWorksGuide2014.pdf>.
15. Center For Disease Control (CDC). Increasing Access to Drinking Water in Schools. 2011; Available from: [http://www.cdc.gov/healthyyouth/npao/pdf/Water\\_Access\\_in\\_Schools.pdf](http://www.cdc.gov/healthyyouth/npao/pdf/Water_Access_in_Schools.pdf).