

# School Gardening: A Different Approach to Tackle Childhood Obesity?

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The global incidence of childhood obesity has dramatically increased within the recent decades.<sup>1</sup> Approximately 43 million pre-school children worldwide were estimated to be overweight and obese in 2010, while another 92 million children were considered at risk of becoming overweight.<sup>2</sup> According to the World Health Organization, the terms overweight and obesity are defined as abnormal or excessive fat accumulation which presents a risk to human health. The latter has especially been found to be strongly associated with the development of insulin resistance and often results in subsequent diabetes mellitus.<sup>3,4</sup>

In order to tackle this alarming development, many campaigns and programs have focused on reducing childhood obesity and promoting healthier diets among children in the past. However, since our nutritional behaviors are influenced by a large number of psychosocial factors, this is a challenging issue and a single approach might be insufficient in doing so. A potential way of encouraging children towards a healthier diet, including more fruits and vegetables, is often overlooked: school gardening.

School gardens are gardens that are maintained by students for other students, and are located in the vicinity of a school. They are usually maintained under the supervision of a teacher or an expert in the field. The main aim is to educate children in the production of fruits and vegetables, to promote a healthy diet, and to enhance environmental awareness. Step by step, children are introduced to the subject of horticulture by working together in small groups towards a rewarding goal. A well-structured program combines hands-on work, such as planting, growing, and harvesting organic fruits and vegetables, with interactive cooking and nutrition education lessons.<sup>5</sup> These lessons include a wide range of topics, ranging from the role of vitamins in our body to healthy family dining habits, or the difference between fresh produce and packaged foods. Since cooking and eating together is an essential part of ev-

ery lesson, children can directly apply their recently acquired knowledge and are able to reap the first fruits of their work.

One major idea behind such projects is to encourage children to eat fresh and non-processed foods that are low in sugar and fat. Plant-based diets that are rich in fruits and vegetables can have substantial health effects, including lowering plasma lipid levels and reducing the risk of coronary artery disease and stroke.<sup>6,7</sup> Unfortunately, a large number of children currently do not meet the recommended guidelines for fruit and vegetable consumption.<sup>8</sup> Furthermore, several studies suggested that eating behaviours adopted in childhood may potentially continue into adulthood, suggesting that these behaviours may lead to a further decrease in future consumption of fruits and vegetables by 41% and 25%, respectively.<sup>9,10</sup> These findings certainly emphasize how crucial it is to promote a healthy diet early on, and this is where school gardening comes into play.

There is growing evidence that school gardening programs have the potential to substantially influence children in their dietary patterns and improve students' knowledge on nutrition.<sup>5,11,12</sup> For instance, the gardening experience helps children by improving their ability to identify vegetables they usually do not consume on a regular basis, such as cabbage or zucchini.<sup>13</sup> According to *Ratcliffe et al.*, garden-based education has the potential to increase student's willingness to taste vegetables outside the school setting.<sup>14</sup> Another study compared the effects of a nutrition education curriculum with and without garden activities to each other. Students who participated in a garden-based nutrition intervention program consumed an increased number of servings of fruits and vegetables compared to those students who participated in the nutrition education curriculum alone.<sup>15</sup> Additionally, garden-based education led to a significant increase in the intake of vitamin A, vitamin C, and fiber by students.<sup>15</sup> Not surprisingly, a recent study by *Evans et al.* shows that children who enjoy such activities have the highest level of vegetable exposure, preference, and consumption.<sup>16</sup> Another trial by *Cotter et al.* on salt intake modification by working practices in a school garden is also worth mentioning.<sup>17</sup> Children that were involved in a program combining lectures on the potential dangers of excessive salt intake and regular garden activities, such as cultivating herbs to use as a substitute for salt in food preparation, significantly reduced their salt intake by 1.1 g per day.<sup>17</sup> It is widely accepted that high salt intake

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from diet is related to the increasing prevalence of hypertension. Thus, this strategy, which is based on theoretical and practical education, achieved an important reduction in daily salt intake in at least 50% of the participants.<sup>17</sup>

Another important point is that gardening activities usually take place outside of the classroom. Stimulating children to increase their physical activity by working together on a rewarding common project is another way to tackle obesity. In a randomized controlled trial, *Gatto et al.* recently investigated the effects of a 12-week gardening intervention on obesity parameters and dietary intake among Hispanic/Latino youth in Los Angeles.<sup>18</sup> Their intervention, better known as “LA Sprouts”, included not only gardening elements but also lessons on nutrition and cooking. Children participating in the “LA Sprouts” intervention experienced a significant reduction in waist circumference (−1.2 cm vs. 0.1 cm in the control group;  $P < 0.001$ ) and in body mass index z-scores (−0.1 vs. −0.04 in the control group;  $P = 0.01$ ). Additionally, a significant increase in dietary fiber intake by 3.4% ( $P = 0.04$ ) was observed in the intervention group.<sup>18</sup>

Since school gardening usually implies diversified outdoor activities, children have the opportunity to breathe fresh air while being exposed to the sun and daylight. This enhances vitamin D production and also constitutes a welcome change compared to the usual classes which take place inside. It is noteworthy that garden-based learning does not negatively impact academic performance, as claimed by many critics. On the contrary, it has been shown to enhance improvements in science achievements and math scores.<sup>19,20</sup> In addition, studies revealed that participating in garden activities supports children in developing important skills that will help them to better navigate the world, including contributing to their communication of knowledge and emotions.<sup>21</sup> With regards to the potential benefits mentioned above, it is quite disappointing that only a minority of the Canadian schools offered gardening activities in 2013.<sup>22</sup> In many cases the implementation of school gardening programs appears to be a challenging task, since there is often a lack of sufficient funding and a suitable location. Moreover, it requires dedicated volunteers with enough time to maintain the facilities.

In our opinion, a successful gardening program involves not only the children and their respective teachers, but also the parents. The key element is to inspire young children attending elementary school, and to incorporate weekly gardening activities, such as garden maintenance, into the classical scholar schedule. Through participation in gardening programs, elementary students can be taught knowledge in a more practical way, allowing them to get more hands-on experience. One example is to identify plants and herbs in the school garden while being physically active, instead of acquiring this knowledge solely from books while sitting in the classroom.

A multidisciplinary approach is necessary in order to tackle the complex issue of childhood obesity. School gardening is one approach that also has numerous other educational, mental,

and physical benefits. Unfortunately, these programs are often limited to a single session per week, or to a brief period of time such as in the “LA Sprouts” trial.<sup>18</sup> While this recent study contributed substantially towards a better understanding of school gardening interventions, we believe that these programs should not be limited to a short time span. Although implementation of school gardening programs remains a challenging task, we suggest that only long-term studies are able to reveal the full potential of school gardening on childhood obesity.

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