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## The impact of the school vegetable garden on vegetable consumption among students

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**ABSTRACT:** School vegetable garden (SVG) is the practice of cultivation of vegetables in and around the school premises by the students. A study was conducted among 180 student respondents among six schools by adopting the procedure of two stage random sampling. The study was carried out in Nenmara and Kollengode blocks of Palakkad district in Kerala. All the selected schools had functional SVG and were practicing activities either through agriculture or nature clubs. It was shown that the preference for green vegetables was seen as the most significant felt difference. Potato was the most popular vegetable (97.98 per cent), whereas colocasia was the least popular (41.76 per cent). Students' intake of amaranthus and solanaceous vegetables increased after participating in the SVG. It was discovered that every one of the students involved in the SVG also had a home garden with a few food crops. Chilli, brinjal, vegetable cowpea, and amaranthus were the most common vegetables in household gardens.

**Key words:** Students, vegetable consumption, vegetable garden

A school garden is an excellent way to use the schoolyard as a classroom, reconnect students with the natural world and the true source of their food, and teach them valuable gardening and agriculture concepts and skills that integrate with a variety of subjects including math, science, art, health, and physical education. The school gardens serve a variety of purposes and goals, mostly in the areas of gardening, nutrition, marketing, the environment, topics, life skills, and community benefits. Neumark-sztainer *et al.* (1997) analysed the behavioural profile of a school-based population in Minnesota and discovered that 33.33 per cent were vegetarians and 66.67 per cent were non-vegetarians. In comparison to non-vegetarians, vegetarian teenagers were twice as likely to consume fruits and vegetables, one-third as likely to consume sweets, and one-fourth as likely to consume salty snack foods more than once a day. According to the report, "children are growing healthily in South Carolina," there is an increase in children's readiness to eat fruits and vegetables. Through the garden intervention programme, there was also an increase in the number of students who could recognise fruits and vegetables (Cason, 1999).

As reported by the Kerala Statistical Institute (2001), 98 per cent of Keralites were habituated to non-vegetarian foods and consumption of fruits and vegetables were very low. Children who grow their own vegetables are more likely to eat fresh vegetables (Pothukuchi, 2004). The

children also expressed a preference for a vegetable that they grew (Morris and Zidenberg-Cherr, 2002). The dietary perception and practices in senior secondary boys in Delhi schools studied by Vibha and Sibal (2003) reported that the cereals, fat and oil and sugar were consumed daily by adolescents. Hermann *et al.* (2006) in a study on the after-school gardening and vegetable intake among third to eighth grade male and female students resulted that there was a significant increase in report of daily vegetable intake. Youth gardening programme participants were more willing to eat nutritious food, try ethnic and unfamiliar food, greater likelihood to cook and garden, and expressed a greater appreciation for other individuals and cultures than the nonparticipants (Lautenschlager and Smith, 2007).

McAleese and Rankin (2007) investigated the effects of garden-based nutrition education on adolescents' fruit and vegetable consumption using a non-equivalent control group design. A repeated measure analysis of variance showed that adolescents who participated in the garden-based nutrition intervention increased their preference of fruits and vegetables more than students in the two other groups. The results of this study revealed the efficacy of garden-based nutrition education to increase adolescents' consumption of fruits and vegetables. Many studies revealed that Children who grow their own food were more likely to eat fresh fruits and vegetables (Hermann *et al.*,

2006; McAleese and Rankin, 2007; Pothukuchi, 2004) or expressed a preference for these foods (Morris and Zidenberg-Cherr, 2002). The findings by Parmer *et al.* (2009) suggested that school administrators, classroom teachers, and nutrition educators should implement school gardens as a way to positively influence dietary habits at an early age. The results of the study by Miguel and Ivanovic (2010) on a short-term SVG program focused on pre-schoolers and their mothers from Sao Paulo, Brazil showed that there was an increased number of daily meals and the frequency with which they consume vegetables, as well as the number of vegetables that they consumed. Nolan *et al.* (2012) conducted a study on 'effects of nutrition education and gardening on attitudes, preferences, and knowledge of second to fifth graders in the Rio Grande valley toward fruit and vegetables'. Differences were identified between pre- and post-test scores for all the study variables. After comparing pre- and post-test scores, they concluded that gardening and nutritional instruction had a positive effect on students' nutritional knowledge, fruit and vegetable preference, and snack choices. The study on eating habit among school going adolescents in Mumbai by Kumar *et al.* (2013) reported that two third of the sample adolescents were non-vegetarian. The outcome of the study revealed that more than two third of respondents opined that a combination of vegetarian and non-vegetarian food items was healthy while close to 30 per cent opined that vegetarian food is healthy.

## MATERIALS AND METHODS

The study employed an ex-post facto research design. The research was carried out in the Palakkad region of Kerala, India, in the Nenmara and Kollengode districts. Three panchayaths were chosen at random from the Nenmara and Kollengode blocks. One school was chosen at random from each of the six panchayaths. The two-stage random sampling approach was used. Nenmara, Pallasana, and Elavanchery were from the Nenmara block, whereas Koduvayur, Muthalamada, and Vadavannur were from the Kollengode block. The two-stage random sampling approach was used. The respondents are 30 students from each of the six schools where the SVG programme was implemented, for a total of 180 student respondents. Students range in age from Eleven to Sixteen years old.

The perceived changes in preferences in food consumption among the students involved in SVG were analyzed using the following parameters.

Positive changes in preferences and willingness to taste vegetables; Increase in quantity of vegetables

consumption; Increase in variety of vegetable consumption; Decrease in fast food consumption; Preference for healthy foods; Preference towards vegetables produced by self; Preference towards leafy vegetables

Perceptions on individual parameter by the respondents were also recorded. For that, the sum scores of individual parameter was calculated and ranked. The sum off all the parameters were added and based on the mean value three categories *viz.*, high, medium and low were formed.

## RESULTS AND DISCUSSION

It was shown that the majority of students (92.78 %) adopted a non-vegetarian diet. It was discovered that all of the students ate three meals every day. Neumark-sztainer *et al.* (1997) discovered that 66.67 per cent of their sample was non-vegetarians and just 33.33 per cent was vegetarians in their study on the behavioural profile of a school-based community in Minnesota. A similar pattern was noticed in the Kerala Statistical Institute's (2001) report and the Kumar *et al.* research (2013). The perceived changes in food consumption preferences of SVG.

Table 1 shows that after engaging in SVG, students indicated a stronger preference for green vegetables. Not only was there a preference for green vegetables, but also for vegetables grown by themselves. The pupils observed a significant improvement in their willingness to try veggies. They had also developed a moderate predilection for healthy food and had reduced their use of fast food. In comparison to other characteristics, preference for higher vegetable consumption and interest in a greater variety of kinds scored low. The increasing preference might be attributed to the availability of fresh green vegetables and a preference for products grown on their farms. Heim *et al.* (2009) while studying on the garden pilot project concluded that the project remarkably enhanced the food consumption and preferences among the children. He pointed out that there was a significant increase in interest among children for the fruits and vegetables.

Gibbs *et al.* (2013) discovered that transfer of affects to the home environment altered children's food experiences in their study on the impact of school-based culinary programmes. The findings are likewise consistent with those of Vibha and Sibal (2003). From study as shown in Table 2 lists the many types of meals that students often consume and the frequency with which they do so. The table demonstrates food intake patterns at various frequency levels. It can be seen that all of the pupils ate

**Table 1: Perceived changes in preference of food consumption among students (N=180).**

Sl. No.	Parameter	Score	Rank
1	Positive changes in preferences and willingness to taste vegetables	808	3
2	Increase in quantity of vegetables consumption	780	6
3	Increase in variety of vegetable consumption	770	7
4	Decrease in fast food consumption	788	5
5	Preference for healthy foods	804	4
6	Preference towards vegetables produced by self	825	2
7	Preference for leafy vegetables	849	1

**Table 2: Distribution of students based on their food consumption (N=180).**

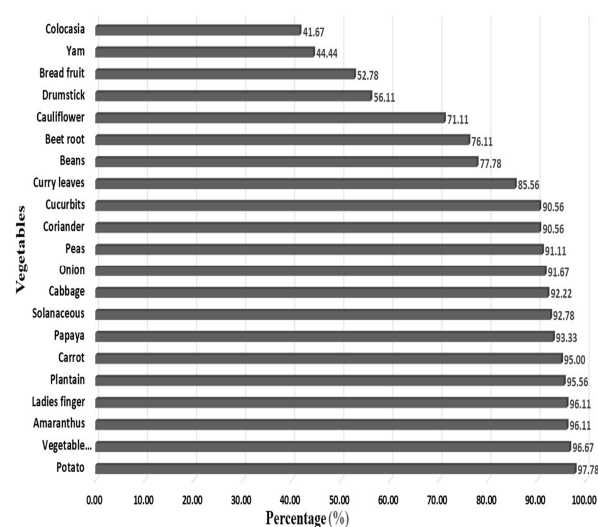
Category	Frequency percentage								Total (%)
	Daily	Weekly Thrice	Weekly Twice	Weekly once	Monthly once	Occasionally	Rarely	Never	
<b>Cereals</b>	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
<b>Vegetables</b>	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
<b>Fat and oil</b>	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
<b>Pulses</b>	43.89	19.44	15.56	13.33	6.11	1.67	0.00	0.00	100.00
<b>Fruits</b>	2.78	36.67	41.11	10.00	0.00	9.44	0.00	0.00	100.00
<b>Egg</b>	16.67	7.22	63.33	5.56	0.00	0.00	0.00	7.22	100.00
<b>Milk</b>	42.22	7.78	15.56	8.33	2.22	0.00	23.89	0.00	100.00
<b>Fish</b>	9.44	15.56	11.11	24.44	10.00	5.56	14.40	9.49	100.00
<b>Meat</b>	0.00	7.22	3.33	44.44	8.89	11.67	16.04	8.40	100.00
<b>Tropical tubers (yam, colocasia &amp; coleus)</b>	10.00	12.22	6.11	8.33	5.56	11.67	46.11	00.00	100.00

**Table 3: Vegetables consumed by students based on percentage (N=180)**

Particulars	Most preferred (above 85 %)	Medium preferred (70 – 85 %)	Less preferred (Below 70 %)
Vegetables consumed	Potato Vegetable cowpea Amaranthus Okra Plantain Carrot Papaya Solanaeous Cabbage Onion Peas Coriander Cucurbits Curry leaves	Beans Beetroot Cauliflower	Drumstick Breadfruit Yam Colocasia

cereal, legumes, vegetables, fruits, and fat or oil-based items. Among all meal options, tropical tubers were the least eaten. Other goods' consumption frequency changed at different intervals. The major grains used in their regular diet were rice and wheat. It was shown that 43.89% of students consumed pulses on a daily basis, whereas 1.67% consumed just sometimes. The majority of students (41%) ate fruits barely twice a week. Egg was also included only weekly twice by majority (63.33%) of the students. Daily consumption of milk was followed only by 42.22 per cent of students.

According to Table 3, the majority of students choose solanaeous vegetables, curry leaves, and coriander leaves, which are frequent components in most culinary dishes. Figure 1 depicts the intake of various vegetables by pupils. According to the findings, the most popular vegetable (97.78 per cent) is potato, whereas colocasia is the least popular (41.67 per cent). After participating in SVG, students' consumption did not alter significantly. Only amaranths (0.55 per cent) and solanaeous vegetables (2.22 per cent) showed any signs of alteration. The results of the study by Miguel and Ivanovic (2010) about a short-



**Fig. 1:** Distribution of vegetable consumption of students.

term SVG program focused on preschoolers and their mothers from Sao Paulo, Brazil showed that there was an increase in number of daily meals and the frequency with which they consume vegetables, as well as the number of vegetables they consumed.

## CONCLUSION

According to the observed changes in food intake of students, desire for green vegetables received the highest rating. The self-produced desire for vegetables, as well as favourable improvements in preferences and readiness to sample vegetables, were placed second and third, respectively. It was discovered that all of the students consumed cereal, legumes, vegetables, fruits, and fat or oil-based meals. Among all meal options, tropical tubers were the least eaten. Other goods' consumption frequency changed at different intervals. The frequency of consumption of several vegetables was investigated, and it was discovered that the students favoured potato, vegetable cowpea, and amaranthus, while colocasia, yam, and bread fruit were the least liked vegetables. After the involvement in SVG 0.55 per cent students expressed an increase in consumption of amaranthus while 2.22 per cent students expressed an increase in consumption of solanaceous vegetables.

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