Vegetable Intake, Preferences, and Variety in Michigan Gardeners over a Single Gardening Season

Ghaida Batarseh1, BS; Katherine Alaimo2, PhD; Sarah Comstock3, PhD; Alyssa Beavers1, PhD, RD
1 Wayne State University Department of Nutrition and Food Science, 2 Michigan State University Department of Food Science and Human Nutrition

Objective
To examine vegetable preferences, vegetable variety intake, and consumption of vegetables before gardening (May) and during peak harvest time (September). This data was collected as part of a larger study examining the relationship between gardening and the composition of the gut microbiome.

Table 1: Demographics

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number (Percent)</th>
<th>Income</th>
<th>Number (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>9 (36%)</td>
<td>&lt;$25,000</td>
<td>5 (20%)</td>
</tr>
<tr>
<td>Female</td>
<td>16 (64%)</td>
<td>$25,000 to &lt;$50,000</td>
<td>9 (36%)</td>
</tr>
</tbody>
</table>

Race
- White: 15 (60%)
- Black: 2 (8%)
- Asian: 8 (32%)

Missing Participants: 3 (12%)

Table 2: Vegetable Preferences were Initially High and Did Not Change Over Gardening Season

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Preference: Pre Mean ±SD</th>
<th>Preference: Post Mean ±SD</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomatoes</td>
<td>4.5 ±0.8</td>
<td>4.4 ±0.7</td>
<td>0.70</td>
</tr>
<tr>
<td>Broccoli</td>
<td>4.0 ±0.6</td>
<td>4.2 ±0.8</td>
<td>0.38</td>
</tr>
<tr>
<td>Cooked spinach</td>
<td>3.6 ±0.8</td>
<td>3.8 ±0.6</td>
<td>0.08</td>
</tr>
<tr>
<td>Cooked greens</td>
<td>3.0 ±0.8</td>
<td>3.3 ±0.6</td>
<td>0.13</td>
</tr>
<tr>
<td>Green beans</td>
<td>4.2 ±0.6</td>
<td>4.3 ±0.7</td>
<td>0.37</td>
</tr>
<tr>
<td>Asparagus</td>
<td>4.5 ±0.6</td>
<td>4.6 ±0.7</td>
<td>0.26</td>
</tr>
<tr>
<td>Bell pepper</td>
<td>4.2 ±0.7</td>
<td>4.2 ±0.6</td>
<td>0.49</td>
</tr>
<tr>
<td>Celery</td>
<td>3.8 ±0.5</td>
<td>3.7 ±0.6</td>
<td>0.65</td>
</tr>
<tr>
<td>Cucumber</td>
<td>4.1 ±0.5</td>
<td>4.3 ±0.6</td>
<td>0.05</td>
</tr>
<tr>
<td>Peas</td>
<td>4.0 ±0.7</td>
<td>4.1 ±0.6</td>
<td>0.33</td>
</tr>
<tr>
<td>Squash/zucchini</td>
<td>4.4 ±0.6</td>
<td>4.2 ±0.7</td>
<td>0.36</td>
</tr>
<tr>
<td>Brussels sprouts</td>
<td>3.0 ±0.7</td>
<td>3.0 ±0.6</td>
<td>0.79</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>4.0 ±0.8</td>
<td>3.8 ±0.7</td>
<td>0.10</td>
</tr>
<tr>
<td>Corn</td>
<td>4.5 ±0.6</td>
<td>4.6 ±0.6</td>
<td>0.49</td>
</tr>
<tr>
<td>Carrots</td>
<td>4.2 ±0.7</td>
<td>4.1 ±0.5</td>
<td>0.75</td>
</tr>
<tr>
<td>Onions</td>
<td>4.1 ±0.3</td>
<td>4.3 ±0.6</td>
<td>0.08</td>
</tr>
<tr>
<td>Green salad</td>
<td>4.5 ±0.4</td>
<td>4.4 ±0.6</td>
<td>0.49</td>
</tr>
<tr>
<td>Eggplant</td>
<td>3.8 ±0.9</td>
<td>3.9 ±0.7</td>
<td>0.67</td>
</tr>
<tr>
<td>Beets</td>
<td>3.2 ±0.8</td>
<td>3.0 ±0.9</td>
<td>0.49</td>
</tr>
<tr>
<td>Radish</td>
<td>3.2 ±0.9</td>
<td>2.9 ±0.8</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Preference score scale: 1=Strongly Dislike to 5= Strongly Like. Paired t-tests compare pre and post values. N=25. Bonferroni correction for multiple comparisons, significant at p<0.025.

Results

Table 1: Demographics

- Male: 9 (36%)
- Female: 16 (64%)
- Race: White: 15 (60%), Black: 2 (8%), Asian: 8 (32%)
- Missing Participants: 3 (12%)

Table 2: Vegetable Preferences were Initially High and Did Not Change Over Gardening Season

- Tomatoes: Pre 4.5 ±0.8, Post 4.4 ±0.7, P=0.70
- Broccoli: Pre 4.0 ±0.6, Post 4.2 ±0.8, P=0.38
- Cooked spinach: Pre 3.6 ±0.8, Post 3.8 ±0.6, P=0.08
- Cooked greens: Pre 3.0 ±0.8, Post 3.3 ±0.6, P=0.13
- Green beans: Pre 4.2 ±0.6, Post 4.3 ±0.7, P=0.37
- Asparagus: Pre 4.5 ±0.6, Post 4.6 ±0.7, P=0.26
- Bell pepper: Pre 4.2 ±0.7, Post 4.2 ±0.6, P=0.49
- Celery: Pre 3.8 ±0.5, Post 3.7 ±0.6, P=0.65
- Cucumber: Pre 4.1 ±0.5, Post 4.3 ±0.6, P=0.05
- Peas: Pre 4.0 ±0.7, Post 4.1 ±0.6, P=0.33
- Squash/zucchini: Pre 4.4 ±0.6, Post 4.2 ±0.7, P=0.36
- Brussels sprouts: Pre 3.0 ±0.7, Post 3.0 ±0.6, P=0.79
- Cauliflower: Pre 4.0 ±0.8, Post 3.8 ±0.7, P=0.10
- Corn: Pre 4.5 ±0.6, Post 4.6 ±0.6, P=0.49
- Carrots: Pre 4.2 ±0.7, Post 4.1 ±0.5, P=0.75
- Onions: Pre 4.1 ±0.3, Post 4.3 ±0.6, P=0.08
- Green salad: Pre 4.5 ±0.4, Post 4.4 ±0.6, P=0.49
- Eggplant: Pre 3.8 ±0.9, Post 3.9 ±0.7, P=0.67
- Beets: Pre 3.2 ±0.8, Post 3.0 ±0.9, P=0.49
- Radish: Pre 3.2 ±0.9, Post 2.9 ±0.8, P=0.21

Preference score scale: 1=Strongly Dislike to 5= Strongly Like. Paired t-tests compare pre and post values. N=25. Bonferroni correction for multiple comparisons, significant at p<0.025.

Discussion
- Vegetable variety significantly increased over the gardening season:
  - Participants consumed an average of 12.1±2.9 vegetables out of a list of 20 before gardening, which significantly increased to 13.6±3.1 after gardening (p=0.026)
- Vegetable consumption frequency (in times per day) did not significantly change over the garden season:
  - Participants consumed vegetables an average of 2.6±1.2 times per day before gardening, which was not significantly different than 2.2±1.2 post-gardening (p=0.08)

Summary and Conclusions
- This study found that vegetable variety increased throughout a gardening season, but total vegetable intake and vegetable preferences did not change
- Future research with larger sample sizes and focusing on new gardeners is needed to examine mechanisms of dietary change in gardeners

References

Funding: USDA NIFA AFRI Education and Workforce Development Program, Award M100868
Acknowledgements: We thank Lauren Gable for her assistance with this project

Methods
- Participants & Study Design: adult home and community gardeners enrolled in a gardener support program in Michigan
- 29 participants completed baseline survey (pre-gardening)
- 25 completed follow-up survey (peak of garden harvest)
- Outcomes
  - Vegetable intake: Dietary Screener Questionnaire from National Cancer Institute
  - Vegetable preferences: preferences for 20 different vegetables assessed on a 5-point scale from the Food Attitudes and Behaviors Survey
  - Vegetable Variety: number of the 20 vegetables from Food Attitudes and Behaviors Survey eaten in past month.
  - Analysis: Paired, two-tailed t-tests were used to compare pre-gardening and harvest time survey data.
  - Vegetable intake and variety: P<0.05 significance cutoff
  - Vegetable preferences: Bonferroni correction for multiple comparisons, P<0.0025 significance cutoff

Results
- Vegetable variety significantly increased over the gardening season:
  - Participants consumed an average of 12.1±2.9 vegetables out of a list of 20 before gardening, which significantly increased to 13.6±3.1 after gardening (p=0.026)
- Vegetable consumption frequency (in times per day) did not significantly change over the garden season:
  - Participants consumed vegetables an average of 2.6±1.2 times per day before gardening, which was not significantly different than 2.2±1.2 post-gardening (p=0.08)