Plant a Seed: Gardening and Nutrition with Elementary School Students

Lee Honors College Thesis Project
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Bronson School of Nursing Scholarly Event
April 8, 2014
Acknowledgments

- Thesis Chair
  - Dr. Sally Vliem, RN, CPNP

- Thesis Committee Members
  - Professor Susan Houtrouw, RN, MNSc, CNS
  - Professor Wendy Kershner, MSN, CPNP, RN, IBCLC

- Edison Environmental Science Academy, Kalamazoo
  Communities in Schools, and 21st Century After-School
  Program Staff

- Elizabeth Amaya, WMUSN and Assistant Site Coordinator
  at Edison
Objectives

- Identify and describe the need for a nutrition and gardening intervention for elementary school students
- Describe research study design, implementation, and results
- Discuss the implications for nursing practice
Background and Significance
Obesity Trends* Among U.S. Adults
BRFSS, 2000
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)

(Centers for Disease Control and Prevention, 2014)
Obesity Trends* Among U.S. Adults
BRFSS, 2010

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)

(Centers for Disease Control and Prevention, 2014)
Background and Significance

- Chronic disease
  - Heart disease
  - Stroke
  - Type II Diabetes Mellitus
  - Cancer

- Increasing costs of healthcare
  - $1429 estimated annual cost of obesity

(Centers for Disease Control and Prevention, 2014)
Behaviors that increase obesity may begin in childhood
Rates of obesity significantly increasing for children

- Female: 13.8%
- Male: 14.0%

(Healthy People, 2013)
(Centers for Disease Control and Prevention, 2012)
(Cunningham, Kramer, & Narayan, 2014)
Current Initiatives

- **Healthy People 2020**
  - **NWS-10.2** Reduce the proportion of children ages 6-11 who are considered obese
  - **NWS-14** Increase the contribution of fruits to the diets of the population aged 2 years and older
  - **NWS-15.2** Increase the contribution of total vegetables to the diets of the population aged 2 years and older

- **First Lady, Michelle Obama’s Let’s Move Program**

(Healthy People, 2013)
(Let’s Move, 2014)
Purpose

- Design and implement a gardening intervention that will increase fruit and vegetable consumption, reduce weight and BMI, and increase confidence in gardening for fourth-graders at a local elementary school.
- Determine students’ ability to maintain health behaviors independently.
Design and Sample

- Time Series Design
- Convenience Sample
- Inclusion Criteria
  - Participant in the After-School Program at Edison
  - Informed consent
  - Student assent
- Exclusion Criteria
  - Lack of informed consent from parent
  - Lack of student assent
Subject Recruitment

- Edison Environmental Science Academy 21st Century After-School Program
- Permission obtained from Principal and KCIS Site Coordinator
- Approval received from Human Subjects Institutional Review Board at WMU
Subject Recruitment

- Fourth-graders recruited for experimental group
- Third-graders recruited for control group
Sample Description

- Urban elementary school with 98.2% free-and-reduced lunch rate
- Ages 8-11 years old
- Experimental Group
  - Nine fourth graders
  - 22.2% Male / 77.8% Female
- Control Group
  - Eight third graders
  - 50% Male / 50% Female
Research Procedure

- Data Collection Points
  - At baseline
  - Immediately after 3-week, 6-session intervention
  - After 3 month summer break

- Data collected:
  - Weight
  - Height
  - Responses to Block Fruit, Vegetable, and Fiber Screener
Block Fruit, Vegetable, and Fiber Screener

- NutritionQuest
- 10 questions
- 10-15 minutes
- Inquires about fruit, vegetable, and fiber intake over the past week

(Block Fruit, Vegetable, and Fiber Screener-Last Week, 2009)
“Think about your eating habits over the past week. About how often did you eat each of the following foods? Remember breakfast, lunch, dinner, snacks and eating out. Mark one bubble [box] for each food” (Block Fruit, Vegetable, and Fiber Screener-Last Week, 2009).

<table>
<thead>
<tr>
<th>Fruits and Vegetables</th>
<th>(0) Less than 1/week</th>
<th>(1) Once a week</th>
<th>(2) 2-3 times a week</th>
<th>(3) 4-6 times a week</th>
<th>(4) Once a day</th>
<th>(5) 2+ times a day</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often do you eat any fruit, fresh or canned (not counting juice?)</td>
<td></td>
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<td>Any other vegetables, including string beans, peas, corn, broccoli or any other kind</td>
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<tr>
<td><strong>Fruit Vegetable Score</strong></td>
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</tbody>
</table>
Gardening and Nutrition Intervention

- 45-minute lesson
  - 20 minutes in greenhouse
  - 25 minutes in classroom
- Document growth of plant in journal
- Observe group plants
- Water and nurture plants
<table>
<thead>
<tr>
<th>Gardening Lesson</th>
<th>Nutrition Lesson</th>
<th>Food of the Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>• How to plant a seed</td>
<td>• Importance of fruits and vegetables in daily diet</td>
<td>• Carrots</td>
</tr>
<tr>
<td>• Create pots out of milk cartons</td>
<td></td>
<td>• Strawberries</td>
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<tr>
<td>• Watering plants</td>
<td>• Canned vs. Fresh Fruits</td>
<td>• Peas</td>
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<tr>
<td>• Perennials, annuals, and seasonal foods</td>
<td>• Making a meal out of vegetables</td>
<td>• Corn</td>
</tr>
<tr>
<td>• Recycled materials in gardening</td>
<td>• Natural vs. added sugars</td>
<td>• Oranges</td>
</tr>
<tr>
<td>• Harvesting seeds</td>
<td>• Community gardens and farmers markets</td>
<td>• Tomatoes</td>
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<tr>
<td>• Foods that can be grown at home</td>
<td></td>
<td>• Cucumbers</td>
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<tr>
<td>• How to care for plant at home</td>
<td></td>
<td>• Herbs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Apples</td>
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<td></td>
<td></td>
<td>• Beets</td>
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<td></td>
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<td>• Bell peppers</td>
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</tbody>
</table>
Green Beans

Strawberries

Romaine Lettuce
Three Months Post-Intervention

- One camera returned
- No journals returned
- Most students reported bean plan did not survive the summer
Data Analysis

IBM SPSS Statistics
- Frequency
- Independent t-tests
- Bivariate statistics
  - Correlation coefficient
Fruit Intake
Vegetable Intake

![Graph showing vegetable intake over three time periods: Time 1, Time 2, Time 3. The graph compares experimental and control groups.](image)
Results

- Significant negative correlation ($p<.05$) between the BMI and vegetables at time 2 after the intervention
  - As vegetable intake increased, BMI decreased

- No significant correlation for fruit
Limitations

 Convenience sample
 Small sample size
 Fluctuating attendance
 Nutrition screener
 Age of participants
   Growth
   Access to resources
   Familial support
 Home environment
Implications for Nursing Practice

- “Plant a seed” for each individual
- Long-term implementation requires support and further research
Questions?
References


References

