Smart Nutrition and Conditioning for Kids (SNACK):
A Collaborative Approach to Combating Childhood Obesity

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Disclosure

Tracy Perron PhD, RN is an assistant professor at the College of New Jersey, Tami Jakubowski, DNP is an associate professor at Gwynedd Mercy University and Anne Farrell, PhD is an associate professor at the College of New Jersey. We disclose the absence of personal financial relationships with commercial interests relevant to this educational activity within the past 12 months. Funding from Novo Nordisk was received to support the research project.
Objectives:

– The learner will be able to examine national and regional trends that impact children's risks for childhood obesity in the United States.
– Integrate knowledge and experience of other professions to develop community values and priorities related to health and fitness.
– Collaborate with other professions to develop positive outcomes relevant to prevention and healthcare.
Background

• The College of New Jersey School of Nursing, Health, and Exercise Science developed the SNACK program in response to the 2010 Childhood Obesity Study recognizing a 49% childhood obesity rate in Trenton New Jersey public schools.

• Lifestyle influences contributing to obesity and T2DM include poor food choices, inadequate access to healthy foods, decrease in physical activity, and insufficient access to safe play environments.
Purpose:
SNACK: Smart Nutrition and Conditioning for Kids

• The purpose of the SNACK pilot study was to increase the fitness and health of children age 7-9 years of age in two Mercer county elementary schools.

• This was achieved by providing fundamental Integrative training (FIT) and health education in the areas of fitness, healthy eating and diabetes prevention.
Sample

- Four second grade classes in two Mercer County schools (School A & School B) with ethnically diverse populations were selected.
- One intervention and one wait-listed (control) second grade classes were selected from each school.

**Experimental Group**: 35 Students

**Control Group**: 36 Students

**Boys**: Experimental: 17  
Control: 15

**Girls**: Experimental: 18  
Control: 21
Methods

• The intervention was performed twice a week for 45 minutes for 8 weeks.
• Pre/post study health and fitness assessments were completed on each child.
• To reinforce content a video format for parents, teachers, school nurses and children were developed for home viewing via school websites.
• Nutrition lesson plans were developed to educate the children on healthy eating in a fun, interactive manner during physical education class.
Instruments

**Faculty Developed Questionnaire** was distributed to the parents of the participants pre/post intervention.
- This questionnaire was developed to determine baseline knowledge of healthy food choices, foods available at home, and physical activity at home and school.

**Physical Assessment** was performed on the participants pre/post intervention.
- Height, weight, blood pressure and pulse were taken and BMI’s were calculated.
- Children were examined for early manifestations of diabetes, such as acanthosis nigrans.
Fitnessgram Fitness Test (FIT) was performed on the participants pre/post intervention.

- This a valid and reliable test used to assess aerobic fitness, flexibility and muscle strength.
- In addition, other standard youth fitness tests were used to assess power (long jump), balance (single leg stand) and sprint speed (shuttle run).

CATCH (Coordinated Approach to Child Health) Nutritional Knowledge Instrument was used to measure nutritional knowledge pre/post intervention.
Interdisciplinary Aspects

• A collaborative effort between the nursing and PE department at the schools as well as the college, made it possible to combine fitness and health education together in one program. Both departments have the same objective to successfully reduce rates of childhood obesity and T2DM.

• SNACK included both Nursing and Education students, bringing together the educational aspects of school nursing and health education through personalized lesson plans.
Benefits of Interdisciplinary Collaboration

- Sharing ideas about your discipline and teaching with enthusiastic colleagues with a common goal.
- Students see teachers and other professionals model continued learning, interest in their discipline and in those of others, collaborating with peers.
- Exposure to new ideas.
- Opportunity to work with different people.
- Enhanced flexibility in working with students.
SNACK: A Team Approach to Increasing Nutritional Knowledge

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Disclosure

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I disclose the absence of personal financial relationships with commercial interests relevant to this educational activity within the past 12 months.

Funding from Novo Nordisk was received to support the research project.
Purpose of Nutrition Component

• The purpose of the SNACK Nutrition intervention was to provide 7-9 year old elementary school children and their parents nutrition education about healthy food choices and diabetes prevention.
CATCH Program

• CATCH: Coordinated Approach to Child Health
• Based on CDC’s Whole School, Whole Community, Whole Child (WSCC) Model
• Promotes Healthy Lifestyle: Collaborative Approach
  – Healthy Food Choices
  – Physical Activity
  – Health Education
  – School Environment
  – Family/Community Environment
• CATCH Classroom and Physical Education Toolkit (K-5th grade) purchased for two participant schools
CATCH Nutritional Knowledge Survey (NKS)

- Pre and post intervention
- Assessment of student’s nutritional knowledge and healthy choices
- Research assistants read questions aloud
- Children completed independently
- 22 items, children chose between 2 pictures/words to determine food group, micronutrient, or “GO”, “SLOW”, or “WHOA” food
CATCH Health SNACK Choices Survey (HSC)

- Pre and post intervention
- 15 questions related to healthy snack options
- Written answers only (reading practice).
- Read aloud by Research Assistant (RA) if assistance needed
- Self paced, completed independently
- During PE class
- Collected by PEP and RA’s
Integrated Nutrition Lessons

• Basic Knowledge – MyPlate Nutritional Model:
  – 5 food groups, building blocks for healthy diet (ChooseMyPlate)

• New Jersey Core Curriculum Standards:
  – Information about fats, calories, fiber, sodium, calcium, and energy expenditure addressed
Focus of Nutritional Component

• Student understanding of basic nutritional information and choice of food categories:
  – Grains = energy source
  – Fruits & vegetables = nutrients and fiber
  – Protein = muscles
  – Dairy (calcium) = bone/teeth strength
  – Fats (oils) = provide essential nutrients, liquid/solid
  – Sodium = salt - LIMIT
  – Calorie expenditure = energy in from food, out from movement
Focus of Nutritional Component

• Identification of “GO” and “WHOA” foods
• GO=healthy choice, good to eat anytime
• WHOA=least healthy, likely to cause health problems if eaten often.
Active Nutrition Lessons: Protein

- Game based on protein and hand dribbling
- Learned hand dribbling in PE, then knowledge about protein
- Dribbled to walls where pictures/names of proteins hung
- Say name of protein and spell while dribbling
- Regroup and RA clarified/shared protein examples
- Recall of 10 protein choices allowed 2 shots on basketball net
- Wrap-up:
  - Tell what protein does for body
  - Identify 1 protein not already mentioned by classmate
  - RA connected protein to muscle strength and dribbling/shooting
Active Nutrition Lessons: GO vs WHOA foods

• GO/Whoa foods defined, examples given (protein)
• Children given 2 food choices, pick healthier option
• Muscle fitness activity: number of repetitions differed
  – “GO” choices with fewer repetitions
  – “WHOA” choices with more repetitions to burn off extra calories
• Small group discussion about GO/WHOA foods: PROTEIN
Results: CATCH Healthy Choices Survey

• Control Group:
  – Pre: 70.37%
  – Post: 75.93%, a 5% increase
  – Significance in 2 of 15 questions

• SNACK Intervention Group
  – Pre: 72.59%
  – Post: 82.96%, a 10% increase
  – Significance in 7 of 15 questions
  – P<0.05
Results: CATCH Nutritional Knowledge Survey

• Control Group:
  – Pre: 58.21%
  – Post: 60.07%, increase of 11%
  – Significance in 7 of 22 questions.

• SNACK Intervention Group:
  – Pre: 60.35%
  – Post: 72.98%, increase of 12.5%
  – Significance in 6 of 22 questions.

Both groups were statistically significant.
Parental Questionnaire Results

• Urban elementary school intervention parents reported children’s daily fresh and/or frozen fruit consumption increased (p<0.05).

• SNACK Intervention groups at both schools reported increased daily consumption of vegetables (1 vs. 2 servings).

• School B experimental group post parental questionnaires noted the frequency of meals together as a family increased.
Possible Confounders

- Students not regulated outside of PE class
- Information gained in other classes
- Educational school events or functions
- Information sharing among peers
- Nutritional information provided at home
- Community health & nutrition initiatives
- Control group may have gained SNACK knowledge through peers
- 2 different PE teachers at one school
- Parent videos provided to all parents, not just SNACK children
SNACK: A Collaborative Approach to Improving Children's Fitness

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Anne Farrell, PhD is an associate professor at the College of New Jersey.

I disclose the absence of personal financial relationships with commercial interests relevant to this educational activity within the past 12 months.

Funding from Novo Nordisk was received to support the research project.
F.I.T. Objectives

• Implement 8-week FIT Training to improve fitness levels and activity engagement in children.

• Collaborate with other school professionals to develop positive outcomes relevant to NJCCC Health & Physical Education Standards.

• Incorporate training and mentoring into the TCNJ HPE-Teacher training program
F.I.T. Program

The Fundamental Integrative Training (FIT). FIT includes a circuit of 6-7 exercise stations with 2 activities (total of 12-14) that focus on enhancing muscular fitness and fundamental movement skills (primarily jumping, balancing, throwing and catching).

FIT includes a series of progressive exercises using one’s body weight as well as medicine balls (1-2 kg), fitness ropes (1”), equalizer bars, BOSU balance trainers, fitness spots, dome cones, punch balloons and spooner board (plastic boards that simulates skateboarding).
FitnessGram

Supported by the Youth Presidential Fitness Challenge. Assesses three general components of health-related fitness, which have been identified as important to overall health and function

- Aerobic Capacity - PACER test/Beep test, multi-stage progressive shuttle run set to music
- Muscular Strength and Endurance - Curl Up & Push Up — to a cadence
- Flexibility - back-saver sit-and-reach

Skill Related:
• Power - Standing Long Jump
TCNJ HPET Student Training

FitnessGram:
- TCNJ HPET Students (25):
- Trained during HES 303: Assessment Course
- Assessed on validity & reliability
- Must have completed at least one methodology course.
- Assigned to ONE station for pre/post testing

F.I.T.:
- 4 HPET Majors, completed student teaching
- Majors & PE teacher trained on F.I.T cues & progression
- Documentation of progression
- Daily & weekly reporting methods
- Oversaw implementation at same school for 8 weeks
Elementary Student Training

Fitness Testing Practice:

• All students had instruction/demonstration and two trials prior to the actual fitness testing.

• Feedback from TCNJ students, PE teacher, & TCNJ faculty provided during trials

Fitness Taking Procedures:

• PACER - all students

• Groups of 4-5 students

• Rotation between fitness testing station

• Scoring documented by TCNJ scorer
Implementation

Two times per week
40-45 minute periods.
- Warm-up (~5 minutes)
- F.I.T. (~12 minutes)
- PE Skill Content (~5-10 minutes)
- Combo - Nutrition/PE Skill Content/Fitness (~10 minutes)
- Closure (~2 minutes)

Accommodations Made by School Districts:
- 2x per week & modification of 6 day cycle
Week 8

Station 1

Rope Waves

Equilizer Air Walker

Rope Slams

Push-Ups
Week 8

Station 2

Med Ball Chest Push

Target Wall Ball
(catch after 1 bounce)

Med Ball Slams

Med Ball Jacks
Station 3

Balloon knee tap & clap

Balloon crab walk

ABC Balloon Taps

Balloon Bear Walk
Station 4

Bridge Builder

Week 8

Bosu Burpee & Bosu Crocodile
Week 8

Station 5

- Cone Trail
- Mirror Line Jump

Touch & Go & Triple Jump
Week 8

Station 6

Spooner sit &
spin

Spooner
standing surf

Spooner

Star Gazer & Hand Surfer
Station 7
Mix and Match Create your own exercise

Med Balls

Balloons
## Fitness Outcomes EG vs CG

Table 1: Fitnessgram mean scores for pre and post intervention by condition

<table>
<thead>
<tr>
<th>Table 1: Fitnessgram mean scores for pre and post intervention by condition</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>Pacer (laps)</td>
<td>10.75</td>
<td>16.94*</td>
</tr>
<tr>
<td>Push-ups</td>
<td>1.72</td>
<td>6.69*</td>
</tr>
<tr>
<td>Curl-ups</td>
<td>10.30</td>
<td>30.89*</td>
</tr>
<tr>
<td>Long Jump (inches)</td>
<td>41.74</td>
<td>48.29*</td>
</tr>
<tr>
<td>Sit and Reach-Left (inches)</td>
<td>8.42</td>
<td>9.91*</td>
</tr>
<tr>
<td>Sit and Reach-Right (inches)</td>
<td>8.40</td>
<td>10.42*</td>
</tr>
</tbody>
</table>

*Significant Difference Between Pre and Post Test (p<.05) / **significant difference in mean improvement of exercise between study groups (p>.05)
# Fitness Outcomes by School

## Table 1. Fitnessgram Mean Scores for Pre- and Post-Intervention

<table>
<thead>
<tr>
<th></th>
<th>School A (Urban Rim)</th>
<th>School B (Urban)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>Experimental</td>
</tr>
<tr>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
</tr>
<tr>
<td>Pacer (laps)</td>
<td>16.29</td>
<td>18.00</td>
</tr>
<tr>
<td>Push-ups</td>
<td>2.43</td>
<td>3.71*</td>
</tr>
<tr>
<td>Curl-ups</td>
<td>9.21</td>
<td>21.43*</td>
</tr>
<tr>
<td>Long Jump (inches)</td>
<td>42.57</td>
<td>46.14*</td>
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<tr>
<td>Sit and Reach-Left (inches)</td>
<td>8.86</td>
<td>9.96*</td>
</tr>
<tr>
<td>Sit and Reach-Right (inches)</td>
<td>8.79</td>
<td>10.25*</td>
</tr>
</tbody>
</table>

*Significant Difference Between Pre and Post Test (p<.05)
Results

- Implementing an 8-week FIT Training does improve fitness levels in children.
- Based on parental reports, FIT encouraged movement outside of school based.
- Increased physical education may have impacted fitness scores for all children.
- Collaborate with other school professionals.
- Incorporate training and mentoring into the TCNJ HPE-Teacher training program successful.
FIT Analysis & FIT Future

• Minimal time is needed to improve fitness levels in children
• Opportunities for “focused” intervention can be implemented during physical education
• Other opportunities throughout the school day should be explored if physical education requirements remain the same
• Exploration of larger groups, variety of ages, and for extended periods of time.
• A wide range of FIT movements that use body weight and equipment should be explored to keep the program fresh.
SNACK Conclusion

• Childhood obesity is a well known public health concern in the United States, and is increasing in other developed countries worldwide.

• Latino, native American, pacific islander, and African American children and children from lower income families have higher rates of childhood obesity.

• Obesity in children increases the risk of early diagnosis of hypertension, heart disease, and diabetes.

• Lifestyle modifications implemented at the earliest possible ages holds the most promise for sustainability and long term health benefits.

• Smart Nutrition and Conditioning for Kids (SNACK) is one example of an interdisciplinary approach to early intervention that teaches children how to be fit and stay healthy.