CHILDHOOD OBESITY -
An Intervention & Outcomes

Jim Farris, Ph.D., PT
ATSU Arizona School of Health Sciences
Laura Taylor & Megan Williamson
NEA Clinic Charitable Foundation,
Center for Healthy Children,
Jonesboro, AR
Christopher Robinson
Arkansas State University
The purpose of NEA Clinic Charitable Foundation Center for Healthy Children is to teach, motivate and guide children who are overweight, and their families, to build a solid foundation of proper nutrition and regular exercise for a healthy lifestyle.
SUMMARY OF EVIDENCE FOR CHILDREN IN N.E.A. REGION

• HIGHER INCIDENCE OF BEING OVERWEIGHT OR OBESE COMPARED TO NATIONAL NORMS.\textsuperscript{1,2}

• ONSET OF BEING OVERWEIGHT APPEARS TO BEGIN BY THE 4\textsuperscript{th} GRADE, IF NOT EARLIER.\textsuperscript{1}
NEA Children cont…

- PARENTS’ EXERCISE HABITS HAVE A SIGNIFICANT IMPACT ON CHILDREN’S EXERCISE HABITS.¹

- CHILDREN’S ACTIVITY & GENERAL FITNESS LEVEL IS INVERSELY RELATED TO BMI.¹

- CHILDREN WITH HIGHER BMI APPEAR TO HAVE A HIGHER INCIDENCE OF HYPERTENSION.²
NEA Children cont...

- CHILDREN WITH AN AROW BMI MAY HAVE SIMILAR FITNESS LEVELS AS THEIR PEERS WITH NORMAL BMI\(^2,3\)
- CHILDREN WITH NORMAL BMI USUALLY PERFORM BETTER ON FITNESS TESTS THAN CHILDREN WITH OW BMI\(^2,3\)
REVIEW OF INTERVENTIONS

• THEME: PARENTS APPEAR TO BE KEY
  – SUPPORT FOR BEHAVIORS THAT PROMOTE GOOD HEALTH BOTH INSIDE & OUTSIDE OF THE HOME
  – INTERVENTIONS WITH INVOLVED PARENTS MORE SUCCESSFUL
  – PARENTS’ READINESS FOR CHANGE AND PERCEPTION OF OVERWEIGHT AS HEALTH PROBLEM

  • LIKELIHOOD TO IMPLEMENT BEHAVIORAL CHANGES
PARENT PERCEPTION OF CHILD’S WEIGHT & HEALTH

• FEWER PARENTS OF OVERWEIGHT CHILDREN ACCURATELY PERCEIVE CHILD’S WEIGHT (10.5%) vs. OTHER PARENTS (59%)\(^8\)

• FEWER PARENTS IDENTIFY CHILD AS AROW or OW CORRECTLY WITH WORDS (36%) – BUT BETTER WITH PICTURES (70%).\(^9\)

• 26% OF PARENTS WITH CHILDREN AROW & OW WORRIED ABOUT CHILD’S WEIGHT
  – More concern if child is over 6 years of age\(^9\)
FAMILY INVOLVEMENT FACTORS

• PARENTAL SUPPORT & MODELLING IS POSITIVE FOR CHILD ACTIVITY LEVEL\textsuperscript{10}
  – ESP FOR YOUNGER CHILDREN\textsuperscript{11}
  – ESP IF BOTH PARENTS ARE ACTIVE\textsuperscript{12}

• THREE MOST IMPORTANT FORMS OF PARENTAL SUPPORT\textsuperscript{10}
  – ENCOURAGEMENT
  – INVOLVEMENT
  – FACILITATION
FAMILY FACTORS cont...

- Familial Environmental Factors of Nutritional Behavior
  - Parents’ Eating Behaviors
  - Controlling Child-feeding Practices vs. Fostering Healthy Food Preferences & Promoting Acceptance of New Foods
  - Developing Activity Preferences
Program Components Cohort 3

• Planned Exercise Programming (14 weeks total)
• Nutrition Education (Parents)
• Team “competition” & Fun Friday (compliance)
• Pre-participation physical by NEA Clinic M.D.
• Pre vs. Post Measures (weeks 1 & 16)
  – B.P. & blood
  – Anthropometric
  – Performance
• Application
• Interview
• N=29
Exercise Intervention

• Two Required Exercise Sessions per week
  – M-W or T-R
  – Fridays = fun: swimming, karate, hiking, cycling, rock climbing wall, skating, active games (eg, DDR, PS2 Gamebikes)

• One hour exercise sessions after school

• All exercise and activities led by Certified Personal Trainer with MS in Exercise Science

• Additional exercise monitors included ASU PT & Exercise Science students
Exercise Intervention cont...

- **Parent(s) Exercise Plan**
  - Parents were encouraged to exercise for a “family lifestyle change”
  - All parents were offered a special discounted rate to the NEA Clinic Wellness Center
  - All parents were offered use of the running/walking track FREE of charge
Nutrition Education

- Nutrition Class topics Mandatory for Parents
  - Basic Nutrition Overview
  - Label Reading
  - Managing Calories
  - Understanding Hunger
  - Quick, Healthy Meals
  - Best Choices for Eating Out
  - Best Choices for School Lunch
  - Review and Resources
Program Goals

• Introduce new games, sports and activities

• Embrace proper diet and regular exercise as a lifestyle
Program Goals cont...

- **Increase**
  - Muscular Fitness
  - Cardiovascular Endurance
  - Nutritional Knowledge
  - Self Esteem
  - Motivation to Live Healthier

- ** Decrease**
  - Weight
  - Body Fat Percentage
  - BMI
  - BP
  - Cholesterol*
  - Triglycerides*
  - Negative Feelings Toward Proper Diet and Exercise

*Blood panel (pre & post) not required until Cohort 3. Voluntary in 2, justified mandate.
OUTCOMES
# Anthropometric Results

## Cohort 3

<table>
<thead>
<tr>
<th></th>
<th>PRE</th>
<th>POST</th>
<th>p Value (Paired t)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BMI</strong></td>
<td>29.45 (2.8)</td>
<td>27.1 (3.02)</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>** Circumference (6 site)**</td>
<td>147.3 (10.8)</td>
<td>147.1 (9.8)</td>
<td>NS</td>
</tr>
<tr>
<td><strong>B-Fat% Est (2 site SkF)</strong></td>
<td>42.8 (6.9)</td>
<td>40.8 (6.4)</td>
<td>p = 0.015</td>
</tr>
</tbody>
</table>
ANTHROPOMETRIC RESULTS
COHORT 3

• 6 Site Circumference
  – Arm, Chest, Waist, Hip, Thigh, Calf

• Significant changes in:
  – Waist: Decrease (p=0.039)
  – Calf: Increase (p=0.004)

• NS Change in:
  – Thigh: Increase (p=0.054, trend)
## Performance Results

<table>
<thead>
<tr>
<th>Activity</th>
<th>PRE Mean (Std)</th>
<th>POST Mean (Std)</th>
<th>p value (Paired t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step (3 min)</td>
<td>137 (20)</td>
<td>126 (12)</td>
<td>p=0.004</td>
</tr>
<tr>
<td>HR- (I.P.E.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Push-up</td>
<td>1.04 (1.8)</td>
<td>5.6 (3.8)</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Sit-up</td>
<td>23.6 (12.7)</td>
<td>33.2 (13.8)</td>
<td>p=0.003</td>
</tr>
<tr>
<td>Sit&amp;Reach</td>
<td>13.8 (3.0)</td>
<td>16.6 (2.2)</td>
<td>p&lt;0.001</td>
</tr>
</tbody>
</table>
## BP/Blood Results

<table>
<thead>
<tr>
<th></th>
<th>PRE Mean (StD)</th>
<th>POST Mean (StD)</th>
<th>p value (paired t)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Systolic BP</strong></td>
<td>102 (10)</td>
<td>108 (9)</td>
<td>p=0.003??</td>
</tr>
<tr>
<td><strong>Glucose</strong></td>
<td>90 (5)</td>
<td>87 (6)</td>
<td>p=0.057 trend</td>
</tr>
<tr>
<td><strong>Total Cholesterol</strong></td>
<td>179 (38)</td>
<td>162 (30)</td>
<td>p=0.033</td>
</tr>
<tr>
<td><strong>ALT</strong></td>
<td>41 (9)</td>
<td>35 (8)</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td><strong>Bilirubin</strong></td>
<td>0.36 (0.13)</td>
<td>0.33 (0.12)</td>
<td>p=0.047</td>
</tr>
<tr>
<td><strong>BUN</strong></td>
<td>14 (3)</td>
<td>12 (3)</td>
<td>p=0.017</td>
</tr>
</tbody>
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Brief Summary of Intervention Outcomes

• POSITIVE IMPROVEMENTS IN ALL AREAS
  – ANTHROPOMETRIC
    • Decreased BMI, estimated Body Fat%, & Waist circumference;
    • Increased calf, thigh(trend)
  – PERFORMANCE
    • Aerobic/CV, muscular fitness, flexibility improvements
  – BLOOD PRESSURE / BLOOD VARIABLES
    • BP?
    • Total Cholesterol & markers of liver & kidney fxn improved
    • Glucose (trend) for improvement
CONCLUSION

- MULTIDISCIPLINARY INTERVENTIONS DESIGNED FOR CHILDREN WHO ARE OVERWEIGHT AND THEIR PARENTS CAN HAVE A POSITIVE IMPACT ON THE HEALTH AND WELLNESS OF THESE CHILDREN.
References

1. AP Mott, Farris, Greenwood; presented at ACSM, 2002. St Louis, MO
3. Baine B, Farris JW, & others; presented at Southern District AHPERD Conference 2005
Thank you
Participant of the Ctr for Healthy Children