# Blood Pressure and Quality of Life in 9-10 year old Youth and Adults Dyad Pairs Over One Year: iCook 4-H Study

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## Objective

To determine if there is a significant association between systolic blood pressure (SBP) and perception of quality of life (PEDS Physical and Psychological QoL) changes in 9-10 y/o youth and adults after a 12-month culinary skills, family mealtime and physical activity intervention.

## Overview

One in three American youth is overweight or obese, nearly triple the rate since 1963

Obesity health problems that previously weren't seen until adulthood are high SBP, T2DM, high blood cholesterol

### Adolescent Obesity Rate

| State | 2005 | 2007 | 2009 | 2011 |
|---|---|---|---|---|
| Maine | 11% | 13% | 13% | 12% |
| Tennessee | 15% | 17% | 16% | 15% |
| South Dakota | 11% | 9% | 9% | 10% |
| Nebraska | 10% | NA | NA | 12% |
| West Virginia | 15% | 15% | 14% | 15% |

### Adult Obesity Rate

| State | 2005 | 2007 | 2010 | 2013 |
|---|---|---|---|---|
| Maine | 22% | 23.7% | 26.5% | 28.9% |
| Tennessee | 26.6% | 29% | 31.9% | 33.7% |
| South Dakota | 24% | 26.1% | 28.7% | 29.9% |
| Nebraska | 24.4% | 26.5% | 27.6% | 29.6% |
| West Virginia | 28.6% | 30.6% | 32.2% | 35.1% |

## Blood Pressure

Increasing rise in pediatric obesity coinciding with increase to 2-5% hypertension in this population

Hypertension in pediatric patients shown to persist into adulthood resulting in a significant risk factor for CVD.

Early detection could have a positive impact on reducing health risks and improving cardiovascular health.

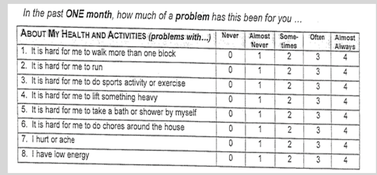
## Methods

Five states (ME, NE, SD, TN, WV) recruited and delivered 6 sessions every two weeks that focused on cooking skills, family mealtime, and increasing physical activity. During BP assessments, each child had an initial rest of 5 min with 2 min rest between measurements using a digital Omron BP machine with averages recorded. The Peds-QL tool assessed perceived QoL in children related to their functioning physically, emotionally, and socially.

For children, two linear mixed models were fit using REML estimation and assuming no within-group correlations. Both models used research subject as the random effect. Fixed effects in both models were systolic blood pressure, group, and time (with group-time interaction). Systolic blood pressure for children was standardized according to NIH guidelines for age, height, and gender. One model used PEDS Physical QoL as the response while the other used PEDS Psychological QoL. Similar models were fit for adults using raw systolic blood pressure measurements. Therefore, 4 models total were fit.

If interaction terms were not significant, they were removed and additive models were fit. If an effect was significant, post hoc Tukey tests were conducted to determine where the significance lies.

| Session | Culinary Skills | PA Skills | Nutrient Focus | Family Engagement |
|---|---|---|---|---|
| 1 | Cool Cooks Tools | Goal Setting for eating and PA | Fruits and Vegetables : More Matters | Dinner Time Talk Strategies |
| 2 | Food Safety Basics | Stretching | The Whole Story on Whole Grains | Division of Responsibilities |
| 3 | The Art of Meal Planning | Healthy Downtime | Nutritious Beverages | Family-focused mealtime with controlled use of "screen time" |
| 4 | Grocery Shopping | Know your Heart Rate | Focus on Healthy Fats | Improve family communication through daily food preparation |
| 5 | Eating Together | Active Play | Dairy Does It | Identifying games for the whole family |
| 6 | Spices and Seasoning | Building Strong Muscles | Power Protein | I love it , I like it, No thank you, Differences in taste |



*In the past **ONE month**, how much of a **problem** has this been for you ...*

| About My Health and Activities (*problems with...*) | Never | Almost Never | Some-times | Often | Almost Always |
|---|---|---|---|---|---|
| 1. It is hard for me to walk more than one block | 0 | 1 | 2 | 3 | 4 |
| 2. It is hard for me to run | 0 | 1 | 2 | 3 | 4 |
| 3. It is hard for me to do sports activity or exercise | 0 | 1 | 2 | 3 | 4 |
| 4. It is hard for me to lift something heavy | 0 | 1 | 2 | 3 | 4 |
| 5. It is hard for me to take a bath or shower by myself | 0 | 1 | 2 | 3 | 4 |
| 6. It is hard for me to do chores around the house | 0 | 1 | 2 | 3 | 4 |
| 7. I hurt or ache | 0 | 1 | 2 | 3 | 4 |
| 8. I have low energy | 0 | 1 | 2 | 3 | 4 |

## Demographics

- Family dyads (n=228)
  - (control n=78; intervention n=150)
  - 9 to 10 year old children and adult main food preparer
- 41% of dyads reported participating in government assistance programs
- Mean BMI of children was normal, adults were overweight

| Dyad | Age mean | Age sd | Bmi mean | Bmi sd |
|---|---|---|---|---|
| Child | 9.35 | 0.67 | 19.49 | 4.37 |
| Adult | 38.96 | 8.04 | 29.69 | 7.51 |

### Child Baseline Demographics

| Gender | Count | Percent |
|---|---|---|
| Male | 103 | 45.2 |
| Female | 125 | 54.8 |

| Race | Count | Percent |
|---|---|---|
| White | 143 | 67.8 |
| Black | 25 | 11.8 |
| Asian | 2 | 0.9 |
| Hispanic | 30 | 14.2 |
| Native Am | 6 | 2.8 |
| Other | 5 | 2.4 |

### Adult Baeline Demographics

| Education | Count | Percent |
|---|---|---|
| Elementary | 7 | 3.2 |
| Some HS | 3 | 1.4 |
| High School | 27 | 12.5 |
| Some College | 58 | 26.9 |
| Associates | 28 | 13.0 |
| Bachelors | 63 | 29.2 |
| Graduate | 23 | 10.6 |
| Doctoral | 7 | 3.2 |

| Assistance | Count | Percent |
|---|---|---|
| Yes | 87 | 40.8 |
| No | 126 | 59.2 |

### Child Baseline BMI Categories

| Category | Male Count | Male % | Female Count | Female % |
|---|---|---|---|---|
| Under | 6 | 50.0 | 6 | 50.0 |
| Normal | 59 | 46.1 | 69 | 53.9 |
| Over | 18 | 45.0 | 22 | 55.0 |
| Obese | 20 | 42.6 | 27 | 57.4 |

## Results

### Adult Physical QoL vs Adult SBP

| | numDF | denDF | F-value | p-value |
|---|---|---|---|---|
| (Intercept) | 1 | 293 | 3708.393 | 0.000 |
| asbp | 1 | 293 | 0.646 | 0.422 |
| time | 2 | 293 | 0.068 | 0.934 |
| group | 1 | 218 | 0.706 | 0.402 |
| time:group | 2 | 293 | 0.105 | 0.901 |

### Adult Psychological QoL vs Adult SBP

| | numDF | denDF | F-value | p-value |
|---|---|---|---|---|
| (Intercept) | 1 | 293 | 12712.991 | 0.000 |
| asbp | 1 | 293 | 0.564 | 0.453 |
| time | 2 | 293 | 2.583 | 0.077 |
| group | 1 | 218 | 2.491 | 0.116 |
| time:group | 2 | 293 | 0.623 | 0.537 |

No significant interaction, time, group, or systolic blood pressure effects for adults

### Child Physical QoL vs Child zSBP

| | numDF | denDF | F-value | p-value |
|---|---|---|---|---|
| (Intercept) | 1 | 303 | 8019.987 | 0.000 |
| zsbp | 1 | 303 | 2.386 | 0.123 |
| time | 2 | 303 | 6.686 | 0.001 |
| group | 1 | 223 | 0.158 | 0.691 |
| time:group | 2 | 303 | 0.687 | 0.504 |

| Comparison | Estimate | SE | z-value | p-value |
|---|---|---|---|---|
| post - pre | 2.886 | 1.138 | 2.537 | 0.0300 |
| 12mo - pre | 4.163 | 1.191 | 3.495 | 0.0014 |
| 12mo - post | 1.277 | 1.218 | 1.048 | 0.5461 |

### Child Psychological QoL vs Child zSBP

| | numDF | denDF | F-value | p-value |
|---|---|---|---|---|
| (Intercept) | 1 | 302 | 9933.714 | 0.000 |
| zsbp | 1 | 302 | 1.620 | 0.204 |
| time | 2 | 302 | 5.986 | 0.003 |
| group | 1 | 223 | 2.521 | 0.114 |
| time:group | 2 | 302 | 1.006 | 0.367 |

| Comparison | Estimate | SE | z-value | p-value |
|---|---|---|---|---|
| post - pre | 2.604 | 1.088 | 2.3926 | 0.0440 |
| 12mo - pre | 3.724 | 1.136 | 3.2780 | 0.0029 |
| 12mo - post | 1.120 | 1.167 | 0.9591 | 0.6026 |

No significant interaction, group, or standardized systolic blood pressure effect for either Child QoL model.

Significant time effects for both. Post QoL greater than Pre QoL, and 12 month QoL greater than Pre QoL. No significant QoL change between 12 month and Post QoLs.

## Conclusion

Analysis of linear mixed models shows time effects in children, and that perceived Physical and Psychological QoL increases with time. No associations between QoL and SBP were found. However, with a larger sample size these factors may be found to interact. Further understanding of programs collecting data that is qualitative and quantitative to understand these interactions is important.

Funding provided by Agriculture and Food Research Initiative Grant no. 2012-68001-19605 from the USDA National Institute of Food and Agriculture, Childhood Obesity Prevention: Integrated Research, Education, and Extension to Prevent Childhood Obesity, A2101 and state experiment stations.

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