BODY MASS INDEX

AS A HEALTH QUALITY INDICATOR FOR EFNEP AND SNAP-ED

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What are EFNEP and SNAP-Ed ?

- **EFNEP** : Expanded Food and Nutrition Education Program

- **SNAP-ED** : Supplemental Nutrition Assistance Program - Education

- **Target audience**
  Low-income families with young children

- **Health-related problems**
  Obesity , malnutrition, and limited physical activities

- **Lessons**
  Food safety, food saving, nutrition practices ,and diet quality

EFNEP and SNAP-Ed Evaluation

- **Evaluation/Reporting System (ERS)**
  - Family Record
  - A food practice checklist (FPC)
  - 24-hour food recall
- **Benefit Cost Analysis**
  - Based on a food practice checklist and 24-hour food recall

Problems ?

- Concern only behavior changes (eating and activity habits)

  - Assume that behavior changes will lead to physical changes which resulted in health quality

- No individual-level physical outcomes measured

  - Body mass index (BMI), blood Pressure (BP), waist circumference, waist-hip ratio , A1C, cholesterol, biomarkers, etc

Objectives

- Evaluating the accuracy of using behavior changes as an effectiveness indicator of EFNEP and SNAP-ED

- Exploring associations between shifts in BMI and changes in eating and activity habits

What is BMI ?

- Body mass index (BMI) is a measure of body fat based on height and weight*

$$BMI = \frac{weight(lb) \times 703}{(height(in))^2}$$

- **BMI Categories*:**
  - Underweight = <18.5
  - Normal weight = 18.5–24.9
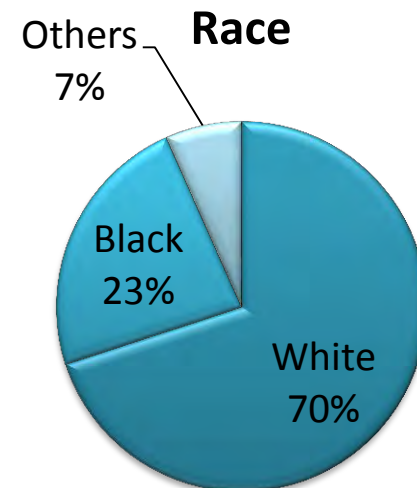 - Overweight = 25–29.9
  - Obesity = BMI of 30 or greater

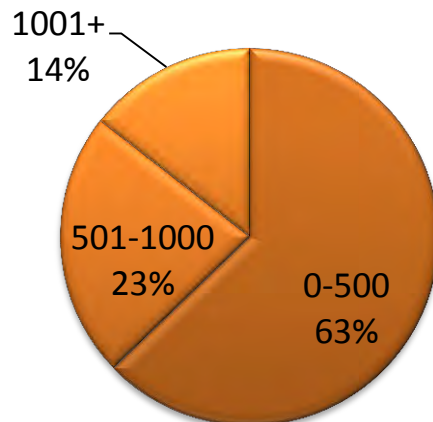*National Institutes of Health   Department of Health and Human Services*

Procedures

- Individual-level data

- 180 EFNEP and SNAP-Ed participants

- Michigan data from 2009 to 2010

- County Reporting System(CRS5)

  Demographic : household income, age, sex, race, urbanity, education and Healthy Eating Index (HEI), number of lesson, number of contact, type of lesson

- Supplemental checklist

  BMI at Entry and Exit

Results: Characteristics of Participants in Entry-Exit Sample
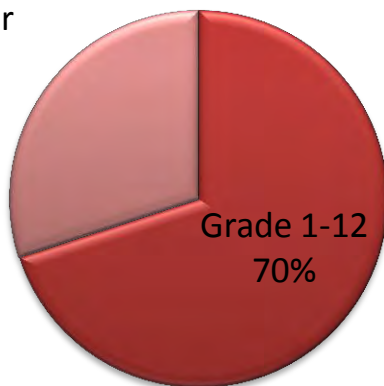
Sex

- Male 11%
- Female 89%

Age

- 61+ 7%
- 51-60 13%
- 41-50 14%
- 31-40 15%
- <=20 14%
- 21-30 37%
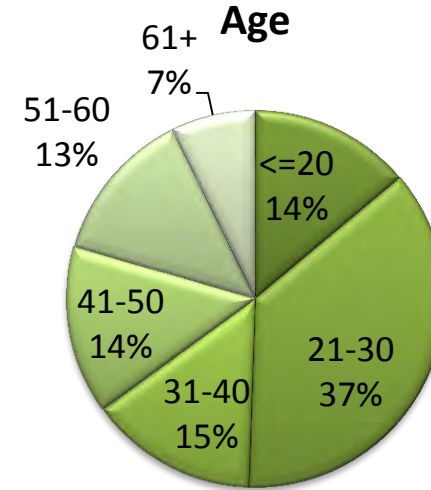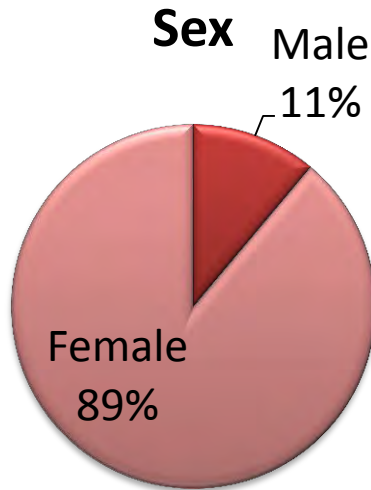
Household Income per Month per Adult

- 1001+ 14%
- 501-1000 23%
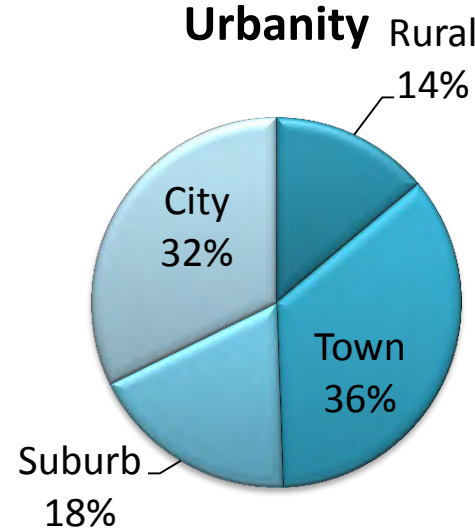- 0-500 63%

Race

- Others 7%
- Black 23%
- White 70%

Results: Characteristics of Participants in Entry-Exit Sample

Education

College or Higher 30%

Grade 1-12 70%

Urbanity

Rural 14%

City 32%

Town 36%

Suburb 18%

Entry BMI

Normal 21%

Overweight 26%

Obesity 53%
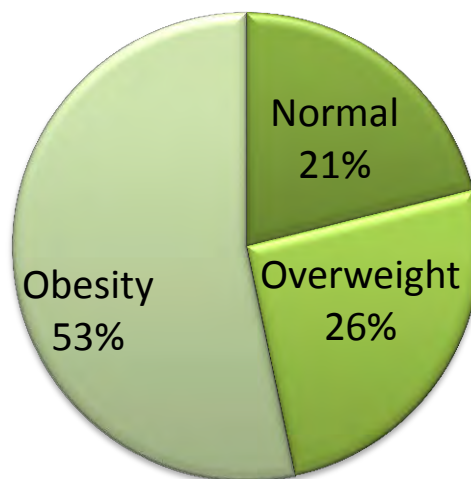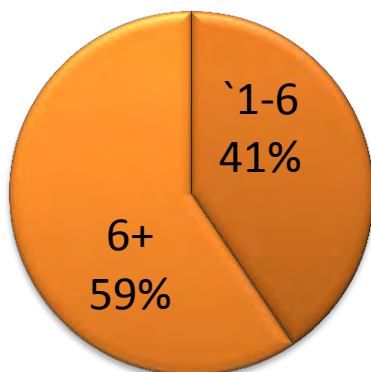
Results: **Characteristics of Participants in Entry-Exit Sample**

Number of Lesson

`1-6
41%

6+
59%

Both
10% **Type of Lesson**

Group
30%

Individual
60%

Number of Contact

6+
33%

`1-6
67%
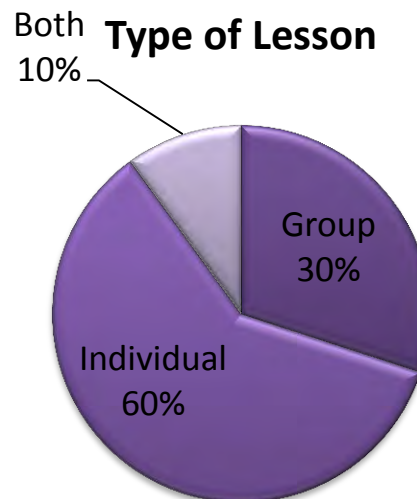
Health Eating Index Change

20+
13%

< -20
9%

`-20 - 0
29%

0- 20
49%

Results: Changes in Eating and Activity Habits

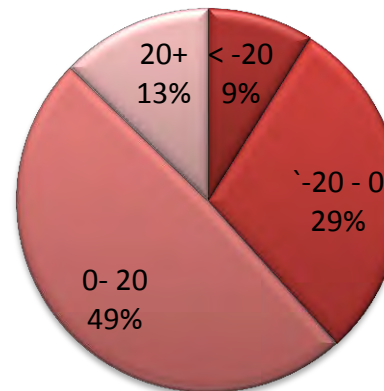| Behavior Change	Obs	Mean	Std. Dev.	Min	Max	P-value (H0:mean=0)
Change In: Food Choices	180	0.64	1.25	(4.00)	5.00	0.0000
Change In: Without Adding Salt.	180	0.26	1.53	(4.00)	4.00	0.0228
Change In: Food Labels	180	1.12	1.31	(2.00)	4.00	0.0000
Change In: Vegetables	180	0.39	1.45	(4.00)	4.00	0.0003
Change In: Fruit	180	0.15	0.99	(5.00)	4.00	0.0444
Change In: Whole Grain	180	0.03	1.57	(5.00)	5.00	0.7757
Change In: Low-fat Or Fat-free Dairy	180	0.57	1.40	(4.00)	5.00	0.0000
Change In: Daily Physically Active	180	0.71	1.38	(2.00)	5.00	0.0000
Change In: 30 M. Physically Active	180	0.40	1.46	(4.00)	4.00	0.0003
Change In: Meals From Scratch	180	0.58	1.33	(5.00)	4.00	0.0000

Results: Changes in BMI

Body Mass Index	Obs	Mean	Std. Dev.	Min	Max	P-value (H0:Mean=0)
BMI Entry	180	32.48	8.86	18.28	59.88	N/A
BMI Exit	180	32.21	8.47	18.55	59.26	N/A
BMI Change (BMI Exit - BMI Entry)	180	(0.27)	2.21	(8.38)	7.68	0.1057

Results:

ΔBMI (BMI Exit – BMI Entry) = f(Demographics, ΔHEI Score, ΔActivity habits, ΔEating habits)

Variables	Coef.	Std. Err.	t	P>t
Entry Obesity	-0.756**	0.343	-2.20	0.03
Age	-0.175***	0.063	-2.78	0.01
Age^2	0.00191***	0.001	2.71	0.01
Female	-0.4099	0.483	-0.85	0.40
Household Inocome	-0.0004	0.000	-1.48	0.14
Number of Lesson	0.0495	0.114	0.43	0.67
Individule Lesson	-0.965**	0.381	-2.53	0.01
White	0.5245	0.412	1.27	0.21
City	0.3133	0.427	0.73	0.46
Number of Contact	-0.0306	0.121	-0.25	0.80
Education	-0.1133	0.090	-1.27	0.21
HEI Change	-0.0188*	0.010	-1.94	0.05

Results:

Δ*BMI (BMI Exit – BMI Entry) = f(Demographics, ΔHEI Score , ΔActivity habits, ΔEating habits)*

Variables	Coef.	Std. Err.	t	P>t
Change in: food choices	-0.2524	0.164	-1.53	0.13
Change in: without adding salt.	-0.0498	0.100	-0.50	0.62
Change in: food labels	-0.0795	0.140	-0.57	0.57
Change in: vegetables	0.0246	0.122	0.20	0.84
Change in: fruit	0.1297	0.200	0.65	0.52
Change in: whole grain	-0.1415	0.135	-1.05	0.30
Change in: low-fat or fat-free dairy	0.0403	0.118	0.34	0.73
Change in: daily physically active	0.0885	0.130	0.68	0.50
Change in: 30 m. physically active	-0.1306	0.112	-1.16	0.25
Change in: meals from scratch	0.1142	0.143	0.80	0.43
Constant	5.421**	2.222	2.44	0.02

Conclusions

- The participants have positive changes significantly in their eating and activity habits

- BMI on average decreased by 0.27 but not significant

- The physical outcome of program is not captured by changes in eating and activity habits

Implementations

- Extend to 3, 6 and 12 months past program data set

- Benefit Cost Analysis based on BMI changes

- The future research for other physical outcome

  – Blood Pressure (BP), waist circumference, waist-hip ratio , A1C, cholesterol, biomarkers, etc.

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Limitations

- Self-Report BMI
  - EFNEP and SNAP-Ed staff are not allowed to collect BMI data of participant because it is not covered in their current job description

- Sampling Bias
  - Missing data