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Experiential Learning Interventions to Improve Fruit and Vegetable Consumption Among Head Start Preschoolers

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Introduction

The prevalence of childhood obesity is a serious concern in the United States due to its adverse effects on health, including social and psychological issues.

Statistics on obesity and overweight among US Preschoolers:

- 21.2% have overweight
- 10.4% have obesity

Asigbee FM, Curr Dev Nutr. 2020; Varman SD, Int J Environ Res Public Health. 2021; Kähkönen K, Foods. 2021

Risk Factors for Childhood Obesity

- A high intake of calorie-dense food and low physical activity.

- Inadequate intake of fruits and vegetables

Almutairi N, Int J Qual Stud Health Well-being. 2022; Taveras EM, JAMA Pediatr. 2017

Preventive Measures to Reduce Childhood Obesity

- Get children involved in **physical activities, at least 60 minutes** per day.
- **Food preferences and eating habits are established in the early stages of life and are difficult to change** once established.
- Early preferences for fruits and vegetables have been positively correlated with high intake and negatively correlated with the likelihood of childhood obesity.

Project and Study Purposes

- The **purpose of the Head Start to Healthy Lifestyles (HSHL) project is to improve dietary quality and physical activity of Head Start preschoolers and their caregivers** by exposing them to food groups and where food comes from by reading to them and as well as sharing experiences to increase their fruit and vegetable intake. Parents also received nutrition education.
- The purpose of this analysis was to **assess the extent to which parents or caregivers participating in Year 2 of the project had any improvements in their food intake or nutrition-related behaviors.**

Methods: Study Design

- A participatory study (9 months)
- 8 Head Start preschool centers in Denton and Tarrant County
- 460 preschoolers
- Pre-survey: 228 parents completed
- Post-survey: 41 parents completed

Child Interventions

- HSHL staff **read MyPlate Food Group Books to preschoolers (4 x/month).**

- **Tasting activities** in the classrooms.

- Tarrant Area Food Bank **provided classroom gardening lessons: Grow It! Try It! Like It! (6x/year)**

Family Interventions

- Received home garden, soil, seeds, and newsletters about the plants and recipes twice per school year.
- Access to **Kitchen Garden Cooking School for Families**
  - Google site; asynchronous online course with lessons on:
    - Specific fruit or vegetable that can grow in Texas, with three recipes.
    - Nutritional benefits of the selected fruits and vegetables
  - Spending money wisely on cheap but quality food
  - Cooking skills demonstrations
- Access to social media, text messages

Survey Tool and Statistical Analysis

- UT Health created questions on fruit/vegetable intake, sugar-sweetened beverage intake, milk intake, and other dietary components of both parents and children
- McNemar and Wilcoxon tests were used to analyze the differences between pre- and post-intervention data. (n=41 matched pairs)
- SPSS used.

Results: Demographics

- Caregivers were mainly female (95%) aged 18-59 years and most of the children aged 0-4 years (65%).
- More than half of caregivers were Hispanic (53%).
- 14% had four-year college degree; 34% had some college; 29.3% had high school or GED; 9.8% had less than high school.

Table 1. Changes in Healthy Eating, and Nutrition-Related Behaviors among Head Start Children (n = 41)

		Negative Ranks			Positive Ranks			Test Statistics	
	n	Mean rank	Sum of rank	n	Mean rank	Sum of rank	Ties	Z	p-value
Eating/Intake Behavior									
Ate more than 1 Fruit	1	4	4	7	4.57	32	31	-2.111	**0.035**
Ate more than 1 Vegetable	8	8.88	71	9	9.11	82	23	-0.275	0.783
Drinking Sugar Sweeten Beverage	8	9.56	76.5	9	8.5	76.5	22	0	1
Type of Milk Use	13	9.58	124.5	5	9.3	46.5	22	-1.801	0.072
Eating Dessert	9	8.5	76.5	9	10.5	94.5	22	-0.428	0.669
Type of Fruit	8	9.88	79	11	10.09	111	21	-0.677	0.498
Drank 100% Fruit juice	18	11	198	4	13.75	55	18	-2.6	**0.009**
Orange Vegetable	9	12.78	115	14	11.5	161	17	-0.784	0.433
Green Vegetable Salad	5	6.7	33.5	7	6.36	44.5	27	-0.462	0.644
Starchy Vegetable	9	11.11	100	10	9	90	20	-0.22	0.826
Other Vegetables	7	8.29	58	11	10.27	113	21	-1.256	0.209
Caregiver Used MyPlate to Plan Child's Meals	5	9.4	47	20	13.9	278	13	-3.193	**0.001**

- **Fruit and 100% fruit juice intake** increased for children.
- Caregivers reported using MyPlate to plan their children's meals.
- No changes were found in other variables.

Changes in Caregivers Healthy Eating and Nutrition-Related Behaviors

- Days caregivers ate fruit increased (p=0.044)
- Caregivers reported increased use of MyPlate to plan their meals (p<0.001)
- Caregivers increased use of food label (P=0.002)
- Using grocery lists had borderline significance (p=0.052)

Null Findings:

- No improvements in other healthy eating habits among parents.

Table C. Changes in Healthy Eating, Nutrition Related, and Physical Activity (PA) and Sedentary Behaviors among Head Start parents/caregivers (n = 41)

	Negative Ranks			Positive Ranks			Test Statistics		
	n	Mean rank	Sum of rank	*n*	Mean rank	Sum of rank	Ties	Z	*p-value*
Eating Intake/Behaviors									
Ate more than 1 Fruit	8	10.50	84.00	12	10.50	126.00	20	-.827[b]	.408
Ate more than 1 Vegetable	7	8.64	60.50	9	8.39	75.50	24	-.421[b]	.674
Quantity Fruit Eaten	6	14.08	84.50	18	11.97	215.50	17	-1.911[b]	.056
Number of Days Fruit Eaten	8	12.25	98.00	18	14.06	253.00	14	-2.016[b]	.044
Quantity of Vegetables Eaten	10	15.45	154.50	18	13.97	251.50	13	-1.119[b]	.263
Number of Days Vegetables Eaten	14	18.00	252.00	17	14.35	244.00	10	-.080[c]	.936

	Negative Ranks			Positive Ranks			Test Statistics		
	n	Mean rank	Sum of rank	*n*	Mean rank	Sum of rank	Ties	Z	*p*
Food Resource Use									
Use My Plate	3	9.29	65.00	20	15.65	313.50	14	-3.422[b]	<.001
Read food label	7	7.29	51.00	11	10.91	120.00	12	-3.025[b]	.002
Compare unit price	8	14.06	112.50	17	12.50	212.50	15	-1.377[b]	.168
Use grocery lists	4	15.50	62.00	17	9.94	169.00	20	-1.947[b]	.052

	Negative Ranks			Positive Ranks			Test Statistics		
	n	Mean rank	Sum of rank	*n*	Mean rank	Sum of rank	Ties	Z	*p*
PA and Sedentary Behavior									
PA Days	20	19.73	394.50	18	19.25	346.50	3	-.351[c]	.725
PA Walking Time	11	15.95	175.50	19	15.24	289.50	11	-1.210[b]	.226

Discussion

- In the second year of the HSHL grant, we **made progress in implementing health promotion activities** to help Head Start families to establish healthy eating behaviors.
- Getting **caregivers to participate and to complete both pre- and post surveys was challenging**; just 41 caregivers of 460 Head Start preschoolers completed both pre-and post-surveys
- Although there were **no differences in intake of vegetables and no decreased intake of sugar-sweetened beverages,** findings suggest that experiential learning may be a promising strategy to enhance fruit and vegetable intake among Head Start preschoolers to improve health outcomes.

Strengths and Limitations of HSHL Project

Strengths

- Implemented evidence-based nutrition curricula in classroom setting to children once a week for 9 months.
- Provided newsletters on fruits and vegetables, as well as gardens and seeds.
- Families accessed study materials on project website at their convenience.

Limitations

- Lack of on-site interaction with parents.
- Parents who are not inclined in technology may not be able to participate.

References

1. Asigbee FM, Davis JN, Markowitz AK, et al. The association between child cooking involvement in food preparation and fruit and vegetable intake in a Hispanic youth population. *Curr Dev Nutr.* 2020;4(4):nzaa028. doi: 10.1093/cdn/nzaa028.

2. Varman SD, Cliff DP, Jones RA, et al. Experiential learning interventions and healthy eating outcomes in children: A systematic literature review. *Int J Environ Res Public Health.* 2021;18(20):10824. doi: 10.3390/ijerph182010824.

3. Taveras EM, Gortmaker SL, Hohman KH, et al. Randomized controlled trial to improve primary care to prevent and manage childhood obesity: the High Five for Kids Study. *Arch Pediatr Adolesc Med.* 2011;165(8):714-22. doi: 10.1001/archpediatrics.2011.44.

4. Ling J, Chen S, Zahry NR, Kao TA. Economic burden of childhood overweight and obesity: A systematic review and meta-analysis. *Obes Rev.* 2023;24(2):e13535. doi: 10.1111/obr.13535.

5. Taghizadeh S, Hashemi MG, Zarnag RK, et al. Barriers and facilitators of childhood obesity prevention policies: A systematic review and meta-synthesis. *Front Pediatr.* 2023;10:1054133. doi: 10.3389/fped.2022.1054133.

6. Kim HS, Park J, Park KY, Lee MN, Ham OK. Parent involvement intervention in developing weight management skills for both parents and overweight/obese children. *Asian Nurs Res* (Korean Soc Nurs Sci). 2016;10(1):11-7. doi: 10.1016/j.anr.2015.07.006.

7. Almutairi N, Burns S, Portsmouth L. Barriers and enablers to the implementation of school-based obesity prevention strategies in Jeddah, KSA. *Int J Qual Stud Health Well-being*. 2022;17(1):2135197. doi: 10.1080/17482631.2022.2135197.

8. Taveras EM, Marshall R, Sharifi M, et al. Comparative effectiveness of clinical-community childhood obesity interventions: A randomized clinical trial. *JAMA Pediatr.* 2017;171(8):e171325. doi: 10.1001/jamapediatrics.2017.1325.