



Fruit and Vegetable Intake, Intention, and Healthy Food Choice Self-Efficacy among EFNEP Youth in Guam



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Introduction

Children on Guam are not meeting the fruit and vegetable (FV) intake recommendations outlined in the USDA Dietary Guidelines.¹ Low consumption of FV can lead to unhealthy eating habits and childhood overweight and obesity.² Compared to the U.S., Guam has higher rates of childhood overweight and obesity.^{1,3} Improving healthy eating behaviors is complex and nutrition education is one of the effective components.² The USDA's Expanded Food and Nutrition Education Program (EFNEP) uses local resources and educators to reach low-income families and youth throughout the U.S., including Guam.

Guam EFNEP implements the Health Kids Club (HKC) curriculum that has six (6) lessons and applies the Experiential Learning Model used in 4-H youth development programs.^{4,5} Therefore, the constructs of the Social Cognitive Theory grounded in observational learning, reinforcement, self-control, and self-efficacy is the framework to evaluate this study's objective.⁶

Objectives

The objective of this cross-sectional study is to examine the effectiveness of the HKC curriculum on fruit and vegetable intake and dietary behaviors among the EFNEP youth participants in Guam.

Methods

The EFNEP youth participants in this study included 3rd-5th grade students that received the Health Kids Club curriculum during 2014-2016 and 2016-2018. Fruit and vegetable (FV) intake, intention, and healthy food choice self-efficacy (HFCSE) was measured at baseline/pre- and post-education using the same survey respective to each study period. For years 2014-2016, youth completed the *3rd-5th Grade Nutrition Education Survey* that had 14 questions and used a three- and four-point Likert scale. For years 2016-2018, youth participants completed the *3rd-5th Grade EFNEP Pre-Post Survey* which also consisted of 14 questions and responses were reported on a four- and five-point Likert scale.

Select questions from each survey were used for analysis in this study to describe and compare (pre-post) FV intake, FV intention, and healthy food choice self-efficacy outlined in **Table 1**.

Responses were self-reported by youth with instructions and guidance provided by trained EFNEP educators and/or teacher, if applicable. Only participants that completed both the pre- and post-survey were included in this study's analysis.

Statistical analyses were completed using Microsoft® Excel (version 16.49) and included paired sample *t* tests and Wilcoxon signed-rank test. Difference in FV intake, intentions, and healthy food choice self-efficacy were statistically significant if $P < 0.05$.

Table 1. Selected questions in the EFNEP 3rd-5th Grade Surveys used to evaluate outcomes for this study during two study periods 2014-2016 and 2016-2018.

Study Outcome	3 rd -5 th Grade Nutrition Education Survey Questions ¹ (2014-2016)	3 rd -5 th Grade EFNEP Pre-Post Survey Questions ² (2016-2018)
FV Intake	I eat vegetables.	In the past week, I ate vegetables. In the past week, I ate vegetables as a snack.
	I eat fruit.	In the past week, I ate fruit as a snack. In the past week, I ate vegetables as lunch.
FV Intention	Will you ask your family to buy your favorite fruit or vegetable?	I wash fruits and vegetables before I eat them.
	Will you ask your family to have fruits in a place like the refrigerator or a bowl on the table where you can reach them?	
	Will you ask your family to have cut-up vegetables in the refrigerator where you can reach them?	
HFCSE	I choose healthy snacks.	When I'm offered a new food, I will try it.
	Will you ask your family to buy non-fat or 1% milk instead of regular whole milk?	I read Nutrition Facts labels.

¹Survey questions and format used for EFNEP data collection from 2014-2016

²Survey questions and format were updated in 2018 and used for data collection from 2018 to present

Results

The total number of youth who participated in EFNEP were 994 and 1,575 during 2014-2016 and 2016-2018, respectively. Majority of the participants were males (54%) and Asian and/or Native Hawaiian or Other Pacific Islander, which reflects the demographics of Guam. The distribution of third (30%), fourth (21%), fifth (27%) graders and unspecified (22%) were similar in both study periods.

For this analysis, only youth with pre- and post-survey responses were included, which were 775 in 2014-2016 and 938 in 2016-2018; therefore, reflecting graduation rates of 78.0% and 59.6%, respectively. Youth reported a higher post-score for all behavior categories in both study periods and all were statistically significant (**Table 2**). In 2016-2018, statistically significant median increase in FV intention score, $z = 2.27$, $p = 0.023$.

Table 2. Youth, 3rd to 5th grade, in Guam improved fruit and vegetable (FV) intake and intentions and healthy food choice self-efficacy (HFCSE) after completing EFNEP (Health Kids Club curriculum).

Study Outcome	2014-2016 ^a (n=775)						2016-2018 ^b (n=938)					
	Pre-Test		Post-Test		Mean Difference		Pre-Test		Post-Test		Mean Difference	
	Mean	SD	Mean	SD		SD	Mean	SD	Mean	SD		SD
FV Intake	5.80	1.38	6.25	1.44	0.45***	1.38	12.03	2.33	12.23	2.48	0.20**	2.33
FV Intention	7.53	1.56	7.71	1.43	0.18***	1.14	3.58	0.85	3.66	0.77	0.08**	0.94
HFCSE	4.64	1.29	5.19	1.31	0.55***	1.43	5.89	1.27	6.26	1.56	0.37**	1.27

^a3rd-5th Grade Nutrition Education Survey; ^b3rd-5th Grade EFNEP Pre-Post Survey; ***Significant at $P < 0.001$;

**Significant at $P \leq 0.01$

Discussion

The results in this study support the hands-on approach involving the Experiential Learning Model – experience, share, process, generalize, and apply, implemented with the Health Kids Club curriculum. The Health Kids Club curriculum was developed in Hawaii with a population that is similar to Guam that is mostly Asian and/or Native or Other Pacific Islander. This suggests that a curriculum that is designed by and practice-tested with people from the community and of the same ethnic background can be effective at improving diet behaviors.

This study is not without limitations as there was no comparison or control group, which warrants future research to examine and compare different curricula. Without dietary assessment and only a few diet behavior questions assessed the intended outcome may not have been truly captured. Food behaviors are influenced by multiple sectors of the Social Ecological Model that were not assessed here.

This is the first study to demonstrate significant positive diet behavior change from nutrition education among youth in Guam. Upon completion of the EFNEP program, youth reported a higher FV intake, intention, and healthy food choice self-efficacy and these findings support community-based youth nutrition education is an effective component for diet intervention in low-income families. Research is needed to demonstrate behavior change maintenance and identify effective leverage points to sustain healthy behaviors.

Conclusion

Guam EFNEP youth curriculum is effective in improving youth's, 3rd to 5th grade, fruit and vegetable intake and intention and healthy food choice self-efficacy as evaluated by nutrition education surveys used.

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