Teaching Food Safety to Children: An After School-Based Program

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One opportunity to provide food safety education to children is in before- and after-school settings. The Food and Fitness Fun Education Program© (FFFEP) was developed by a nutrition professional for a non-profit, multi-site, before- and after-school program in predominately Hispanic, low-income areas of Los Angeles County.

The FFFEP was evaluated over a three year period, with pre- and post-testing to determine change in food safety knowledge in each session. The total usable sample size was 1,810. Paired t-tests were performed to compare food safety knowledge at the beginning and end of the curriculum. In all cases, the post-test score was significantly higher than the pre-test score. Therefore, based on the research findings, FFFEP was successful at increasing food safety knowledge in children.

Background and Introduction

The reduction of foodborne illness in all populations is a priority of Healthy People 2010 (Dharod, Perez-Escamilla, Bermudez-Millan, Segura-Perez, Damio, 2004), and is a concern addressed in this paper. Researchers suggest that foodborne illness is caused by inappropriate food handling, on the part of the consumer, in about one-quarter of all cases (Dharod, et al., 2007). Furthermore, inadequate food safety behaviors are higher among individuals with low levels of education and among Hispanics (when compared to Whites) (Cody & Hogue, 2003; Dharod, et al., 2007). This is an issue of concern, as the Hispanic population in America is growing, and is predicted to be 63 million by the year 2030 (Cody & Hogue, 2003; Dharod, et al., 2007). California, a state with one of the largest Hispanic populations, therefore, faces an even greater challenge.

While much research has been done on the topic of foodborne illness, research on children is almost non-existent. One published study, conducted in the United Kingdom, found that children ages 4-7 exhibited good knowledge of hand washing (Eves, Bielby, Egan & Lumbers, 2006). Similar results were found in the 7-11 and 11-14 age groups, as well.

The CDC reports that poor personal hygiene is one of the five most common causes of foodborne disease outbreaks (Allwood, Jenkins, Paulus, Johnson & Hedberg, 2004). Frequent and thorough hand washing is an important part of good hygiene (Bermudez-Millan, Perez-Escamilla, Damio, Gonzalez & Segura-Perez, 2004). In addition, researchers have reported that behaviors related to keeping foods at safe temperatures, including the proper storage of cold food products can also lead to an increase in food safety (Bermudez-Millan, et al,, 2004).

Several programs, including Fight BAC! (2007) (Fight Bacteria), Home Food Safety…It's in Your Hands (HFSYH), and Germ City are currently addressing food safety issues in all populations. The Fight BAC! Campaign is based on key practices: CLEAN – wash hands and surfaces often, SEPARATE – don't cross-contaminate, COOK - to proper temperatures, and CHILL – refrigerate promptly.

The Food and Fitness Fun Education Program© (FFFEP)

Before- and after-school settings offer excellent opportunities for intervention given the frequent occurrence of sedentary behavior and between meal snacking that typically occurs. These settings are uniquely situated to embed health promotion and prevention programs within a structure that is viewed as fun, accessible, and safe. The FFFEP was developed by a nutrition professional for a non-profit, multi-site, before- and after-school program in predominately Hispanic, low-income areas of Los Angeles County.

The FFFEP curriculum was designed to develop and improve environments and behaviors that facilitate the importance of food safety, healthy eating, choosing nutritious foods, and participating in regular physical activity. Each trained educator instructed a group of 12-14 children in sessions from 30 minutes (Kindergartners and 1st graders) to 60 minutes (2nd -5th graders and 6th – 8th grade). Thirty minute physical activity lessons were conducted for all children.

The healthy eating behaviors lessons (the focus of this paper) consisted of using Glo Germ™ (2008) to teach proper hand-washing. A separate lesson focused on the importance of keeping cold foods cold. Children were first asked about germs and when they washed their hands. A small amount of Glo Germ™ (2008) was placed in the child's hands which they rubbed in similar to hand lotion and they were then sent to the restroom to wash their hands (without instruction). When they returned, the black light was again placed over their hands and the children could see the efforts of their hand-washing. In the second lesson, Keeping Cold Foods Cold, the emphasis was

placed on returning juice and milk to the refrigerator after pouring a glass. The activity for this lesson was a basic science experiment where children could see "germs" multiply before their eyes. Using water (hot/cold), yeast, and sugar, ingredients were placed into Erlenmeyer flasks and a balloon placed on top. The flask was placed in either a hot or cold water bath. The children would observe what was taking place inside the flask as well as watching the balloons.

Methods

The FFFEP was evaluated over a three year period, with pre- and post-testing to determine change in food safety knowledge. The total usable sample size was 1,810. Specifically, children were asked "When do you wash your hands?" After the pre-test, during the lesson, children were taught five conditions in which they needed to wash their hands: after using the bathroom, before eating, after playing outside, after playing with pets or animals, and after sneezing or coughing. Children were next asked "How long should you wash your hands?" A correct answer was recorded when the student answered 20 seconds, or the ABC song. And, finally, children were asked "Why do you put the milk/juice in the refrigerator after you pour a glass?" A correct answer was recorded when children eluded to the fact that the milk/juice would spoil, become rotten, get "icky", or grow germs. Data, including demographic information, were recorded into SPSS for analysis.

Results

Demographic results of the 1,810 respondents showed that 51% were girls. In terms of ethnicity, 72% were Latino, 9% were Caucasian, 4% were African-American, 12% were Asian and 3% were other. Eighty-eight percent of respondents were grades K-5. Paired t-test results indicated significant (at p=.000) increases in post-test scores in all cases (Table 1). The FFFEP was successful in increasing the food safety knowledge, as measured by hand washing identification and keeping cold foods cold.

Discussion, Implications, and Recommendations

Based on the research findings, FFFEP was successful at addressing food safety in children. In the case of hand washing, children showed an improvement in pre- vs. post-test knowledge, identifying conditions in which hands needed to be washed, as well as, the appropriate length of time hands needed to be washed. Additionally, children showed an improvement in the knowledge of keeping cold foods cold. These results are encouraging, especially among children in this study, a majority of who represent minority populations. The FFFEP could and should be incorporated into other before- and after-school programs. It is a unique and successful program that specifically includes the promotion of food safety education for children. Recommendations include: 1) adding some hands-on exercises and role-playing; 2) carrying out the hand washing when faced with one of the five conditions; 3) adding an observation component; and 4) measuring long term knowledge retention (post-testing again at a later date).

Table 1. Paired t-test results

Variable	Mean	S.D.	t	sig.
How long should you wash your hands?				
Pre-test correct answer	.3147	.6072		
			-22.850	.000*
Post-test correct answer	.9099	.9192		
When do you wash your hands?				
After using the bathroom				
Pre-test correct answer	.2941	.4558		
			-7.699	.000*
Post-test correct answer	.4194	.4967		
Before eating				
Pre-test correct answer	.6516	.4766		
			-7.446	.000*
Post-test correct answer	.7678	.4260		
After playing outside				
Pre-test correct answer	.1963	.3973		
			-12.539	.000*
Post-test correct answer	.3957	.4891		
After playing with pets/animals				
Pre-test correct answer	.0543	.2266		
			-13.960	.000*
Post-test correct answer	.2209	.4150		
After sneezing or coughing				
Pre-test correct answer	.0489	.2158		
			-9.391	.000*
Post-test correct answer	.1453	.3546		
Combined total of all 5 conditions				
Pre-test total # identified	1.25	.9322		
			-18.623	.000*
Post-test total # identified	1.95	1.2935		
Why do you put the milk/juice back in the refrigerator after you pour a glass?				
Pre-test correct answer	.5960	.4908		
			-8.905	.000*
Post-test correct answer	.7307	.4437		

*significant at $p \leq .05$

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[1,2]Endnotes

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