Evaluation of Food Safety Education Program for Low Socioeconomic Families with Young Children

Han Chen[1], Leah Klinestiver[2], Juan Archila[1], Yaohua Feng Ph.D.[1]
1. Department of Food Science, Purdue University; 2. Department of Public Health, Purdue University

Introduction

Foodborne illness, as a major public health concern, can be caused by improper food handling practices at consumers' home kitchens. Consumers with low socioeconomic status are more likely to engage in unhealthy behaviors compared to those with high socioeconomic status[1]. Thus, consumers at low socioeconomic status tend to have decreased health condition[2] and can be more susceptible to foodborne illnesses. Young children, with immature immune systems, are at a higher risk of contracting a foodborne illness and suffering more severe symptoms. Therefore, there is an urgent need to develop effective food safety educational programs for the primary food handlers of low socioeconomic families with young children.

Objectives

To develop and evaluate the effectiveness of a dialogue-based virtual food safety educational program for primary food handlers of low socioeconomic families with young children using the Theory of Planned Behavior model.

Methods

The educational program was composed of two weekly 1-hour virtual course sessions, two in-class activities, and two take-home tasks. All learning materials were developed based on four major topics: Clean, Separate, Cook, and Chill. The effectiveness of the program was measured by the pre- and post-survey.

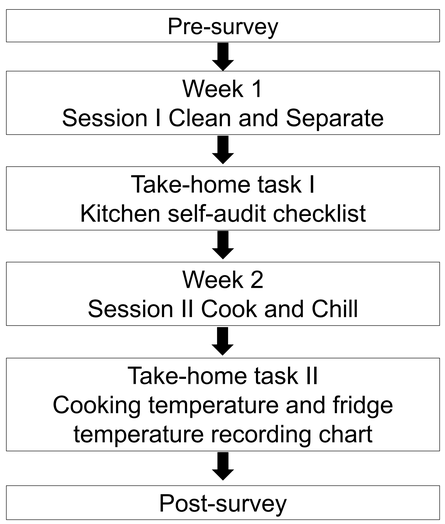

Figure 1. Study Procedure

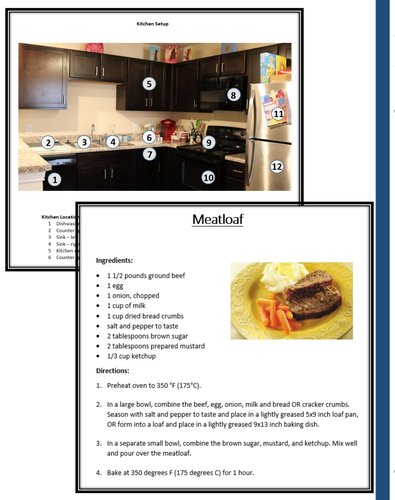

Figure 2. Examples of In-Class Cooking Activities

Results

Demographic Characteristics

A total of 30 primary home food handlers participated in the virtual food safety education program. Most participants were female, aged 25-54, had bachelor's degree or less, and had less than $50,000 annual household income. Over eighty percent of the participants had 1-3 children (<10 years old) and prepared meals at home nearly all the time.

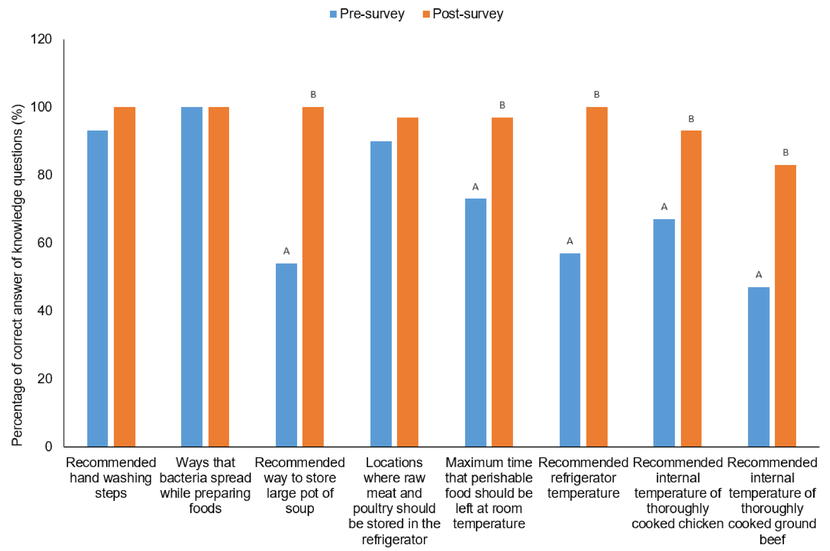

Figure 3. Correct response rate of knowledge questions before and after the education program. Capital letters (A,B) show significant difference between pre- and post-survey at significant level of 0.05. Prior to the program, less than 60% of participants knew about recommended soup storage practice, recommended refrigerator temperature, and recommended internal cooking temperature of ground beef. Knowledge questions with less than 80% correct response rate were all improved significantly after the program.

Table 1. The percentage of self-audited cooking temperature lower than recommended cooking temperature. Most meat cooking temperatures reported complied with the recommended cooking temperatures except poultry and fish products.

Meat Types	Lower than recommended temperature % (number of items with lower temperature / total number of items reported)
Poultry (165ºF)	19% (4/21)
Fish (145ºF)	33% (1/3)
Ground Meat (160ºF)	0 (0/24)
Beef Steak (145ºF)	0 (0/5)
Pork (145ºF)	0 (0/6)

Table 2. The percentage of self-audited fridge temperatures higher than recommended temperature (40ºF for refrigerator and 0ºF for freeze) (n=30).

Section of the Refrigerator	Higher than recommended temperature % (N)
Door	40%(12)
Top Shelf	33% (10)
Bottom Shelf	30% (9)
Freezer	67% (20)

- The temperatures of different refrigerator sections reported by many participants were higher than 40ºF.
- Over 60% of the participants' freezer temperatures were higher than 0ºF

Table 3. Overall measurements of knowledge, Theory of Planned Behavior constructs, behavior change intention, and self-reported behavior before and after the intervention.

	Pre-Survey (Mean ± SD)	Post-Survey (Mean ± SD)	P value (Paired Samples T Test)
Knowledge	5.80 ± 1.32	7.70 ± 0.75	<0.001
Attitude	30.50 ± 2.61	33.03 ± 1.75	<0.001
Perceived behavior control	31.67 ± 2.45	34.47 ± 1.31	<0.001
Subjective norm	31.90 ± 4.59	35.10 ± 4.21	<0.001
Behavior change intention	27.73 ± 1.74	29.67 ± 0.84	<0.001
Self-reported behavior	25.80 ± 4.44	30.17 ± 4.07	<0.001

- After the education program, participants' knowledge, attitude, perceived behavior control, subjective norm, behavior change intention, and self-reported behavior were all increased significantly at the significant level of 0.05

Common Issues Regarding Virtual Program

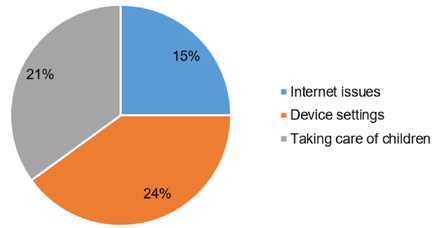

Figure 4.Three major issues related to virtual program delivery were identified. Over 20% of the 33 sessions delivered were interrupted due to participants' device settings or participants' responsibility to taking care of their children, and 15% of the sessions were interrupted by the internet issues.

Participants' Feedback

- Participants highly agreed that their expectations of this program were met.
- Participants would recommend this program to their family and friends.
- Participants agreed that this program provided significant impact on their food handling practices.

Significance

The COVID-19 pandemic changed the way how food safety education being delivered. The findings of this study showed that virtual food safety education can be effective in increasing knowledge and promoting behavior change. Low socioeconomic families and other groups in need can benefit from such virtual programs.

References

1. Denney, J. T., Krueger, P. M., & Pampel, F. C. (2014). Socioeconomic status and health behaviors. *The Wiley Blackwell Encyclopedia of Health, Illness, Behavior, and Society*, 2223-2227.
2. Stringhini, S., Carmeli, C., Jokela, M., Avendaño, M., Muennig, P., Guida, F., ... & Tumino, R. (2017). Socioeconomic status and the 25× 25 risk factors as determinants of premature mortality: a multicohort study and meta-analysis of 1· 7 million men and women. *The Lancet*, *389*(10075), 1229-1237.

Acknowledgement

We thanks all the collaborating extension agencies and organizations for recruiting the study participants. This material is supported partially by the National Institute of Food and Agriculture, U.S. Department of Agriculture.