

**Effectiveness of Cooking with
Cadets: A 16-week cooking
intervention for OSU Air Force &
Army ROTC cadets**

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Wentz Research Project 2021-2022

Oklahoma State University

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SUMMARY:**Background & Objective**

The occurrence of overweight is not only steadily increasing for United States (US) civilians, but it is also growing for US military personnel. For example, 69% of people in the general population of the US are overweight or obese.¹ In comparison, 51.4% of US military personnel are overweight or obese.² Among the general population of civilians, a solution is needed, but one is also needed for the military, as a matter of national security.

One far reaching solution that is also considered primary prevention would be university ROTC programs. ROTC is a program that allows college students to graduate and commission into the military as officers. According to ROTC leaders, about 75% of officers in the military were commissioned through a university ROTC program. After ROTC cadets graduate, they will become officers and leaders within the military. One responsibility they will have initially is being a leader to at least 50 Soldiers. Soldiers will regularly approach their commanding officer for advice on all topics, including weight management, nutrition, and health. However, these officers are not formally trained in providing such guidance to their Soldiers, which could have negative health and performance implications for the Soldier and the greater military.

Considering that cadets immediately take on leadership roles with a far reach, ROTC could be a big impact solution to the weight concerns of the military, but are they interested? Cadets and their instructors are very interested in such classes though. According to focus group data from my current Wentz project, cadets and instructors ranked nutrition as 4.8/5 and 5/5, respectively, for interest in nutrition classes and 4.3/5 and 5/5, respectively, for importance of nutrition classes to their future military career. They are particularly interested in cooking

classes. Cadets and instructors have informed the research team one area of concern is the low food literacy of cadets, which is different from low nutrition knowledge. Food literacy looks more at food skills, in addition to applying nutrition knowledge in food preparation.³ Thus, the purpose of this Wentz project was to determine the effectiveness of Cooking with Cadets, a 16-week cooking intervention for OSU Air Force & Army ROTC cadets.

Methods

The design of this study was quasi-experimental with one delayed pre/post assessment. Inclusion criteria was that participants must be OSU ROTC Army and Air Force Cadets. Participants were recruited via a convenience sample. This was done by sending out a flyer to each individual cadet and also having cadre (ROTC professors) advertise the program. The delayed pre/post survey was done through Qualtrics at the end of the 16-week program. Nutrition, cooking, and food safety knowledge, skills, and confidence were assessed through a 5-point Likert scale, with 1=no/none and 5=lots/very. In addition, changes in dietary habits were assessed through a modified food frequency questionnaire created to assess elements of the Healthy Eating Index (HEI) 2015 for dietary quality.^{4,5} Participants were asked to rate amount of different types of foods consumed by choosing how many times they ate the food item per day, with 0=none and 10=10 times. Descriptive statistics were used to analyze results. Mean, standard deviation, frequency, proportion, and mean difference were calculated in order to see how participants changed after participating in the program.

Results

It is important to note most survey participants (86%) only attended 5-8 classes. Nutrition, cooking, and food safety knowledge, skills, and confidence improved 1-2 points out of

5 (32-88%). Dietary habits improved such that healthier foods were consumed 0.3-1.1 times more often per day and moderation foods were consumed 0.1-0.9 times less often per day. For example, participants consumed 60% less of fried or breaded vegetables, 13% less refined grains, 33% less sweets and sweetened beverages, 9.1% high-fat/ breaded/ processed meats, and 35% less unhealthy fats after attending this program.

Discussion

Since Cooking for Cadets results in nutrition knowledge and food literacy improvements of ROTC cadets, this new program, as well as the nutrition education program developed and assessed as part of my previous Freshman Research Scholar and current Wentz Research Scholar projects, will alternate each year to add variety to programming and to improve nutrition knowledge and food literacy of ROTC Cadets.

This model of collaboration between ROTC programs and university nutrition departments has shown to be successful at OSU, and it could have a wide-reaching impact if disseminated broadly. Looking at the downstream impact, attendees could pass on valid and truly healthy nutrition information to their 50-100 soldiers, which may improve diets and subsequently decrease overweight and obesity, increase fitness, decrease potential for chronic diseases, and decrease injuries to Soldiers. This programming would also add to the military's goal of building a health-supportive environment by making good nutrition more normal and acceptable to Soldiers. For the larger military, this program could improve health and as a result improve the performance of our armed forces, as well as decrease medical spending. In the end, this project lays the ground work to improve the nutrition of not just one future Soldier, but potentially hundreds and thousands of Soldiers over their upcoming career.

Conclusions

Cooking with Cadets is a very effective program in improving nutrition, cooking, and food safety knowledge, skills, and confidence, as well as dietary habits and quality of ROTC cadets. This program is classified as primary preventative healthcare because ROTC is the earliest point in an officer's career that an intervention program can be placed before they enter service. Some limitations to this study are the small sample size ($n=7$), quasi-experimental study design, and interruptions of the program due to weather (3 missed sessions). Future researchers should look at different ways of recruiting participants, as cadets have busy schedules between school, ROTC, and possibly work, and also look at effectiveness of these nutrition education programs on a larger scale.

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4. Yuen EYN, Thomson M, Gardiner H. Measuring nutrition and food literacy in adults: a systematic review and appraisal of existing measurement tools. Health Literacy Research and Practice. 2018;2(3):e134-e160.
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APPENDICES:

- **Waiver**
- **Poster**
- **Results Table**
- **Recruiting Flyer**
- **Sample Schedule of Classes**

**OKLAHOMA STATE UNIVERSITY SYSTEM
ACADEMIC/TECHNICAL/PROFESSIONAL VOLUNTEER GUIDELINES**

As a public institution, the University is often in need of volunteer services and often approached by individuals who are interested in volunteering within laboratories and other research facilities. To ensure compliance with federal statutes (DOL) governing employment and volunteerism, the following guidance is provided. Although this guidance may be useful for regular and sporadic volunteerism (i.e., conference assistance, move-in day and other event volunteerism), this form is intended for use with volunteers who provide assistance within research facilities and other academic, technical, or professional endeavors which occur on a more scheduled and consistent basis. This form is not required for sporadic volunteerism. In these cases, the supervisor or unit administrator should indicate by Y (yes) or N (no) in the spaces provided under the following questions.

1. Is the entity that will benefit/receive services from the volunteer a nonprofit organization? ____
Y
2. Is the activity less than a full-time occupation? ____ Y
3. Are the services offered freely and without pressure or coercion? ____ Y
4. Are the services of the kind typically associated with volunteer work? ____ Y
5. Have regular employees been displaced to accommodate the volunteer? ____ N
6. Does the volunteer receive (or expect) any benefit, including future employment, from the entity to which it is providing services? ____ N

If the answers to questions 1-4 are yes and questions 5-6 are no, the person is a volunteer. If not, the person will not qualify as a volunteer and may not volunteer services. If you have questions, please contact OSU Human Resources at (405) 7447401. If the person qualifies as a volunteer as defined above, the Oklahoma State University Volunteer's Acknowledgment and Release of Claims form should be completed as indicated below.

- Unit administrator completes paragraph one of the agreement indicating the date of effectiveness and the name of the volunteer.
- In the section Dates of Volunteer Activity or Project in which Volunteer shall be participating, the unit administrator provides both the dates of the volunteer activities and a brief summary of services to be performed. Please note the dates should not be open ended and shall include

both a beginning and end date that is reasonable to the project/services performed. In no case, shall the dates span beyond one year duration.

- Unit administrator provides completed form to volunteer. Volunteer must read and sign/date form prior to any volunteer services commencing.
 - Unit administrator will keep a copy of the document in his/her departmental files and forward the completed form to OSU Human Resources for review prior to volunteer duties commencing. HR will then provide copies to the following.
 - OSU/A&M Board of Regents Legal Counsel; 5th Floor – Student Union;
 - Stillwater, OK 74078 ○ Office of the President, Attention: Gary Clark; 107 Whitehurst; Stillwater,
 - OK 74078 ○ Risk & Property Management, Attention: Mike Bale; 618 N. Monroe; Stillwater, OK 74078

PLEASE NOTE: Volunteers are to be included in campus mandatory trainings such as those under Policy 1-0135 Minors Participating in OSU-Related Activities and Programs and Title IX. Please work with OSU Human Resources to enroll in these trainings.

OKLAHOMA STATE UNIVERSITY

VOLUNTEER'S ACKNOWLEDGMENT AND RELEASE OF CLAIMS

THIS AGREEMENT is entered into effective as of the ____ day of _____, 2015, ²² by and between Oklahoma State University ("University") and ("Volunteer"), an individual who desires to volunteer ~~their academic, technical, or~~ professional skills on a consistent and scheduled basis to the University for the time period below or with regard to the project further identified as follows:

Dates and Description of Volunteer Activity or Project in which Volunteer shall be participating

Every Friday from 12-1pm in Thatcher Hall, Cooking with Cadets classes offered through the Nutritional Sciences department in collaboration with Army ROTC.

1. Volunteer understands that the scope of Volunteer's relationship with University is limited to a volunteer position and that no compensation is expected in return for services provided by Volunteer; that University will not provide any benefits traditionally associated with employment to Volunteer, including Workers' Compensation; and that Volunteer shall be responsible for his/her own insurance coverage in the event of personal injury or illness as a result of Volunteer's service to University.

2. Volunteer acknowledges that his/her service is on an "as needed" basis and subject to immediate termination at any time at the sole discretion of the University.
3. Volunteer acknowledges that the University owns the full right and title and interest to all inventions, improvements, discoveries, patents, patent applications, copyrights, trademarks, trade secrets and any other legally protectable information which is first made, conceived and/or generated by Volunteer in the course of Volunteer's service to University and hereby assigns and agrees to assign all right, title and interest in same to the Board of Regents for Oklahoma State University and the Agricultural and Mechanical Colleges.
4. Volunteer acknowledges and agrees that he/she will review any applicable University policies, procedures, or regulations pertaining to the Volunteer's service, and all rules and directions from University personnel regarding use of University facilities and equipment. Volunteer further agrees to comply with all applicable federal and state laws and regulations.
5. The Volunteer releases and forever discharges and holds harmless University and its successors and assigns from any and all liability, claims, and demands of whatever kind or nature, either in law or in equity, which arise or may hereafter arise from the services Volunteer provides to University. Volunteer understands and acknowledges that this Agreement discharges University from any liability or claim that he/she may have against University with respect to bodily injury, personal injury, illness, death, or property damage that may result from said services. Volunteer agrees this Agreement is intended to be as broad and inclusive as permitted by Oklahoma law and agrees that it shall be governed and interpreted in accordance with Oklahoma law.

THE UNDERSIGNED FURTHER STATES AND AFFIRMS THAT HE/SHE HAS CAREFULLY READ THE WITHIN AND FOREGOING "VOLUNTEER'S ACKNOWLEDGMENT AND RELEASE OF CLAIMS," KNOWS AND UNDERSTANDS THE CONTENTS THEREOF, AND EXECUTES SAME AS HIS/HER OWN FREE ACT AND DEED.

IN WITNESS WHEREOF, the undersigned has executed this Agreement as of the day and year first above written.

VOLUNTEER:

UNIT ADMINISTRATOR:

DEPARTMENT: _____ NSCI

UNIT ADMINISTRATOR CONTACT INFORMATION (EMAIL/PHONE):

_____ Jill Joyce, jill.joyce@okstate.edu, 405-744-2033



Poster:

Effectiveness of Cooking with Cadets: A 16-week cooking intervention for OSU Air Force & Army cadets

Cody Cummins, Jill Joyce, PhD, RD

BACKGROUND

- Military Health:
 - About 50% of the military is overweight or obese¹
 - 51% of the military consumes energy drinks daily²
 - Under 15% of personnel meet fruit and vegetable intake recommendations²
- Sources of Nutrition Information Used By Personnel³
 - Most often magazines, media, and family
 - Least often doctors and dietitians
- Nutrition Education in Military Training⁴
 - 60% of officers state the military places too little emphasis on nutrition and that there needs to be more of a focus on changing young Soldiers' nutrition
 - Suggest more nutrition training as part of basic and unit training
- Purpose: To determine the effectiveness of Cooking with Cadets in improving nutrition, cooking, and food safety knowledge, skills, and confidence, as well as in improving motivation to eat healthfully and their dietary habits.

METHODS

- Study design – quasi-experimental, pre/post-test
- Sampling method – convenience
- Inclusion criteria – current OSU ROTC Army and Air Force Cadets
- Assessment
 - Nutrition, cooking, and food safety knowledge, skills, and confidence = 5-point Likert scale for each of the 9 items
 - Dietary habits = modified food frequency questionnaire (FFQ) looking at frequency of consumption of adequacy and moderation Healthy Eating Index (HEI) 2015⁵ scoring components
- Statistical Analysis
 - Descriptive = mean, standard deviation, frequency, proportion, mean difference

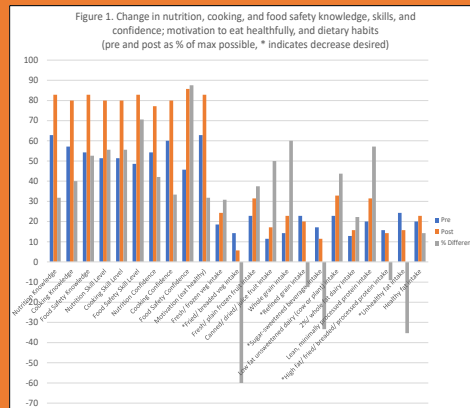
DISCUSSION

- Nutrition cooking, and food safety knowledge, skills, and confidence improved 1-2 points out of 5 (32-88%).
- Dietary habits improved such that healthier foods were consumed 0.3-1.1 times more often per day and moderation foods were consumed 0.1-0.9 times less often per day.

REFERENCES (contact author for reference list, cody.bleu.cummins@okstate.edu)

FUNDING OSU Wentz Research Scholarship

Cooking with Cadets improved nutrition, cooking, and food safety knowledge, skills, and confidence, as well as motivation to eat healthfully and their dietary habits of OSU Air Force and Army cadets.



TACTICAL FITNESS AND NUTRITION LAB

Table 1. Pre- and Post-program Outcome Assessment (preliminary data, n = 7)

	Pre	Post	Difference (post – pre)	% Difference (difference/pre × 100)
n, %				
Classes Attended	1-4	0, 0		
	5-8	6, 86%		
	9-12	1, 14%		
Previous Spring ROTC Nutrition Class Participation	Yes	5, 71%		
	No	2, 29%		
Previous Fall ROTC Nutrition Wellness Challenge Participation	Yes	6, 86%		
	No	1, 14%		
Mean ± Standard Deviation				
Nutrition knowledge (1 = no/none, 3 = somewhat, 5 = lots/very)	3.1	4.1	1.0 ± 0.6	31.8%
Cooking knowledge (1 = no/none, 3 = somewhat, 5 = lots/very)	2.9	4.0	1.1 ± 0.7	40%
Food safety knowledge (1 = no/none, 3 = somewhat, 5 = lots/very)	2.7	4.1	1.4 ± 1.1	52.0%
Nutrition skill level (1 = no/none, 3 = somewhat, 5 = lots/very)	2.6	4.0	1.4 ± 0.8	55.0%
Cooking skill level (1 = no/none, 3 = somewhat, 5 = lots/very)	2.6	4.0	1.4 ± 1.0	55.0%
Food safety skill level (1 = no/none, 3 = somewhat, 5 = lots/very)	2.4	4.1	1.7 ± 0.8	70.0%
Nutrition confidence (1 = no/none, 3 = somewhat, 5 = lots/very)	2.7	3.9	1.1 ± 0.7	42.3%
Cooking confidence (1 = no/none, 3 = somewhat, 5 = lots/very)	3.0	4.0	1.0 ± 0.8	33.3%
Food safety confidence (1 = no/none, 3 = somewhat, 5 = lots/very)	2.3	4.3	2.0 ± 1.2	87.5%
Motivation to eat healthy (1 = no motivation, 3 = some motivation, 5 = lots of motivation)	3.1	4.1	1.0 ± 0.6	31.8%
Consumption of fresh or frozen vegetables (times per day)	1.9	2.4	0.6 ± 1.1	30.8%
Consumption of fried or breaded vegetables (times per day)	1.4	0.6	-0.9 ± 1.3	-60%
Consumption of fresh or plain frozen fruit (times per day)	2.3	3.1	0.9 ± 1.2	37.5%
Consumption of canned/ dried fruit or fruit juice (times per day)	1.1	1.7	0.6 ± 1.1	50%
Consumption of whole grains (times per day)	1.4	2.3	0.9 ± 1.1	60%
Consumption of refined grains (times per day)	2.3	2.0	-0.3 ± 1.3	-12.5%
Consumption of sweets and sugar-sweetened beverages (times per day)	1.7	1.1	-0.6 ± 0.8	-33.3%
Consumption of low-fat/ fat-free cow's milk dairy products or unsweetened plant-based milk/ yogurt (times per day)	2.3	3.3	1.0 ± 3.0	43.8%
Consumption of 2% or whole milk dairy (times per day)	1.3	1.6	0.3 ± 0.5	22.2%
Consumption of lean, minimally processed protein foods (times per day)	2.0	3.1	1.1 ± 1.8	57.1%
Consumption of high fat, fried, breaded, or processed meats (times per day)	1.6	1.4	-0.1 ± 0.0	-9.3%
Consumption of unhealthy fats (times per day)	2.4	1.6	-0.9 ± 2.1	-35.3%
Consumption of healthy fats (times per day)	2.0	2.3	0.3 ± 1.0	14.3%

*Green font indicates a change in a positive direction.

Table 1. Pre- and Post-program Outcome Assessment (preliminary data, n = 7)

		n, %			
Classes Attended	1-4	0, 0			
	5-8	6, 86%			
	9-12	1, 14%			
Previous Spring ROTC Nutrition Class Participation	Yes	5, 71%			
	No	2, 29%			
Previous Fall ROTC Nutrition Wellness Challenge Participation	Yes	6, 86%			
	No	1, 14%			
		Pre (mean)	Post (mean)	Mean Difference (post – pre, mean \pm sd)	% Difference (difference/pre x 100)
Nutrition Knowledge (1 = no/none, 3 = somewhat, 5 = lots/very)		3.1	4.1	1.0 \pm 0.6	31.8%
Cooking Knowledge (1 = no/none, 3 = somewhat, 5 = lots/very)		2.9	4.0	1.1 \pm 0.7	40%
Food Safety Knowledge (1 = no/none, 3 = somewhat, 5 = lots/very)		2.7	4.1	1.4 \pm 1.1	52.6%
Nutrition Skill Level (1 = no/none, 3 = somewhat, 5 = lots/very)		2.6	4.0	1.4 \pm 0.8	55.6%
Cooking Skill Level (1 = no/none, 3 = somewhat, 5 = lots/very)		2.6	4.0	1.4 \pm 1.0	55.6%
Food Safety Skill Level (1 = no/none, 3 = somewhat, 5 = lots/very)		2.4	4.1	1.7 \pm 0.8	70.6%
Nutrition Confidence (1 = no/none, 3 = somewhat, 5 = lots/very)		2.7	3.9	1.1 \pm 0.7	42.1%
Cooking Confidence (1 = no/none, 3 = somewhat, 5 = lots/very)		3.0	4.0	1.0 \pm 0.8	33.3%

Food Safety Confidence (1 = no/none, 3 = somewhat, 5 = lots/very)	2.3	4.3	2.0±1.2	87.5%
Motivation to Eat Healthy (1 = no motivation, 3 = some motivation, 5 = lots of motivation)	3.1	4.1	1.0±0.6	31.8%
Consumption of Fresh or frozen vegetables (times per day)	1.9	2.4	0.6±1.1	30.8%
Consumption of Fried or breaded vegetables (times per day)	1.4	0.6	-0.9±1.3	-60%
Consumption of Fresh or plain frozen fruit (times per day)	2.3	3.1	0.9±1.2	37.5%
Consumption of Canned/ dried fruit or fruit juice (times per day)	1.1	1.7	0.6±1.1	50%
Consumption of Whole grains (times per day)	1.4	2.3	0.9±1.1	60%
Consumption of Refined grains (times per day)	2.3	2.0	-0.3±1.3	-12.5%
Consumption of Sweets and sugar-sweetened beverages (times per day)	1.7	1.1	-0.6±0.8	-33.3%
Consumption of Low-fat/ fat-free cow's milk dairy products or unsweetened plant-based milk/ yogurt (times per day)	2.3	3.3	1.0±3.0	43.8%
Consumption of 2% or whole milk dairy (times per day)	1.3	1.6	0.3±0.5	22.2%
Consumption of Lean, minimally processed protein foods (times per day)	2.0	3.1	1.1±1.8	57.1%
Consumption of High fat, fried, breaded, or processed meats (times per day)	1.6	1.4	-0.1±0.9	-9.1%
Consumption of Unhealthy fats (times per day)	2.4	1.6	-0.9±2.1	-35.3%
Consumption of Healthy fats (times per day)	2.0	2.3	0.3±1.0	14.3%

Flyer:

Spring ROTC Cooking Classes

Do you want to start a New Year's Resolution and actually stick to it?
Do you want to become healthier and improve fitness?
Do you want to learn how to cook (and eat free food while learning)?
OSU Nutritional Sciences has you covered!

Who: Open to all Air Force and Army ROTC cadets (and cadre if interested)

What: 15 weeks of cooking classes, which will cover...

- Nutrition topic for health and performance of military personnel
- Hands on cooking demos (learn a new skill and practice on a new recipe)
- Food safety

When: Starts Friday, January 14, 0900-1000

Where: Classes are offered in person only (in Thatcher, room TBD)

**Common food allergens will be present, masks expected due to food handling*

For more information, please contact Dr. Joyce at jill.joyce@okstate.edu.



TACTICAL FITNESS
AND NUTRITION



Sample Schedule of Classes:

WEEK	NUTRITION THEME	COOKING OBJECTIVES	RECIPE
1	Introduction: Pre-eval survey of objectives and behaviors, Food allergy identification, Safety waiver	Finding and Reading Recipes	None
2	Pre-Workout Meals, Snacks, Hydration	Reading Recipes and Supplement Safety	Trail Mix
3	Post-Workout Meals/Snacks	Measurement Units, Scaling Recipes, Storage	Granola
4	Variety of Fruits & Veggies	Knife Skills, Cross Contamination	Stir Fry
5	Whole Grains	Cooking grains, 2/4 Hour Rule	Mediterranean Quinoa Salad
6	Plant Proteins	Food Processing, Air Frying Properly Cooling	Falafel
7	Healthy Fats	Peeling and Grating, Fridge Organization	Salad + Ranch and Italian Dressing
8	Healthy Weight Promotion	Portion Distortion, Kneading, Cleaning	Homemade Bagels
9	Cancer Prevention	Crockpot Cooking, Temperature Checks	Crockpot Chicken Soup
10	Heart Health	Utilizing and Storing Herbs and Spices	Caprese Salad
11	Mental Health	Roasting, Pantry FIFO	Homemade Peanut and Sunflower Butter
12	Respiratory Health	Blending, Minimizing Waste	Smoothies
13	Budget Friendlier Healthy Foods	Meal Planning, Freezing Leftovers	Crockpot Pulled Pork 2 Ways
14	Q&A on Hot Topics	Mashing, Folding, Answering Questions	Crockpot Chocolate Chip Banana Bread
15	Reading Labels, Understanding Claims	Shopping, How to Avoid Store Traps, Picking Products	None

ROTC Cooking Class
Week #: 1
Introduction



**TACTICAL FITNESS
AND NUTRITION LAB**