


3-6-2017

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Recommended Citation

Long, Jessica Rose, "WooFood Cooks" (2017). *Capstone Presentations*. Paper 4.
<http://escholarship.umassmed.edu/capstones/4>

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Introduction:

Let's Move, is a US government sponsored initiative that has led to changes in food options available at schools nationwide, and may have played a role in the recent decrease in childhood obesity in the US (9,10). Unhealthy diet and inactivity is associated with many chronic diseases in childhood such as cardiovascular disease (CVD), hypercholesterolemia, hypertension, type 2 diabetes (T2D), asthma, and sleep apnea. Obesity can also lead to social discrimination, poor self-esteem, depression, lower academic achievement, and lower economic success (9,10). Obesity is more prevalent among individuals of lower socioeconomic status and among underrepresented communities such as Hispanic/ Latinos, and African Americans (3). This may be due to more prevalent advertising of unhealthy foods in these communities, less access to healthy foods, less quality child care centers with emphasis on providing quality nutrition and opportunities for physical activity, increased availability of high energy dense foods, sugary sweetened beverages, increased portion sizes, and less breastfeeding (3). With respect to food environment, which refers to the nutritional options available to an individual within his community, teens are more susceptible to becoming overweight or obese when there is a greater number of fast food restaurants and convenience stores in their neighborhoods leading to unhealthy diets and rendering them more vulnerable to developing metabolic syndrome a condition that is a precursor to T2D and CVD (11,12). Poor diet quality in childhood and adolescence translate into poor health outcomes as adults (3,11).

Men of color are often disproportionately affected by chronic health issues and are highly underrepresented in weight management intervention research (14,17).

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Although, African American boys are less likely to be overweight or obese than other minority boys and girls, they have experienced a greater increase in the number of individuals who identify as overweight or obese than any other racial group with an 8.6% increase in 6-11 year-olds and a 1.6% increase in 12-19 year-olds from 2007-2008 to 2011-2012 (2,17). Additionally, Black (37.3%) and Hispanic (34%) men have a lower prevalence of obesity than the respective women of these ethnic groups (49.6%, 43%), but similar to White women (6). Therefore, as previously mentioned, organizations like Let's Move are targeting these groups with healthy diet messages when they are young so that habits will be maintained and fortified in adulthood.

Since the 1980s, there has been a steady decline in the amount of meals being eaten in the home. In 1984 about 75% of meals were eaten in the home, whereas in 2014, less than 60% of meals are eaten within the home (5). Individuals living in the United States are eating home cooked meals less often for a number of reasons: food costs, lack of sufficient time, access to healthy food options, and lack of cooking skills (18). Additionally, men and women are marrying at a later age than in the past: at ages 27 for women and 29 for men, which is up from ages 23 for women and 26 for men in the 1990's (1). Thus, more time is spent in independent living, where men are solely responsible for food shopping and preparation without the help of a woman, who is often the primary determinant for cooking in the home (18). Cooking is a relevant skill for these young men as they move toward adulthood and self-sufficiency to avoid reliance on fast food and convenience food, which are associated with lower diet quality (18).

The purpose of this WooFood Cooks Capstone Project was to bring high school-aged men of color into the kitchen, expose them to micronutrient rich foods, and teach

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them to cook healthy meals so that they could take these skills home to their families and employ these skills into adulthood. By having multiple opportunities to learn about, prepare, cook, and eat meals with fruits, vegetables, and lean meats, this program will hopefully have a long-term positive impact on the health of these young men.

Methods:

We contacted Assistant Principal Bruce O’Connell at the North High School Health Science Academy to get permission to invite students to the healthy cooking program. Students from backgrounds underrepresented in medicine (e.g. African American, Hispanic/Latino, recent African Immigrants, or first-generation American students) were targeted. Students were required to have parents complete a permission slip, which granted them access to transportation to and from the program. The program involved two, 3 hour visits to a teaching kitchen. A local chef, from the Flying Rhino restaurant, led the first class. He demonstrated cooking techniques required to prepare a healthy meal. Some of the techniques that were taught were:

- Knife skills
- Cooking vegetables
- Cooking grains
- White meat preparation and cooking
- Appropriate portion sizes

Students were given opportunities to practice new skills following each individual demonstration. Once each component of the meal was complete, the students were showed how to professionally “plate” the meal. During meal consumption, we reviewed *My Plate*, which gives a visual representation of a balanced and healthy plate.

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The second session of the Woo Food Cooks, healthy cooking class, was conducted in a similar manner to the first class. The chef for this session was Alan Kwan, a Graduate School of Nursing student. He taught the students new techniques and reviewed old skills learned in the first class such as:

- Knife skills
- Marinating
- Steaming rice
- Salad preparation
- Fruit preparation
- Meat preparation and cooking

The online Drexel University Nutrition Education Program for High School Students was used to provide nutrition education. It consisted of fifteen PowerPoint lessons that focused on different topics such as the impact of fast food and drinks on health. During this cooking session we focused on the PowerPoint that discussed the components of a healthy plate and the impact of diet on health outcomes. Each student left with a copy of the recipes and a handout on *10 Tips to a Great Plate* from choosemyplate.com.

After each cooking class, each student received and completed a survey that measured satisfaction with the class with a 0-5 point rating scale: 0 represented definitely not, in response to the survey question, while 5 represented absolutely, in response to the survey question. There were also open response questions for narrative input for improvement.

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Results:

Class 1.

A total of 7 students attended the class. Students on average rated the workshop a 4.57 (sd=1.27) in helpfulness, 4.81 (sd=1.50) in organization, and 5 (sd=1.60) in terms of how engaging it was. In terms of feedback on ways to improve the course, students said that they wanted more food to eat during the class and after the cooking was complete. This was a sign they enjoyed the food, but perhaps also that they are used to large portions. They wanted a way to connect cooking to the practice of medicine. They also wanted to have a discussion about physical activity and how to couple it to eating a healthy diet. As a result we used the Drexel University Nutrition Education Program for High School Students to meet these requests.

Class 2.

A total of three students attended the class. Four students were absent from the second class because of an upcoming high school graduation and the others chose not to attend because summer was just beginning. Scheduling of the event definitely had an impact on turnout since the first class was in early May of 2015, whereas this event was scheduled for late June 2016 when school was soon to be dismissed for the summer. Students on average rated the workshop a 4.67 (sd=1.05) in helpfulness, 4.67 (sd=1.05) in organization, and 5 (sd=1.60) in terms of how engaging it was. All three students reported that they had cooked independently before the first class in May of 2015. They also reported having cooked since the first class. On average, they cooked about 5.3 times. They reported having cooked rice, fish, pasta, pancakes, stew, and eggs. In terms of feedback on ways to improve the course, students said they would like to have a class

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that focuses on cooking seafood. They also mentioned that their favorite part was cooking, especially cooking the steak on the stovetop.

Discussion:

The purpose of the WooFood Cooks: Healthy Cooking Program was to teach underrepresented minority male youth basic cooking skills and nutrition education. Cooking skills and nutrition education provided during youth may have benefits through adulthood (6).

Survey results revealed that the classes were feasible and acceptable to students, however only 3 of 7 students returned to the second class suggesting that a one-session workshop might be more feasible or an incentive to maintain interest. The students initially shared that they felt that there was not enough food before, during, and after the cooking class was complete. At the second class, healthy snacks such as trail mix and baked plantain chips were available for consumption before the cooking began. Students were also able to take a sample of the main course home with them.

The students also felt that there was not a clear enough connection between how food can have a positive or a negative impact on health outcomes, the connection between nutrition and medicine, and how physical activity fits into healthy lifestyle. The implementation of the **Drexel University Nutrition Education Program for High School** Students helped to illustrate the importance of eating a diet low in saturated and trans fats, monitoring caloric intake, and eating a diet low in salt (12). This program also talked about the importance of getting sixty-minutes of vigorous physical activity a day and how this directly impacted ones health with longer lifespan, less depression, and maintenance of a healthier weight (12). It appears that utilizing the nutrition handouts (i.e. 10 Tips to a

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Healthy Plate) and the nutrition program PowerPoint helped to meet the need of having a concrete, visual aid to present the information about nutrition.

At the second class, the feedback came in the form of what the class could do in the future. The students enjoyed the cooking experience and desired to cook other food items such as seafood. It seems that having snacks prior to cooking and utilizing the Drexel University Nutrition Education Program for High School Students, changes implemented based on the students feedback from the previous class, helped to make the second class run more smoothly and make them want to learn more about cooking.

Conclusions:

A recent study revealed improvements in dietary habits among US adults from 1999-2012, which is corresponding with a decrease in the levels of hypertension, dyslipidemia, and cardiovascular mortality, and the possible leveling of obesity prevalence (15). However, this study also found racial, educational, and economic disparities in percent of decline in poor diet (15). Non-Hispanic white adults had a decline of 53.9% to 42.8% ($p < .003$); whereas, Non-Hispanic black adults had a decline from 64.7% to 57.7 ($p < .12$) and Mexican American adults had a decline from 66.0% to 58.9% ($p < .13$) (15). It appears that more needs to be done in these communities to close the poor diet gap.

The HEALTH-KIDS Study, designed to explore the feasibility of preventing obesity in low socioeconomic urban African-American community schools, found that children's preference for high-fat and high-sugar meals and snacks was mirrored by the food staff at their schools and by their parents (16). It would appear that parental engagement is essential to changing children's eating habits. Cowgill, et al found that

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Hispanic parents, in particular, wanted to lead by example but often did not have the proper information, skills, or time to do so (4). Access is also an issue for minorities. In many minority, urban, low-income communities fast-food restaurants are prevalent and supermarkets are fewer which affects options for healthy eating (8, 15).

The Pawtucket Heart Health Program investigated whether a twelve-week cook-off for junior high school students during their home economics class would lower blood cholesterol levels (7), given the connection between high cholesterol and atherosclerosis and coronary artery disease, which begins in childhood (7). Results revealed a statistically significant decline in the cholesterol levels of 40% of those participants with an elevated cholesterol level by about 10.7% on average (7). This could be a model worth replicating.

Future directions for this project would be to implement a more consistent meeting time (i.e. once a month), which would expose the students to a greater number of ingredients and cooking techniques, help to keep students engaged, and hopefully, decrease the attrition rate. It may also be beneficial to conduct the cooking classes in the school's teaching kitchen for ease of access. Having the class more frequently would also give more opportunities to present culturally relevant foods in a new and nutritious way. A financial incentive (i.e. gift cards for a local WooFood certified restaurant) for attending a certain number of classes may help to make participants eager to continue attending the classes. Additionally, as revealed in *Targeting Interventions for Ethnic Minority and Low-Income Populations*, the health choices and outcomes of children are greatly influenced by the decisions of their parents (8). It would be ideal to incorporate parental participation in the classes so that parents may choose to seek out healthier food

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options for themselves and thus for their children. It would also be advantageous to perform health screenings (i.e. blood pressure, blood sugar, cholesterol, and BMI) along with recall surveys about food intake and exercise to see whether these objective markers change as a result of a change in nutritional status. Finally, incorporating trips to the supermarket to practice smart shopping may allow another form of skill building that could potentially last into adulthood.

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