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The Healing Power of a Whole Foods, Plant-based Diet: A Nutrition Prescription for Cancer

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The Healing Power of a Whole Foods, Plant- Based Diet:

A Nutrition Prescription for Cancer - The Ceres Project

Meghan Adelman, RN, BSN

University of San Francisco – Fieldwork Summary

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Abstract

Chronic disease is quickly overtaking infectious diseases as one of the biggest threats to population health worldwide (Egger, 2012). Studies have shown that plant based diets are effective at reducing prevalence but are also a viable complimentary treatment approach to healing. Further investigation is needed into how plant based diets can reduce risk of recurrence, specifically as it relates to a cancer diagnosis. The Ceres Project is an organization that provides a healing foods philosophy to the care of cancer patients through meal delivery programs at low to no cost. The aim of this research study was to implement the first trial of The Ceres Transition Program, which tested three treatment groups to determine what manner of additional support is needed for clients to establish a long-term dietary commitment to the Ceres food philosophy. A total of n=34 participants were randomly assigned to 4 groups, 3 treatment groups and a control that received only cash to use at the individual's discretion. Two groups received three nutrition and cooking classes held over the course of eight weeks in conjunction with a cash stipend or vegetable box supplement. The final treatment group strictly received a vegetable box for eight weeks. Pre-post surveys were implemented to evaluate baseline and endline eating behaviors by phone. Although the study lacked adequate sample sizes, preliminary data suggested that both cooking skills and cooking attitudes improved over all three treatment groups. Increased sample sizes for the next trial will allow for further manipulation of the data to reveal specifics between class and control and whether fruit and vegetable consumption increased with the intervention. Lastly, it will be important to understand whether the dietary recommendations lasted past six months to a year thereby demonstrating a long-term behavior change. Implications for policy should focus on increasing SNAP EBT transfers for farmer's markets to also include Community Supported Agriculture (CSA) deliveries to those

living with cancer. The rationale for this is that a debilitating illness significantly effects energy levels necessary for shopping for and preparing healthy food due to cancer treatment.

Eliminating this barrier may help to increase fruit and vegetables consumption during this challenging period. Finally, establishing programs that can offer nutrition and cooking education with a *Food as Medicine* philosophy should be incorporated into the treatment of chronic illness in primary care settings as it may help interrupt the progression of red flag markers into a confirmed diagnosis.

Introduction

The connection between poor dietary choices and chronic disease is well established in the research literature. Cancer is included in the category of non-communicable diseases (NCD's), which accounts for 63% of deaths worldwide and is projected to levy an economic toll of 30 trillion in the next 20 years (Bloom, et al., 2011). It is understood that side effects of cancer treatment pose a huge challenge for patient's ability to meet nutritional needs but there is mounting evidence to suggest that a whole-foods, plant-based diet can largely improve outcomes for those fighting cancer. For the purposes of this discussion, a plant based diet (PBD) describes one that significantly reduces animal proteins in the diet, while increasing plant protein alternatives such as legumes, seeds and grains and eliminates refined or processed foods. This paper will explore the nutritional impact of cancer and highlight the untapped potential that these specific dietary interventions can have on both the prevention and treatment of various cancers.

The American Cancer Society projects that there are 1.7 million cancer diagnoses and half a million related cancer deaths annually (American Cancer Society, 2016). Non-communicable disease rates are climbing posing an additional threat to public health and compromising the treatment of acute conditions such as cancer. The potential exists to hinder the progression of chronic disease rates, specifically cancer, by increasing adherence to a healthy diet that is minimally processed, robust in phytochemicals, vitamins and fiber, otherwise known as a plant-based diet (PBD) (Burke, Karsies & Shannon-Hagan, 2015). Although a genetic component exists in the development of NCD's, behavioral mechanisms play an equally if not more important role in determining disease course inevitability. In fact, it has been suggested that 90-95% of cancers are not the result of genetics but from modifiable behavior related risk

factors such as diet (Bail, Meneses, & Denmark-Wahnefried, 2016). Additionally, environmental influences and lower socioeconomic status (SES) pose significant health disparities relative to poor nutrition access, higher stress, riskier behaviors and subsequent prevalence of overweight/obesity among lower SES groups (CDC, 2014). Therefore, programs designed to reestablish the priority of high quality nutrition during and after cancer treatment are desperately needed to reduce the devastating toll of cancer on the population.

One important strategy to reducing non-communicable diseases in the future is to identify key subsets of the population that can sustain a lasting impact of dietary behavioral change. By designing interventions aimed at educating the adolescent population about healthy eating behavior, the potential exists that public health will steadily improve in the years to come. As it stands, adolescent obesity rates remain steady at 17% affecting one out of every six children in the United States and prevalence is higher among Hispanic and non-Hispanic Black populations (CDC, 2016). Increased marketing strategies featuring fast foods, sugar sweetened beverages and snacks are omnipresent during TV programming aimed teenage audiences. The industry has now targeted mobile devices and social media to increase advertising exposure to this demographic even going so far as creating restaurant specific mobile apps with interactive features to capture sustained attention (Yale Rudd Center for Food Policy and Obesity, 2013). Since dietary habits are formed in the formative years, it is critical that youth develop a keen understanding of the connection between diet and disease to prevent long-term consequences for poor eating behavior adopted early in life.

Combining the two goals of reducing cancer rates and other non-communicable diseases with educating youth about the power of a healthy diet has the potential to create a lasting impact on population health. While one intervention is focused on improving health outcomes for those

that are currently fighting cancer, the other has the potential to eradicate the burden of disease resulting from a lack of awareness about the importance of our food choices for future generations. Moreover, teaching youth about the connection between current diet choices and future health outcomes is a pivotal approach to solving the problem of escalating NCD prevalence.

Background

Plant based diets (PBD's) are gaining attention for their ability to prevent numerous chronic metabolic disorders as well as promote healing from illness. The anti-inflammatory effect the diet offers is one of the strongest arguments in favor of its role in cancer treatment. One explanation for this is likely due to reduced oxidative stress resulting from a diet comprised primarily of polyunsaturated fats versus saturated fats (Eickelman, Schwingshaket, Fedirko & Aleksandrova, 2016). Also, phytochemicals from plant sources have been shown to provide an effective integrative treatment approach for cancer. For example, specific phytochemicals such as resveratrol and ursolic acid have specifically shown anti-proliferative effects in breast cancer cells (Venugopal & Liu, 2012). Another finding is that there is evidence of anti-tumor effects from specific phytochemicals that inhibit tumor growth (Gonzalez-Vallinas, Gonzalez-Castejon, Rodriguez-Casado & Ramirez de Molina, 2013). However, benefits of a PBD also support patients through critical recovery periods by providing complimentary resources in the form of vitamins and minerals to enhance the immune response after the cancer treatment ends. One study showed that dietary interventions highlighting the PBD model have been successful in preventing remissions and well as mortality after cancer treatment (Sierpina, et al., 2015). Thus, the evidence supporting PBD's is consistent in demonstrating substantial benefits and should be included in the clinical management of cancer. By making nutrition interventions a high priority

in the treatment plan, the need for unnecessary and invasive radiological and pharmacological interventions could be minimized, especially when those options cause burdensome side effects.

Aside from the physiological benefits of these dietary interventions, there is also a significant psychological component that eating for health provides to those with cancer. Awareness of the healing properties of foods helps to improve eating behavior which in turn contributes to feelings of overall well-being (Bail, Meneses, & Denmark-Wahnefried, 2016). Often, patients lack the energy and confidence needed to change poor eating habits after a cancer diagnosis and therefore programs that include culinary interventions can be pivotal at a critical stage in the process. Supportive nutrition education environments such as group culinary programs for those living with cancer provide an atmosphere where patients share similar experiences with other group members who are also fighting cancer. In some ways, this is the most beneficial aspect of this type of intervention and the formation of like communities promotes behavior change. Therefore, culinary interventions are effective at improving eating habits but also increases perceived quality of life and feelings of self-efficacy, which then become a powerful influence in recovery (Barak-Naham, 2016).

Many Americans both adolescents and adults are consumed with the need for instant gratification and are not motivated to make changes that may not result in benefits until far into the future. A necessary change in this paradigm is needed so that the population begins to understand that current eating behaviors have long-term consequences. One study asked adolescents to identify feelings or associations with eating behaviors. Results showed that teens attribute eating junk food with pleasurable experiences like being with friends and having fun and conversely, healthier food with being with parents, or adhering to structure and rules (Story, Neumark & French, 2002). To re-frame ideas around healthy eating patterns, the model should

attempt to mimic conditions of eating poorly in this demographic to exert the greatest effect on change.

Several meal delivery programs exist that adhere to a “food as medicine” model for those undergoing cancer treatment. These range from non-profit organizations that aim to support low SES status individuals by providing low to no cost meals to the more traditional for profit models that provide these meals on a fee based service. However, combining nutritional support for cancer with adolescent education on healthy eating behaviors sets The Ceres Project apart and is an innovative approach to reducing cancer in the community for the long term. Increased awareness about the value of nutrient dense, plant-based diets to enhance treatment provide a poignant example for the merits of prevention among teenagers. Since it is known that dietary choices in youth are strong predictors of future health and disease, it is imperative to include adolescents in the conversation (Story, Neumark & French, 2002).

Scope of Work

Agency

The Ceres Project is a non-profit organization based in Sonoma County that provides low to no cost meal delivery to people living with a cancer diagnosis. Since its inception, the program has expanded to include those living with other debilitating illnesses where high quality nutrition is a necessary component to healing. The geographic area that Ceres serves includes the greater Bay Area, Sonoma, Vallejo and Marin Counties but the program provides licensing opportunities to replicate the model in several other states nationwide. Ceres is largely supported through volunteers consisting of close to 450 teenagers and 575 adults at any given time with a permanent staff of 25. Through cooking skills, teenagers begin to learn about the value of high quality nutrition, especially as it relates to disease prevention and treatment. By connecting teenagers to this important health service, it accomplishes two goals. First, the program invests in the future health equity of our population by shaping perspectives of the next generation about the value of eating healthy and the connection between diet and disease. Secondly, it instills the value of altruism in younger generations, which will cultivate strong and compassionate communities far into the future. Through this model, Ceres can support 700 clients a year by sending out 150 meals a week and the team collaborates to achieve great things every day.

Fieldwork Project

Funded through a grant from the North Bay Cancer Alliance & Community Foundation of Sonoma County, The Ceres Transition program was designed to support clients bridge the gap between the eight-week meal delivery program and a commitment to long term healthy eating behavior. (The Ceres Project, 2016). More specifically, the main goal was to increase access to healthy food for underserved populations in Sonoma County who are being treated for cancer.

As a stipulation of the grant, the program provided nutrition education and cooking classes for residents intended to improve self-efficacy around healthy eating behavior. Lastly, participants needed to earn less than \$45,000 annually to be eligible for the research program. The goals and objectives of this project were written and defined by The Ceres Project as follows (The Ceres Project, 2016);

- “Increase access to healthy food for low-income patients with a cancer diagnosis to reduce side effects, improve treatment outcomes, speed recovery times and help prevent recurrence.
- Provide 8 weeks of organic whole food meals delivered to client’s homes along with simple to understand nutrition information.
- Provide a second 8 weeks of a CSA (community supported agriculture) box of fresh organic vegetables along with recipes and nutrition information.
- Support clients with the knowledge and skills they need to continue to eat well after the intervention is over.
- Provide a one-on-one Nutrition Consultation in the client’s home using student interns from Bauman College’s Nutrition Consultant Program and/or from other nutrition programs to assess current eating habits and any specific challenges the client faces and provide custom recommendations.
- Assist all clients who qualify to enroll in SNAP by partnering with Redwood Empire Food Bank’s Community Corner enrollment assistance.
- Provide three 4-hour classes covering the basics of healthy eating, cooking skills, how to shop effectively on a budget and menu planning. Each class will include hands-on cooking instruction and participants will go home with at least three meals that they

prepared together in the class.

- Provide a handbook of information with shopping strategies, menu plan and recipes. We will create a culturally relevant menu plan and shopping strategies for Hispanic clients and create a Spanish language version of this class*
- Conduct pre-and post-assessments to evaluate changes in clients' knowledge, comfort and commitment to cooking and eating healthy food, and to evaluate the value of the various interventions provided.
- Based on what is learned, create a formal transition program to support Ceres' low-income clients in adopting long-term healthy eating habits that can improve their quality of life and prevent recurrence.
- Strengthen and expand referral relationships in the Hispanic community. Have at least 25% of program participants be Hispanic**

It should be noted that the goal of having a Spanish version* available and recruiting 25% of Hispanic clients was not met for the first trial of the Transition Program. A second trial will follow and is set to begin in the summer of 2017, hopefully including this important objective.

Specific Role

From the inception of the Ceres meal support program, clients had asked Ceres for additional support in learning the nutrition philosophy and cooking methods that Ceres models after their eight-week meal delivery ended. Thus, the idea was born to introduce a program like the Transition Program to look for ways that Ceres could further support their clients in adopting long term eating habits shown to reduce the chance of cancer returning and to maintain good health. The primary responsibility as program administrator was to support the research design and implement many aspects of the first trial of the Transition Program offered to Ceres clients.

Essentially that meant being the liaison for the program, being available to field questions or concerns, and reviewing ongoing logistics along with my preceptor, Thais Harris, NC. I conducted calls from the randomized participant list with the goal to admit 10-12 participants in each of the four treatment groups. The first was the Cash or control group that consisted of the participant receiving the equivalent of \$160 over the course of eight weeks to use towards groceries, although specific use of the cash was purposely not communicated. The idea was to determine if the extra money alone helped the client to change behavior regarding purchasing choices. The second treatment group was called the ClassCash group. In addition to the monetary stipend, this group received the class intervention, which was held every other week for six weeks during the eight-week period. The third condition was called Box group and these participants received a vegetable box delivery from the Ceres garden or CSA (Community Supported Agriculture) for the eight-week period. Finally, the last treatment group was called ClassBox, which combined the nutrition and cooking class intervention with an eight-week delivery of a vegetable box.

In preparation for the program, I met with principal researchers Dr. Katz and her research assistant (RA) to create a survey tool to be used for intake and post-test evaluation. This process required several renditions with the help of the RA to complete the final version of the survey tool. Once that was designed, I began intake interviews with a randomized list of potential participants that were former Ceres clients.

After the participants were confirmed, I made appointments to complete the survey with clients, reviewed the consent form and explained the details of the program. Due to the treatment groups being spread out over the course of eight months, the entire process evolved over the course of roughly one year. Continuous attempts to reach people proved inefficient in

this process and I quickly realized that the phone calls could vary significantly in length depending on who I was talking to. Another important impediment was that several of those contacted were still dealing with negative effects of cancer, and some were still undergoing chemotherapy and radiation. For these reasons, phone calls on average lasted somewhere between 20-40 minutes.

For the class component, I was responsible for orchestrating details surrounding class logistics, placing reminder phone calls ahead of time, preparing education binders with handouts and PowerPoint material, distributing cash stipend and taking notes on class progress and development. I also supported the kitchen staff with preparation, orchestration of the class/kitchen time, clean up and assisted in any way that was required during the day. I arrived early to help set up the classroom and prep the kitchen as well as stayed late to clean up.

Throughout the program, several meetings and emails were required within the team to review aspects of the class that were successful and identify areas that needed improvement. This troubleshooting was spent more on the initial ClassCash condition because by the end of that period, team collaboration improved and the development of the second ClassBox condition ran more smoothly.

Initially I was tasked with data entry and completed the first half of that goal but it was later determined that it work better to have one RA transcribing the information from the surveys onto the data sheet to meet consistency standards. Although I spent a fair amount of time on this initially, the role shifted to Dr. Katz's RA towards the end of the program.

The final step was to repeat phone calls at the end each eight-week period to complete a post-test survey with each participant. After completion, I forwarded them to my preceptor and to the research team for review. We had a final meeting at Ceres including all members of the

team including Ceres CEO Cathryn Couch to consider how to improve the program for the subsequent trial. I had one additional meeting with my preceptor in April to offer continued support to the incoming intern with recommendations to augment the success of the second trial of the Transition Program set to begin in the Fall of 2017.

Impact

Results

The Ceres Transition Program compared three different treatment groups and a control that received cash only for a total of (n=34) participants. The Cash group consisted of (n=13), the ClassCash (n = 7), Box (n=9), and the ClassBox was (n=5). The objective of the study was to determine the best manner to encourage the adoption of long-term healthy eating habits and increased self-efficacy for healthy food preparation after Ceres meal delivery program ends. The control group received \$160 to use in any way they wanted to. The ClassCash group combined three cooking and nutrition courses with the eight weeks of cash stipend. The Box Group received eight weeks of a vegetable box delivery with recipes and information about contents. Finally, the ClassBox group combined three cooking and nutrition courses with a vegetable box delivery for eight, weeks. It is important to note that because of the small sample sizes for each cohort it was not feasible to run tests of significance with individual treatment groups but when combined, the data suggested a potential for positive results in future interventions.

The principal researchers analyzed the data from the initial round of the Transition Program using a t-test and comparison of means at endline (Katz & Cassar, 2017). Preliminary data suggested that perceived cooking skills improved across all treatment groups when all 13 skills were grouped together. From this data, it suggests that the class component may have caused this increase in reported skills. However, since perceived skills at baseline were high at the onset there was not enough room for an increase at endline to be a compelling result .

Treatment groups were analyzed comparing means for significance against the control group regarding cooking skills and cooking attitudes. Cooking skills in all treatment groups were significantly higher than in the control $p > 0.036$. Specific cooking skills that were

significantly higher from the control were frying, baking, following a recipe, preparing rice or other cooked grains or legumes, preparing meat or fish, preparing a salad, and cooking eggs. Cooking attitudes in all treatment groups were also significantly higher than in the control $p > 0.002$. Participants in the treatment groups were more likely to respond positively to questions asked about cooking attitudes especially regarding enjoyment of cooking, cooking as a good use of time, importance of knowing how to cook, ease of cooking, and liking to try new recipes. Those in the treatment groups would also respond negatively to negative statements but primarily to the question stating, “cooking takes too much time”.

Another interesting finding was that cooking attitudes were increased across all treatment groups as compared to the control whereby participants were more likely to respond positively to questions that mirrored a positive attitude about cooking. Once again, this suggested a positive relationship would exist if samples were larger but the current sample sizes could not truly demonstrate significance.

Approximately 37% of the intake from the diet recall was from fruit and vegetable consumption. It did not appear from the current sample that the treatment groups affected this in any way when compared to the control. This will be an important relationship to explore in the next round with larger samples. Lastly, clients reported making almost four meals from scratch or at least 40% of daily intake. Although, a significant difference was not detected between treatment groups to control there was some indication to suggest that there could be with the ClassCash group. Again, this finding might be flushed out with a larger sample size.

Implications

Based on the above findings, the next trial of the Transition program will undoubtedly require increased sample sizes to determine a true effect. Additionally, it is unclear whether it was the class that helped to change attitudes or the availability of the vegetable box alone based on the need to combine all the data together just to be able to run a t-test. However, several research implications arose from the first trial of the program. The first is that the data suggests that positive effects might result from the class combination treatment group. This could stem from increased knowledge but it could also stem from clients feeling supported, which was verbalized by many participants at the end of the class sessions. Although not part of the data analysis, a process outcome that might be interesting to explore on the subsequent rounds would be to determine the effect of social support in changing healthy eating behaviors because the treatment groups that seemed to be the most engaged in the process were the ones that included a class component. With this combination, an element of accountability existed that appeared to further motivate individuals to commit to healthy dietary practices. In fact, for the ClassCash group, many individuals committed to getting together after the class ended to share recipes and cook for one another. It would be interesting to follow this group long term to determine whether these dietary habits continued longer than other groups based on the social support involved.

Additionally, it would be interesting to test whether the availability of fresh vegetables alone caused an increase in consumption as with the ClassBox group. Many clients expressed a fear of wasting the vegetables they received every two weeks because the boxes were plentiful and that the vegetables were impeccably fresh and delicious. The inherited pressure not to waste food may have also contributed to increased vegetable consumption.

As far as program implications, the baseline and endline surveys should include questions alluding to perceptions of support for eating a healthy diet. To further this effect, the program could consider adding health coaches into the model as was initially outlined in the objectives, who could regularly meet with clients to discuss adherence to the program recommendations. This person could be a volunteer who could either make regular phone calls to clients or better yet, visit them as they do at the onset of the Ceres meal delivery program. Additionally, it would be interesting to add some evaluation of how the mere presence or visualization of the vegetable box effected the consumption of vegetables or inspired cooking.

As it relates to policy implications, improved access to purchasing fruits and vegetables within the SNAP programs is necessary whereby the USDA partners with farms offering CSA programs to pay for home deliveries for underserved populations. Although the USDA is expanding the use of SNAP vouchers at farmer's markets, home delivery for this population would be ideal (Farmer's Market Coalition, 2016). Recent cancer treatment puts the Ceres client at a disadvantage because many do not feel well enough to go shopping for food thereby limiting their ability to eat healthy. Therefore, it will be important to expand SNAP policy to include CSA's so that clients living with severe illness can get local produce delivered to their home.

Another important policy implication would be to identify patients early on with chronic disease risk and automatically enroll them in cooking and nutrition courses like the one being offered through the Transition Program. By interrupting the behaviors that lead to diagnosis of a chronic disease, the potential exists to reduce the economic burden to our healthcare system far into the future. Many people do not have the knowledge or the skillset to make healthier choices and by re-framing the urgency using the Health Belief Model of behavior change, associating imminent risk for disease could motivate improved nutrition choices.

The initial trial of the Ceres Transition Program provided helpful information about which method of support, nutrition and cooking classes or a combination of classes with a vegetable box delivery or cash stipend, will encourage the adoption of long term clean eating among vulnerable groups. However, more will need to be done to build on the current design to unearth definitive information from the study. Most importantly, the sample sizes were not large enough to run a regression analysis. Increasing sample sizes would be helpful to determine if all groups were adequately randomly assigned or whether there are other elements at play influencing the results of the study (Katz & Cassar, 2017). Also, further analysis is needed to determine whether nutrition and cooking class plus another variable differed from that of the vegetable box delivery alone. This would implicate the social support aspect of the class in being the largest influence of behavior change. Also, it would be helpful to gain an understanding about whether the treatment increased fruit and vegetable intake or commitment to home cooking, which are both extremely important in their ability to treat and or prevent disease. Finally, the data currently only compares differences in means at endline and not between pre- and post-treatment, which will yield the best information for the final design of the program.

As previously stated, the program was designed to support clients living with cancer in adopting long term eating habits that align with Ceres *Food as Medicine* philosophy. After two research trials, it would be best to conduct a pilot program based on knowledge gained from the research process to further determine effective methods in changing dietary behavior for people living with cancer. As for policy, next steps would be to garner support from federal nutrition programs to institute a *Food as Medicine* model as a monetary benefit for vulnerable groups, especially those suffering from chronic illness. Additionally, it would be beneficial to increase nutrition education opportunities for those living with cancer diagnosis teaching the value of the

healing foods dietary approach in the cure and treatment of cancer. Lastly, an investment in additional research to elucidate this important connection will be necessary to garner widespread acceptance of diet's role in cancer treatment.

Conclusion

Whole foods, plant-based diets have received increased attention in recent years for their ability to cure and or reverse heart disease. It stands to reason that all forms of chronic disease resulting from poor dietary and behavioral choices would also benefit from this healing dietary approach. Researchers have now gained an understanding of how integral the role of diet is in the sequelae of these illnesses but diet interventions are currently not a mandatory component of treatment for all chronic disease, namely cancer. The current chronic disease burden will continue to cripple health care delivery if swift action is not taken to provide innovative solutions. Nutrition prioritization, especially focused on the youth, will pave the way out of the chronic disease health crisis we face. Increasing self-efficacy for healthy eating behaviors, having adequate support and the physiological enhancement from a diet rich in plant phytochemicals are an integral part of cancer recovery and survival.

Through the Ceres Transition Program, clients were given the opportunity to learn the skills and education necessary to permanently change eating habits in the hopes of preventing the return of cancer after treatment. This complimentary healing approach improves both short and long-term morale of the individual fighting cancer, which may be the most poignant factor in its' success. Also, by including adolescents in the program design as volunteer cooks, Ceres is approaching behavior modification from many angles and including various subsets of the population. If this model were to be expanded throughout the country, there would undoubtedly be a huge shift in thinking about the importance of a clean eating practices as it relates to the avoidance of disease.

Coordination and implementation of the first phase of the Ceres Transition Program led to several valuable outcomes that may be realized in future trials.

The program assessed whether the addition of a combination of nutrition and cooking classes with either cash or a vegetable box or solely the delivery of a vegetable box would improve eating behavior as compared to those receiving cash only. The results suggested that both cooking skills and attitudes improved within the three treatment groups as compared to the control. Although sample sizes were too small to measure individual differences, it was clear that some level of support to Ceres clients after the program ends might prove beneficial in a long-term commitment to healthy eating behavior.

Implications for this research elude to the fact that continued support after cancer treatment and Ceres meal delivery will enhance the likelihood of adoption of healthy eating habits although refining the research design is necessary to distinguish which intervention would be the most effective for achieving this. The development of a bilingual Spanish/English program will enhance the number of clients eligible to participate in the program which would not just increase the sample sizes, but also offer greater randomization and data analysis. However, the initial data from the Ceres Transition Program shows promise that specific dietary interventions using the Food as Medicine model has the potential to improve cancer survival and recovery after cancer treatment.

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Appendices

Appendix A - Ceres Community Project Transitional Food Support Pilot/Client Survey, Initial Data Analysis Report, Graphs

Metadata/ Identifying Information: (TO BE FILLED OUT BEFORE INTERVIEW)				
1	Unique Survey ID Number			
2	Client Name			
3	Phone Number			
4	Date of Interview			
5	Method of Interview	Phone =1	In person =2	
6	Baseline or Endline Interview?	Baseline=1	Endline=2	
7	Treatment Group	ClassCash	Cash	BoxClass Box

Individual and Household Information: (BASELINE ONLY)				
1	How old are you?			
2	What is your gender?	Female=1	Male =2	
3	What is the highest degree or levels of school have you completed?	Less than high school =1	High school =2	College =3 Post-Bachelor's Degree (MA, Ph.D.) =4
4	What is your ethnicity?	Hispanic or Latino =1		
		American or Alaska Native =2		
		Asian =3		
		Black or African American =4		
		Native Hawaiian or Other Pacific Islander =5		
		White =6		
		Other (include biracial) = 7		
5	Do you speak a language other than English at home?	Yes = 1	No = 0 <If no skip to #6>	
5 (a)	If yes, what language?	<i>(language)</i>		

6	How many people live in your household?	Adults over 18 yrs. old <i>(count)</i>	Children under 18 yrs. old <i>(count)</i>
7	Which best describes you household income?	Below \$10,000 =1	
		\$10,000 - \$15,000 =2	
		\$15,000 - \$20,000 =3	
		\$20,000 - \$25,000 =4	
		\$25,000 - \$30,000 =5	
		\$30,000 - \$35,000 =6	
		\$35,000 - \$40,000 =7	
		\$40,000 - \$45,000 =8	
		Above \$45,000 =9	

Health Status (BASELINE ONLY)			
8	For which health condition(s) have you been diagnosed, treated, medicate, and/or monitored in the past 12 months?		
9	What is your current treatment status? <i>(multiple choice)</i>	Medication =1	
		Chemotherapy =2	
		Radiation =3	
		Other =4	<i>(Specify)</i>

Cooking Skills					
1	Indicate the extent to which you feel confident about performing each of the following activities				
	Not at all confident = 1	Not very confident = 2	Neutral =3	Confident =4	Extremely confident = 5
Using a knife to cut up fruit or chop vegetables					
Steaming/boiling/blanching vegetables					
Using a food processor to make dips, pastes, or sauces					
Using a measuring cup					
Using a blender to make smoothies or soups					
Frying things in a pan					
Baking things in the oven					
Following a recipe					
Making rice or other cooked grains or legumes from scratch					
Preparing fresh meat or fish					
Making a salad					
Making a simple pasta dish					
Cooking eggs					

Cooking Attitudes					
1	For each item below, indicate the extent to which you agree or disagree with the statement about cooking.				
	1	2	3	4	5
	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I enjoy cooking.					
Cooking meals is a good use of my time.					
Meals made at home are affordable.					
Making meals at home helps me to eat more healthfully.					
It is important to know how to cook.					
It is easy to prepare home cooked meals.					
I like trying new recipes.					
Planning a meal is difficult.					
Cooking takes too much time.					
I find cooking tiring.					

Food Acquisition and Preparation		
1	Where do you (or your household) do most of your food shopping?	
1 a)	What kind of store is it?	Supermarket =1
		Small grocery store =2
		Convenience store =3
		Corner store =4
		Discount or big box store (Target/Wal-Mart) =5
		Whole sale club (Costco/ Sam's Club) =6
		Other =6 (specify)
2	What are the main reasons for shopping at this store? (choose up to two)	Low prices =1
		Organic produce selection =2
		Meat department =3
		Variety of foods (general) =4
		Variety of special food (such as gluten free) =5
		Close to home =6
		Loyalty/frequent shopper program =7
		Other =6 (specify)
3	During the past 30 days, did you (or anyone in your household) go to a food pantry or food bank of groceries?	Yes = 1 No = 0
4	In the past 12 months, did you (or anyone in your household) receive benefits from the Food Stamp Program or SNAP (the Supplemental Nutrition Assistance Program)?	Yes = 1 No = 0
5	In the past 12 months, did you or any member of this household receive benefits from WIC or the School Lunch Program?	Yes = 1 No = 0
6	When in season, does your household have a vegetable garden?	Yes = 1 No = 0
7	When in season, do you ever get food from a Farmer's Market or farm stand?	Yes = 1 No = 0
8	In the past year, have you subscribed to a Community Supported Agriculture (CSA) program?	Yes = 1 No = 0

Food Sufficiency		
1	Which of these statements best describes the food eaten in your household during the last month (30 days)?	
	My family has <i>enough of the kinds of food we want to eat.</i>	Yes = 1 <If yes skip to the next section> No = 0
	My family has enough food, but <i>not always the kinds of food we want.</i>	Yes = 1 <If yes skip to #2> No = 0
	My family <i>sometimes does not have enough food to eat.</i>	Yes = 1 <If yes skip to #2> No = 0
	My family <i>often does not have enough food to eat.</i>	Yes = 1 <If yes skip to #2> No = 0
2	Here are some reasons why people don't always have enough to eat/don't always have the kinds of foods they want or need. For each one, please tell me if that is a reason why you don't/your household doesn't always have enough to eat/always have the kinds of food you want or need. <i>(Choose all that apply)</i>	I/we don't have enough money for food / the kinds of food I/we want to eat. =1
		There is not enough time for shopping or cooking. =2
		The store is too far away. =3
		I/we don't have transportation to get to the grocery store. =4
		I feel too sick to do grocery shopping. =5
		I am on a diet. =6
		I/we don't have a working stove available. =7
		I am not able to cook or eat because of health problems. =8
		The kind of food I/we want are not available in my neighborhood. =9
		Good quality food is not available in my neighborhood. =10

Diet			
1	What did you eat yesterday?		
Meal	Name/description of Food/Beverage (we will need to develop codes for these)	Where/how was the food prepared: Home cooked “mostly” from scratch =1 Home prepared from package/can/frozen food =2 Restaurant =3 Take out =4 Other =5	
Breakfast			
Morning Snack			
Lunch			
Afternoon Snack			
Dinner			
Evening Snack			
2	Was yesterday a typical day, in terms of your meals?	Yes = 1	No = 0
2(a)	If yesterday was not a typical eating day, why/what was different?	<i>(Long answer)</i>	

General Attitude Toward Food						
1	How important is eating healthy food to you?	Extremely Important =1				
		Very Important =2				
		Important =3				
		Not at all important =4				
2	How important is it to you to be able to buy the highest quality of food you can afford?	Extremely Important =1				
		Very Important =2				
		Important =3				
		Not at all important =4				
3	How did you spend the money you received for participation in this program?	Able to purchase more food than usual =1				
		Bought better quality food =2				
		Eat out at a restaurant =3				
		Bought cooking tools =4				
		Bought clothes =5				
		Paid my utilities =6				
		Bought cookbooks =7				
		Went to the movies or other entertainment +8				
Other =9						
4	For each of the statements below indicate the origin of where most of your meals came from when you were growing up:					
	1	2	3	4	5	6
	Always	Very Frequentl y	Half the Time	Less than Half the Time	Rarely	Never
	Mom or other family member home-cooking from scratch					
	Mom or other family member cooking from pre-prepared products:					
	Had Take-out:					
	Went to restaurants:					

Comments:

Appendix A

**CERES TRANSITION PROJECT
INITIAL REPORT**

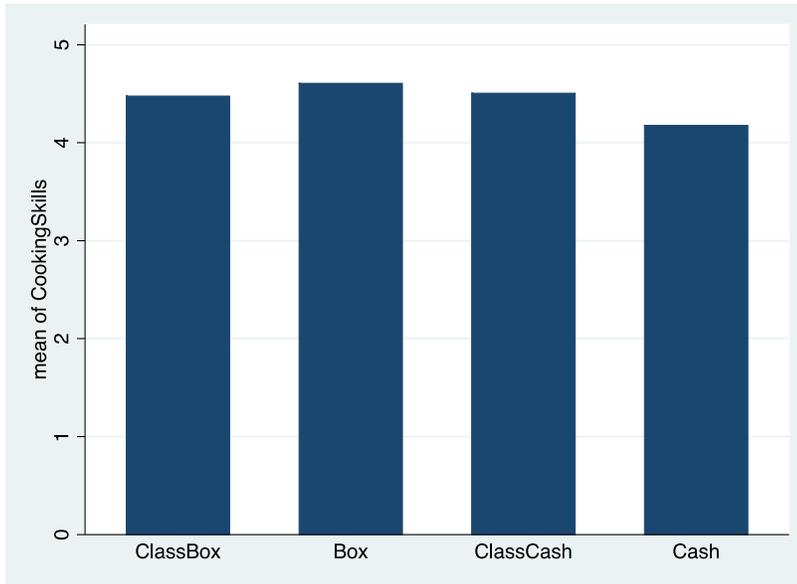
Tables

Table Subjects Characteristics

	All		Cash		ClassCash		Box		ClassBox	
	N	Mean (Std. Dev.)	N	Mean (Std. Dev.)	N	Mean (Std. Dev.)	N	Mean (Std. Dev.)	N	Mean (Std. Dev.)
Age	34	60.65 (12.31)	13	59.54 (9.37)	7	65.29 (8.71)	9	52.89 (15.60)	5	71.00 (8.66)
education	34	2.85 (0.82)	13	2.69 (1.03)	7	3.00 (0.82)	9	2.89 (0.60)	5	3.00 (0.71)
income	34	4.21 (2.35)	13	4.31 (1.84)	7	3.29 (2.06)	9	4.67 (3.16)	5	4.40 (2.61)
Medication	34	0.47 (0.51)	13	0.62 (0.51)	7	0.43 (0.53)	9	0.22 (0.44)	5	0.60 (0.55)
Chemotherapy	34	0.15 (0.36)	13	0.15 (0.38)	7	0.29 (0.49)	9	0.11 (0.33)	5	0.00 (0.00)
Radiation	34	0.03 (0.17)	13	0.00 (0.00)	7	0.00 (0.00)	9	0.11 (0.33)	5	0.00 (0.00)
Other	34	0.41 (0.50)	13	0.31 (0.48)	7	0.29 (0.49)	9	0.56 (0.53)	5	0.60 (0.55)

Appendix A

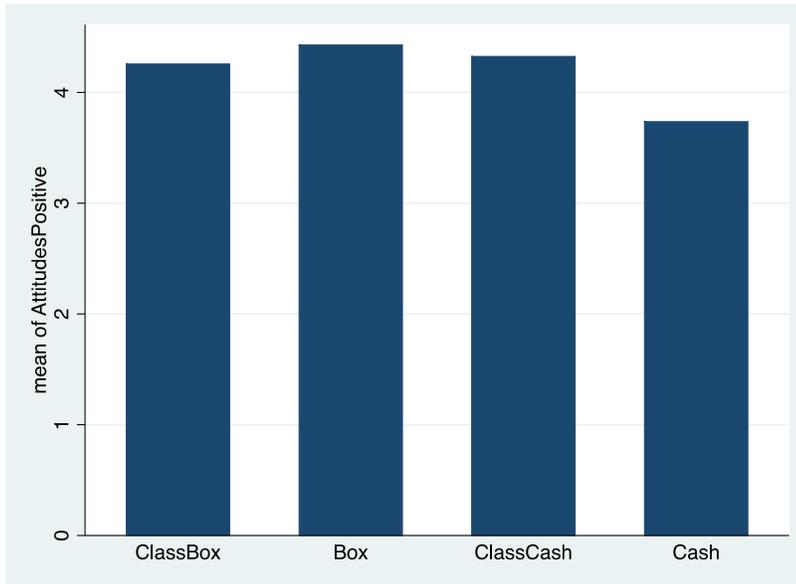
CookingSkills: average score across all 13 individual cooking skills



	N	All Mean (Std. Dev.)	Cash N Mean (Std. Dev.)	All Treatments N Mean (Std. Dev.)	Ho: diff = 0 p-value Pr(T > t) =	Ho: diff > 0 p-value Pr(T < t) =
CookingSkills	34	4.40 (0.58)	13 4.18 (0.22)	21 4.54 (0.08)	0.073	0.036

Appendix A

AttitudePositive: Average of the 7 positive attitudes



	N	All Mean (Std. Dev.)	Cash N Mean (Std. Dev.)	All Treatments N Mean (Std. Dev.)	Ho: diff = 0 p-value Pr(T > t) =	Ho: diff > 0 p-value Pr(T < t) =
AttitudesPositive	34	4.12 (0.64)	13 3.74 (0.19)	21 4.35 (0.11)	0.005	0.002

Appendix B - Capstone Competency Matrix

Appendix A. Competency matrix explaining which program competencies were satisfied and how each was achieved.	
Competency:	Method of Achievement:
6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels Planning and Management to Promote Health	I recruited participants into the research design that met specific economic parameters or annual income of < \$30,000/year. The demographic chosen is faced with particular challenge in eating healthy food and produce on severely restricted budgets. I provided education on strategies for find healthy food at reduced rates.
9. Design a population-based policy, program, project or intervention.	The Transition Program was designed to change the culture of food among low-income people suffering from chronic illness. The intent behind it was to change food habits through increased knowledge, self efficacy strategies, and tools to change behavior.
18. Select communication strategies for different audiences and sectors.	Despite not having a dedicated Spanish translator, I worked with Spanish speaking clients to determine interest in the research program we were offering. I suggested that for the subsequent cohort, that it was necessary to incorporate a plan for Spanish speaking clients which would include a bilingual research assistant, and instructor or interpreter who could attend classes, and translate documents. This situation had implications for the study itself as well as the success of future programs.
19. Communicate audience-appropriate public health content, both in writing and through oral presentation	I helped to create content in both written and oral form for the cooking and nutrition courses. We had roundtable discussions to provide examples and reinforce knowledge being reviewed in the course.
21. Perform effectively on interprofessional teams	During the project I worked with several members of a team including my preceptor, staff at Ceres, adult and teen kitchen volunteers, one educator and one chef. We exchanged multiple emails and stayed in constant contact collaborating on next steps throughout the field work position.

Appendix C - Fieldwork Time Log, Fieldwork Competencies and Objectives, Student Evaluation Form

Day	Activity	Time	Driving Time
3-Feb	mtg	1	
10-Feb	mtg sebastopol	2	2
22-Feb	mtg	1	
26-Feb	mtg USF	1	1
8-Mar	mtg	1	
17-Mar	mtg	1	
6-Apr	pre -calls	3	
8-Apr	pre- calls	3	
12-Apr	pre -calls	2	
14-Apr	pre -calls	1	
21-Apr	survey appts	2	
22-Apr	survey appts	3	
25-Apr	survey appts	3	
26-Apr	survey appts	3	
7-May	Class	6	2
10-May	Survey/emails	1	
12-May	Call Ruth Midi/Email	1	
19-May	Cash Calls/Survey	4	
17-May	Emails	1	
21-May	Class	7	2
24-May	Cash Calls	1	
26-May	Mtg with Thais	1	
25-May	Cash Calls	1	
31-May	Class 2 Report	2	
1-Jun	Survey Cash	1	
1-Jun	Calls for Cash Cohort	2	
3-Jun	Cash Calls	2	
4-Jun	Class 3	7	2
6-Jun	Mtg with Emily	1	
8-Jun	Emails	2	
16-Jun	mtg-wrap up	2	
17-Jun	Endline survey calls	2	
18-Jun	Endline survey calls	4	
22-Jun	Endline survey calls	3	
23-Jun	Veggie box call	4	
27-Jun	Veggie box call	5	
28-Jun	Veggie box call	4	
29-Jun	Veggie box call	3	
29-Jun	Emails	1	
29-Jun	Veggie/Cash group 2	2	
30-Jun	email	1	
30-Jun	Veggie/Cash group 2	2	
1-Jul	Veggie/Cash group 2	3	
4-Jul	Data entry	3	
15-Jul	Data entry	3	
4-Aug	Data entry	3	
Week 8/9	Cash Endline	10	
Week 8/16	ClassBox	12	
Week 8/23	ClassBox	10	
Week 8/30	Endline VegBox	10	
Aug	Emails	4	
24-Aug	Mtg with Thais	1	
25-Aug	Mtg Thais & Miranda	1	
Sept 7-13	Cash 3 endline	10	
Sept 27-29	Endline VegBox	10	
Sept Emails 45		5	
8-Oct	ClassBox 1	6	
	Report	3	
	Driving		2
22-Oct	ClassBox 2	6	
	Report	3	
	Driving		2
27-Oct	Endline Cash	10	
Oct. Emails 41		5	
5-Nov	ClassBox 3	6	
	Report	3	
	Driving		2
8-Nov	Endline ClassBox	10	
17-Nov	Wrap up Meeting	3	
	Driving		2
22-Mar	Mtg with Thais	1	
	Emails	2	
	Research Literature	20	
	Research Literature	20	
		283	17
Total Hours			300

Appendix C - Fieldwork Competencies**Goals & Objective of Fieldwork with The Ceres Project**

Goal: Implement and facilitate proposed Transition Program interventions to determine best approach to support Ceres clients resulting in the adoption of long term healthy eating habits resembling the Ceres philosophy or “Food as Medicine” model.

Based on Grant from the North Bay Cancer Alliance & Community Foundation Sonoma County – Blood Bank of the Redwoods Legacy Fund approved our proposal for increasing access to healthy foods and nutrition education for Sonoma County residents who have been diagnosed with cancer and who have household incomes below \$45,000. This project will include the following:

Fieldwork Learning Objectives:

1. Assist in the design of an intake survey tool

Activities: Reviewed existing nutrition surveys with RA and chose questions relating to our interventions. Collaborated on survey design with RA to discuss questions that needed more clarity and greater breadth of response options after trial round.

2. Initiate phone calls to get participants in the study

Activities: Made several rounds of cold calls to a variety of people to get participation. This proved to be one of the hardest tasks. Many required time to think about it and give follow up phone calls.

3. Administer intake surveys over the phone with each participant

Activities: Set up appointments for calls at appropriate times then executed the calls

4. Assist in creation of handbook

Activities: nutrition educator prepared Handbook materials. Reviewed material after the first class and proposed revisions. Collated materials and handed them out each week including check dispersal for the cash groups

5. Review class content

Activities: Meetings and emails to discuss content, class flow, feedback from participants, handouts, note taking on class content to be written in a post class report for team.

6. Participate in three classes (May-June)

Activities: Arrived early to participate in all areas of class, set-up, paperwork, tea/coffee,

consent forms, meal preparation, cleanup, kitchen assistance, class assistance

7. Assist with post surveys (either in person at last class, by phone the week after the last class, or follow-up after surveys are sent in last CSA bag)

Activities: Post-surveys handled for each group the same way as the participant solicitation, intake survey. Appointments were created at appropriate times for participant and then executed. Assisted with a fair bit of data entry until that was taken over by an RA in Economics Dept.

8. Provide feedback about entire program to improve future versions

Activities: Attended several meetings throughout the program either in person or on conference call. Final meeting held at the Ceres Project Sebastopol with all parties included.

Responsible Parties:

Meghan Adelman, RN, BSN – Program Facilitator
Thais Harris, NC – Preceptor
Cathryn Couch – Founder
Elizabeth Katz – Economics Professor USF, Principal Investigator
Alessandra Cassar – Economics Professor USF, Principal Investigator
2 Research Assistants from Economics department

Tracking measures:

Emails, regular meetings and assignment calendars provided by Thais Harris, NC
Excel spreadsheet (included) to track hours/time allocated

Appendix C - Student evaluation form of Fieldwork Experience



**Master of Public Health Program
Student Evaluation of Field Experience**

Student Information	
Student's Name: Meghan Adelman	Campus ID #
Student's Phone: 415-328-2314	Student's Email: meg@navitasorganics.com
Preceptor Information	
Preceptor's Name: Thais Harris	Preceptor's Title: NC
Preceptor's Phone: 707.829.5833	Preceptor's Email: thais@ceresproject.org
Organization: The Ceres Project	
Student's Start Date: 2/3/2016	Student's End Date: Hours/week: 3/22/17

Please use the following key to respond to the statements listed below.

SA = Strongly Agree A = Agree D = Disagree SD = Strongly Disagree N/A = Not Applicable

My Field Experience...	SA	A	D	SD	N/A
Contributed to the development of my specific career interests	SA	A	D	SD	N/A
Provided me with the opportunity to carry out my field learning objective activities	SA	A	D	SD	N/A
Provided the opportunity to use skills obtained in MPH classes	SA	A	D	SD	N/A
Required skills I did not have Please list:	SA	A	D	SD	N/A
Required skills I have but did not gain in the MPH program Please list:	SA	A	D	SD	N/A
Added new information and/or skills to my graduate education Please list:	SA	A	D	SD	N/A
Challenged me to work at my highest level	SA	A	D	SD	N/A
Served as a valuable learning experience in public health practice	SA	A	D	SD	N/A
I would recommend this agency to others for future field experiences.	Yes			NO	
My preceptor...	SA	A	D	SD	N/A
Was valuable in enabling me to achieve my field learning objectives	SA	A	D	SD	N/A
Was accessible to me	SA	A	D	SD	N/A
Initiated communication relevant to my special assignment that he/she considered of interest to me	SA	A	D	SD	N/A
Initiated communication with me relevant to general functions of the agency	SA	A	D	SD	N/A

2. Would you recommend this preceptor for future field experiences? Please explain.

Yes No Unsure

3. Please provide additional comments explaining any of your responses.

4. **Summary Report:** All students are required to prepare a written summary of the field work to be submitted with this evaluation form.

Student Signature Meghan Adelman 5/7/17 Date