

For the spice study, diets have been generated to mimic the average American diet while incorporating 22 common spices consumed in America. Spices have been of great interest for my research team as prior studies have found increased consumption to correlate with better health status. The study is composed of three feeding periods that last four weeks with a cycle menu of seven days. These three feeding periods include: 1. A diet with a minimal amount of spices, 2. A diet with the average amount of spice consumed in the United States, and 3. a diet with three times the spices consumed on average in America. Each period lasts for four consecutive weeks with a two week break period between periods. The goal of the study was to assess how affective spices were on changing cardiovascular disease risk factors, inflammation, and oxidative stress of those who participated. Diet satisfaction was also measured to determine the effectiveness spice has on satiety after a meal.

The participants were found for the study by calling those from previous studies, distributing flyers throughout campus, and writing about the study in local papers. Those who were admitted to the study must be overweight or obese with a BMI falling between a range of 25-35 kg/m<sup>2</sup>. The participants are all between the ages of 30 and 75 years with at least three health factors that establish they have metabolic syndrome. If a person is interested in participating, they will go through a screening process. If this process goes as planned, they will then have a counseling session with my preceptor, Amy Ciccarella, a registered dietitian. During this session, she discusses the food aspect of the study to ensure that they fully understand what is expected. She asks questions such as how they can be contacted and when they would

like to pick up their food. The participants are also informed that as a controlled feeding study, they must consume all of the food given to them with limited alterations. They will then sign a consent form to officially enter the study.

Meals distributed are made in the metabolic kitchen component of the laboratory. The research assistants and cooks prepare complex recipes to discretely incorporate the spices needed in the diet. An example of a recipe is spiced banana bread muffins. This recipe has the same ingredients, however, the spice levels change depending on the feeding period the participant is in. Food itself is measured by the tenth of a gram and the spices are measured by the hundredth decimal point. All diets were designed using NDSR software to ensure that participants are consuming diets completely matched in micronutrients, macronutrients, and calories. The participants are weighed daily to ensure that the diet continues to meet the calorie needs for each individual.

At the beginning and end of feeding periods, the effect of spice consumption on vascular health is measured via flow mediated dilation. Flow mediated dilation occurs as our participants lay in a bed relaxed while the process facilitates the release of vasodilators to relax the arteries. A specialist that is employed outside of the study comes on specific days to perform this procedure. So far, the results have been showing that participants who eat a meal high in spice do not experience a narrower artery even if their meal is high in fat. This is interesting because a meal high in fat with a minimal amount of spice has resulted in a narrowed artery so far.

An additional measurement we document for the study is the arterial stiffness in our participants. Arterial stiffness is determined by using pulse wave velocity. The staff uses pulse wave velocity by measuring the flow of blood from the shoulder to leg. This process is timed to determine how long it takes for the blood to travel. Aortic blood pressure is also measured since clinical studies have previously proven this to be an effective in determining risk factors for a stroke. The arterial stiffness and aortic blood pressure are both ultimately used to measure risk factors for a stroke. So far, both aortic blood pressure and arterial stiffness are reduced when the participant is in a feeding period that is high in spices.

Diet satisfaction has been measured as well. This has been measured as there was prior research that herbs and spices might make participants more satisfied and likely to consume all the food given in a controlled feeding. The metabolic kitchen distributes a questionnaire that covers food satisfaction at the end of every week along with the food for the study. Any food that is not consumed during the study is also made note of, as it would indicate non-compliance. This non-compliance is not only important to know for measurements, but could also be related to satiety of the spice level. This data is used to compare feedback from the participant between different levels of spices.