

Observational Causal Inference: Whole Grains Prevent Type 2 Diabetes

By Adam Yang

On September 5, 2018, sciencedaily.com posted an article titled, “Whole grains one of the most important food groups for preventing type 2 diabetes”. The article reports that according to researchers at Chalmers University of Technology in Sweden, “It doesn't matter if it's rye, oats, or wheat... As long as it is wholegrain, it can prevent type 2 diabetes” (Chalmers). According to the article, there have been many existing studies that show that whole grains consumption is beneficial in preventing type 2 diabetes. However, the researches wanted to build upon this knowledge by studying whether different types of whole grain would prevent types 2 diabetes with significantly different levels of effectiveness. Therefore, “the study was conducted in Denmark, where there is a big variation in wholegrain-intake” (Chalmers).

The data used for this study was obtained from the Danish Cancer Society Research Center, which consisted of 55,000 participants between the ages of 50 to 65 when the data was first collected. Each of these participants would fill out detailed forms of their eating habits, from which the researchers were able to determine their total whole grains intake per day as well as which type of whole grains they consumed the most. This data was then linked with Denmark's national diabetes register, to figure out which participants developed type 2 diabetes within the next 15 years. The researchers concluded that there is no significant difference between the different types of whole grains in preventing type 2 diabetes. According to the article, “the participants were [also] divided into 4 different groups, based on how much wholegrain they reported eating.” (Chalmers). From this, they found that the group with the highest whole grain consumption, also had the smallest proportion of subjects that developed type 2 diabetes. This proportion “increased for each group which had eaten less wholegrain” (Chalmers). Furthermore, “in the group with the highest wholegrain intake, the diabetes risk was 34 percent lower for men, and 22 percent lower for women, than in the group with the lowest wholegrain intake.” (Chalmers).

The article was written in a way that implies that there is a strong causation between eating whole grains and not getting type 2 diabetes based on the results obtained from observational data. However, without running an experiment with random assignment on which candidates would eat certain amounts of whole grains, these claims should be considered overzealous. Among all the unobserved biases that can be present in this study, the selection bias of the assignment groups is the most obvious. Because the researchers were working with observational data, the subjects were self-selected into the four groups of how much whole grains they eat. It is very possible that the subjects who are more conscious of their health would end up eating more whole grains than their counterparts. These health-conscious subjects may also be consuming less junk food, soda, and red meats while exercising more to stay fit. Therefore, the effect of consuming more whole grains to prevent diabetes is possibly overestimated without considering the omitted variable bias of “health consciousness”.

To make the causal claim reported in the article, there are certain assumptions that the researchers need to believe. As mentioned above, it must be assumed that the only varying difference between the subjects is the amount and types of whole grains they consume. Or in more specific terms, we must assume that the groups that consume more whole grains do not also share a common factor (such as being more health conscious) that would also influence the likelihood of developing type 2 diabetes. Other assumptions that had to be made is that the participants filled out their forms honestly. It is possible that subjects who are less health conscious might exaggerate the healthiness of what they eat and therefore underestimate the correlation. Furthermore, the researchers need to assume that the dietary habits of the subjects remained constant. It is possible that healthy eaters become more health conscious over time and unhealthy eaters become less health conscious over time. The opposite can also be true in both cases and change in eating over the 15 years may add considerable noise to the results.

One thing that the article did not go into much detail about is the effect that different types of whole grains has in preventing type 2 diabetes. It mentioned that there didn't seem to be a significant difference between the whole grain types but didn't explain how the data was analyzed. It is more than likely that most people are not limiting themselves to consuming only one type of whole grain in those 15 years, so it isn't clear how the researchers can conclude that different types of whole gains prevent diabetes by the same amount. In a perfect experiment we would randomly assign groups of people to consume x amount of y type of whole grain. The x variable can be 4 groups (or more) where one group eats no whole grains, and the other groups eat 25 grams, 50 grams, and 75 grams of whole grain a day. The y variable would dictate the types of whole grain each group would eat such as rye, oats, or wheats. None of the groups should eat any other type of whole grain than what was assigned to them. The subjects should be around the age of 50 or 60 years old and none of them should have type 2 diabetes. Having a large sample size for each group and running the experiment for 15 years and then observing which participants developed type 2 diabetes and which did not, should provide a decent causal understanding of how consuming different amounts of different types of whole grains would help prevent type 2 diabetes. However, this experiment would still have flaws because we do not have any control of the subjects prior to their participation in this study. It is possible that what they eat in their teens can still play a role in developing type two diabetes in their older years. To push this ethics of this experiment into the extremes, the subjects can be babies selected at random and being fed the same type and amount of whole grain for their entire lives. In this case, we are stretching the 15-year study into a lifelong study to get an even more reliable experiment.

Works Cited:

Chalmers University of Technology. "Whole grains one of the most important food groups for preventing type 2 diabetes." ScienceDaily. ScienceDaily, 5 September 2018. <www.sciencedaily.com/releases/2018/09/180905083910.htm>.