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Professor Klein

WRTC 358 Assignment 4

The Ins and Outs of Kids and Fiber

"Eat your [insert some collection of healthy food here]; they're good for you!"

For many people, this phrase is pretty familiar. Whether you heard it at the dining room table, in health class, or on TV, most Americans today have either grown up or are still growing up bombarded by foods that "are good for us."

But do we (as American adults and children) really eat them? Or do we hide our peas in the sugar bowl and hope desperately that mom doesn't find out? And while we're at it, just how important are those fruits, vegetables and "high-fiber foods"? Do we actually need them?

Researchers have completed many studies analyzing the food that adults consume. They have decided how much of certain nutrients adults should eat daily and study whether or not they actually reach the recommended amounts and why that is. However, until recently, there were not many studies exploring the effect that food, specifically high-fiber diets, has on children.

In 2012, Mary Brauchla, a graduate student at Purdue University, and her team of researchers published an article in the *Journal of Nutrition and Metabolism* analyzing how much dietary fiber children between the ages of two and eighteen received on a daily basis. Brauchla also looked at how the children consume fiber, and how the amount of dietary fiber affected their overall health.

Dietary fiber comes from fruits, vegetables, whole grains, and legumes (chickpeas, nuts, beans, peas, lentils, etc.) and helps our digestive tract to run smoothly. There may be additional health benefits to high-fiber diets such as the ability to fight disease and a healthy weight.

Brauchla and her team found in their study of 4,755 American children across various race and income levels that most children only consume an average of 6.4 grams of dietary fiber for every 1000 food calories they eat. Since the Dietary Reference Intake recommends at least fourteen grams of fiber per 1000 food calories (close to twenty-five grams per day) for Americans who are at least two years old, most children are receiving less than half of the suggested amount.

So what is this lack of nutrients doing to their bodies?

Brauchla and the other researchers noticed that children who ate less fiber were more likely to be overweight, either currently or in the future. Eating less fiber also makes it more difficult for their bodies to regulate the amount of glucose (sugar) within their blood, putting them at a greater risk for Type II diabetes and other noninfectious diseases such as heart disease, stroke, obesity, and cancer.

More studies show additional explanation for the benefits of diets with a higher amount of dietary fiber. Nutrition researcher Dr. Carlotta De Filippo and her team compared the diets of fourteen children in Burkina Faso, Africa to the diets of fifteen children in Florence, Italy. All of them were between the ages of one and six and ate normal diets that represented the rest of their population for that age group.

The African children lived in a rural area and ate a lot of locally grown plant-based foods such as porridge made from millet grain (called Tô), black-eyed peas (called Niébé),

and vegetables. Occasionally, they ate chicken or termites, but overall their diet was low in animal protein and fat and very high in fiber and plant protein. On average, the children under two ate about ten grams of fiber and 672.2 food calories per day, and the kids two and older consumed 14.2 grams of fiber and 996 food calories per day.

In contrast, the European kids subsisted off meat and sugar-based foods. Their diet was high in animal protein and fat and very low in fiber. They ate about half as much of the amount of fiber as the African kids, but twice as many calories. Clearly, the difference in diet affected the kinds of nutrients and amount of energy that the children received, so the scientists investigated the way that this difference affected their bodily functions.

In order to determine which group was healthier, the scientists analyzed the kinds of bacteria that they had in their stomachs. Due to their high-fiber diet, the African children had a higher portion of Bacteroidetes (one type of bacteria), whereas the European kids had a higher concentration of Firmicutes (another type of bacteria) due to their high-calorie but low-fiber diet. Bacteroidetes improve digestion and help prevent noninfectious diseases. Even though they are eating fewer calories, the high-fiber foods help the African kids maximize their energy intake.

De Filippo explained that scientists have noticed that when people lose weight because they are eating fewer (but better quality) calories, the amount of Firmicutes lessens, decreasing the ratio between Bacteroidetes and Firmicutes in their gut. This leads them to believe that the European kids have a higher risk of obesity and further proves the correlation between high-fiber diets and better bacteria.

Not only does fiber help prevent us from becoming obese, but it also keeps our bodies functioning well. Director of sports and nutrition at Michigan State University, Dr.

Joseph J. Carlson and his team studied just how much high-fiber diets decreased children's risk factors for noninfectious diseases. They lumped these risk factors together into one term called the metabolic syndrome, which assesses the rate at which one is likely to have a noninfectious disease.

Carlson and the other researchers analyzed the diet of 2128 American teenagers, between the ages of twelve and nineteen. They focused on the portion of the food that they could categorize as dietary fiber and put them into five groups based on how much of it they ate. In order to measure whether they had metabolic syndrome or not, they measured waist circumference and blood pressure and collected a blood sample.

Children who ate larger portions of dietary fiber from plant-based foods, such as fruits, vegetables, whole grains, nuts, and seeds, tended to have smaller waist circumferences and a lower body mass index. However, over seventy per cent of the participants had at least one cardiovascular risk factor, making them eligible for metabolic syndrome. When Carlson compared the prevalence of metabolic syndrome to the amount of dietary fiber that the teenagers ate, he noticed that it decreased by an average of twenty per cent for each group that had a larger proportion of fiber in their diets. He also analyzed the amount of saturated fat and cholesterol that the teenagers consumed and found that it did not have the same inverse association effect on metabolic syndrome. In fact, they seemed to have no effect on metabolic syndrome, which further proves that dietary fiber plays a major role in children's health.

In order to decrease metabolic syndrome, Carlson encourages parents simply to tell their children to eat more foods with dietary fiber without giving them any reasoning behind it. He cautions them not to tell kids that certain foods are good or bad for them,

because it would give them an opportunity to rebel. Getting into a routine of eating normal, healthy food (even without necessarily knowing that it is healthy) will clearly benefit kids as they grow into adults.

So what needs to change in order to help kids eat more fiber?

Nutrition epidemiologist Dr. Sibylle Kranz (with help from Brauchla and the rest of her team) completed a study at an elementary school in northwestern Indiana evaluating the diet of sixty-nine children between the ages of seven and eleven. The kids ate two snacks each day, so the researchers broke the kids into two groups and gave the kids in the intervention group snacks high in fiber and the control group kids ate their normal snacks. At every snack period, they gave the intervention group milk and let them choose between two of the fiber snacks, which varied among breakfast cereals, breads, crackers and cereal bars. They all contained between three and nine grams of fiber and some had added sugar. Some of the children would eat all of the snacks, but others only ate small portions or none at all.

The study lasted eight weeks, and the researchers had the children recall their diets half way through the study. Even at four weeks, they noticed a difference in the amounts of fiber that the children had; the children in the intervention group were consuming between ten and twelve grams of fiber per day. While this amount is still much lower than the recommended amount, it is almost twice as much as the kids in Brauchla's earlier study. Kranz's findings show that in order to eat the proper amount of fiber, kids will need to eat it in most of their meals.

Nutrition scientist Carla R. McGill also realizes this point in her article on the amount of grapes and grape products that children and adults eat. She noted that those

who ate more grapes, tended to be healthier and had better levels of fiber and necessary vitamins, but they still didn't have as much as they should.

Reaching the correct amount of fiber means that we have to switch from mainly eating many sugary foods filled with empty calories to more plant-based foods, but these studies encourage us that the benefits are worth it. Furthermore, the earlier that kids start eating high-fiber diets, the more they will see high-fiber foods as normal, helping them to create a healthy lifestyle. Making these changes may be a slow process, but it is one that will pay off eventually. In the meantime, there will still be plenty of kids arguing with their mothers about how many "green things" they will eat.

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